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**A WEB-BASED POSITIVE PSYCHOLOGY INTERVENTION TO PROMOTE**

**WELL-BEING IN PREGNANT WOMEN**

TESIS DOCTORAL

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# Resumen

## Introducción

El embarazo es una época de cambios, un periodo de la vida que representa el inicio de un nuevo rol para las mujeres de todas las edades. Existe un amplio consenso sobre el papel del estado psicológico materno en la influencia que ejerce sobre el desarrollo del feto, el curso del embarazo y la salud física y psicológica, tanto de la madre como del bebé.

La naturaleza, incidencia y las consecuencias perjudiciales del bajo bienestar psicológico materno durante el embarazo han sido ampliamente examinadas y documentadas (e.g., Agius, Xuereb, Carrick-Sen, Sultana y Rankin, 2016; Staneva, Bogossian y Wittkowski, 2015). Un pobre bienestar materno se caracteriza típicamente por bajos niveles de afecto positivo, autoestima y satisfacción con la vida; también se caracteriza por altos niveles de depresión, ansiedad y estrés (Delle Fave, Pozzo, Bassi, y Cetin, 2013; DiPietro, Ghera, Costigan y Hawkins, 2004; Dunkel Schetter, 2011; Matvienko-Sikar, y Dockray, 2017). El bajo bienestar prenatal puede tener consecuencias negativas a nivel físico y psicológico, como depresión pre- y post-parto (e.g., Osborne y Monk, 2013; Robertson, Grace, Wallington y Stewart, 2004), complicaciones en el embarazo (e.g., Andersson, Sundström-Poromaa, Wulff, Åström y Bixo, 2004), parto prematuro y bajo peso al nacer (e.g., Dunkel Schetter, 2011), y también problemas neurocognitivos y socioemocionales relacionados con el desarrollo del bebé (e.g., Goodman, Brogan, Lynch y Fielding, 1993; Huizink, Robles de Medina, Mulder, Visser y Buitelaar, 2003; O'connor, Heron, Golding y Glover, 2003).

Recientemente, la Organización Mundial de la Salud (OMS, 2016) destacó la prioridad de ampliar el concepto de salud más allá de la ausencia de enfermedad, adoptando una perspectiva que mejore y fortalezca la salud, tanto física como psicológica (OMS, 2016). Concretamente, respecto al cuidado prenatal, la OMS acuñó el concepto de "experiencia positiva de embarazo", que incluye no sólo el tratamiento de enfermedades, sino también la educación sanitaria y la promoción de la salud (OMS, 2016). Este cambio desde el enfoque del tratamiento de trastornos hasta el enfoque de la prevención y promoción de la salud es apoyado por el campo emergente de la psicología positiva.

La Psicología Positiva es el estudio científico del funcionamiento y promoción del "florecimiento humano", y tiene como objetivo identificar y promover los factores que permiten que las personas y las comunidades prosperen (Seligman y Csikszentmihalyi, 2000, 2014). Muchos estudios realizados en este campo han analizado los beneficios de las intervenciones positivas ("Positive Psychology Interventions", PPIs; Lyubomirsky, 2008). Según Lyubomirsky (2008), las PPIs son actividades "dirigidas a incrementar sentimientos positivos, comportamientos positivos o cogniciones positivas, en contraposición a mejorar la patología o cambiar pensamientos negativos de patrones de comportamiento desadaptativos" (p.469). Las PPI ayudan a construir y mejorar las fortalezas personales, promover las emociones positivas y el sentido en la vida (e.g., Schueller, y Seligman, 2010; Sin, y Lyubomirsky, 2009). Además, el aumento y promoción de estos recursos positivos pueden contrarrestar los síntomas negativos y los trastornos psicológicos, y pueden amortiguar posibles recaídas futuras (e.g., Bolier, Haverman, Westerhof, Riper, Smit, y Bohlmeijer, 2013; Hone, Jarden, y Schofield, 2015; Sin, y Lyubomirsky, 2009). Recientemente, en el campo de la

psicología positiva, algunos estudios pioneros han estado investigando sobre los beneficios de los recursos psicosociales y de los factores protectores que pueden influir en el curso del embarazo y postparto.

Los primeros resultados prometedores, desde esta nueva perspectiva positiva, han demostrado la importancia de cultivar el afecto positivo de las mujeres durante el embarazo. Estudios recientes han demostrado que el afecto positivo prenatal de la mujer es un factor protector contra la depresión posparto, al contrario, el afecto negativo constituye un factor de predicción de este trastorno (Bos y coll., 2013). También se encontró que el afecto materno positivo está asociado con la duración de la gestación y la disminución del riesgo de parto prematuro (Voellmin, Entringer, Moog, Wadhwa, y Buss, 2013). Además, los sentimientos positivos prenatales de las mujeres embarazadas tienen amplios efectos porque se ha demostrado que están asociados con mejores prácticas de alimentación y estos hábitos alimenticios se han asociado con menos enfermedades infantiles comunes (McManus, Khalessi, Lin, Ashraf, y Reich, 2017). El optimismo prenatal también ha demostrado desempeñar un papel protector en el bienestar psicológico posparto (Grote, y Bledsoe, 2007). Por otra parte, los resultados muestran que las mujeres embarazadas optimistas son más propensas a participar en comportamientos saludables (Dunkel Schetter, 2011) y se adaptan mejor a las dificultades y al estrés que las mujeres pesimistas (Dunkel Schetter, 2011; Lobel, Yali, Zhu, DeVincent, y Meyer, 2002).

El apoyo social prenatal recibido ha sido ampliamente estudiado. Varios estudios apuntan a una asociación entre el apoyo social percibido y una reducción de la ansiedad, la depresión prenatal y postparto, la angustia y la incertidumbre, así como un mayor sentido de

control sobre los cambios relacionados con el embarazo, una mejor imagen de sí mismo y una mejor salud (Giurgescu, Penckofer, Maurer, y Bryant, 2006). De hecho, el apoyo social percibido también se ha asociado con un movimiento fetal más óptimo (Dunkel Schetter, 2011), un menor riesgo de parto prematuro (Dejin-Karlsson, Hanson, Östergren, Lindgren, Sjöberg, y Marsal, 2000; Pryor y coll., 2003), un mejor proceso de parto (Collins, Dunkel Schetter, Lobel, y Scrimshaw, 1993) y un mayor peso al nacer (Feldman, Dunkel Schetter, Sandman, y Wadhwa, 2000; Hedegaard, Henriksen, Secher, Hatch, y Sabroe, 1996).

En resumen, los efectos positivos del optimismo, el afecto materno positivo, las experiencias de vida positivas, el apoyo social percibido y la atención plena pueden ser factores que previenen síntomas depresivos, estrés percibido y riesgo de parto prematuro y promueven mejores prácticas de alimentación con el recién nacido (e.g., Matvienko-Sikar y Dockray, 2017; McManus y cols., 2017; Pluess y cols., 2012; Voellmin y cols., 2013).

Además, recientemente algunos estudio han demostrado que el uso de las tecnologías de la información y comunicación (TICs) pueden ser una herramienta eficaz para la implementación de intervenciones psicológicas dirigidas a mujeres embarazadas (e.g., Ashford, Olander y Ayers, 2016; Lee, Denison, Hor y Reynolds, 2016). Las mujeres pueden acceder a los contenidos web de una intervención con un coste mínimo, cuando y donde sea más conveniente para ellas. Estas ventajas pueden ser particularmente adecuadas para las mujeres embarazadas, teniendo en cuenta las exigencias del embarazo y la preparación para la llegada de un nuevo bebé (Ashford y coll., 2016). La evidencia preliminar sugiere que las intervenciones psicológicas positivas online (OPPIs) pueden mejorar efectivamente el bienestar y reducir los síntomas depresivos (Bolier y Abello, 2014; Mitchell, Vella Brodrick y

Klein, 2010) pero, a juicio de los autores, la eficacia de las OPPIs para mujeres embarazadas no ha sido investigada en profundidad.

El objetivo principal de esta tesis doctoral fue diseñar, desarrollar, implementar y evaluar la viabilidad, aceptación y beneficios potenciales de una intervención online de psicología positiva (“Embarazo y Bienestar”), totalmente auto-aplicada, para promover el bienestar mental en mujeres embarazadas.

## Metodología y Resultados

Inicialmente, se llevó a cabo una revisión narrativa de la literatura científica para identificar y analizar el estado actual de las intervenciones de psicología positiva dirigidas a mujeres embarazadas (Corno, Espinoza, y Baños, en revisión). El **Capítulo 2** de esta tesis doctoral presenta una revisión narrativa de las PPIs, dirigidas a mejorar el bienestar mental de las mujeres durante el período perinatal. Se realizó una búsqueda sistemática en cuatro bases de datos online, en combinación con una búsqueda manuales de listas de referencias. Se incluyeron estudios publicados entre el año 2000 y 2017 sobre intervenciones de salud mental que incluyen, al menos, una PPI dirigida a mujeres durante el período perinatal.

Se identificaron y revisaron críticamente dos programas de intervención. Ambas intervenciones utilizaban el formato online, y la gratitud era la PPI común a ambas. Los resultados preliminares de la intervención basada en la gratitud y la atención plena mostraron posibles efectos directos sobre el estrés auto-informado y el estrés fisiológico. Los estudios encontrados indican que las intervenciones positivas tempranas durante el embarazo desarrollan un impacto positivo en el bienestar físico y psicológico, tanto en el embarazo como



en el posparto. En resumen, la revisión narrativa presentada en el Capítulo 2 ha sintetizado los primeros estudios prometedores a raíz de un nuevo modelo de intervenciones positivas dirigidas a maximizar y apoyar el bienestar de las mujeres durante el período perinatal. Sin embargo, los resultados de esta revisión narrativa muestran como la investigación en este campo todavía es muy pobre y es necesaria mucha más investigación para establecer la eficacia y la eficiencia de las PPIs en el contexto del embarazo. Este estudio ha sido enviado en formato de artículo a la revista *Midwifery* y está actualmente en revisión.

Utilizando los resultados prometedores de la revisión narrativa como punto de partida, procedimos a diseñar “*Embarazo y Bienestar*”, una intervención de psicología positiva online dirigida a apoyar y fomentar el bienestar mental de las mujeres embarazadas. *Embarazo y Bienestar* es un programa de 5 semanas de duración, que consta de cuatro módulos de intervención, un módulo de bienvenida y una página final de resumen. Cada módulo incluye una breve unidad de psicoeducación enfocada en un área psicológica positiva y unas PPIs. Las PPIs propuestas en *Embarazo y Bienestar* ya han sido utilizadas e investigadas en estudios previos (e.g., Lyubomirsky y Layous, 2013, Schueller y Parks, 2014, Layous, Nelson, Lyubomirsky, 2013, Bolier y coll., 2013).

Las intervenciones incluidas en *Embarazo y Bienestar* se pueden clasificar en cuatro categorías principales: atención plena/mindfulness (ejercicio de “escaneo corporal”), saboreo (los ejercicios de “saborear el momento” y “las tres cosas buenas en de la vida”), relaciones sociales positivas y gratitud (ejercicio de “conectividad”) y optimismo y significado en la vida (ejercicios “el mejor yo posible” y “los pequeños pasos”). Hemos adaptado específicamente las PPIs al contexto del embarazo. Además, se adjuntaron diferentes elementos interactivos,

como videos, sonidos e imágenes, para aumentar el compromiso y la adherencia al programa.

*Embarazo y Bienestar* ha sido desarrollado usando la plataforma web Wix (<http://www.wix.com/>).

Las participantes pueden acceder a la web a través de un ordenador, una tableta o un teléfono inteligente, y pueden acceder a los contenidos web en cualquier lugar y a su propio ritmo. El programa de intervención diseñado es completamente auto-aplicado y está disponible en 6 idiomas: castellano, inglés, portugués (Brasil), alemán, holandés e italiano.

En el **Capítulo 3** de esta tesis se propuso evaluar la efectividad de *Embarazo y Bienestar* a través de un ensayo controlado aleatorio con asignación al azar restringida - con el fin de controlar la varianza relacionada con el trimestre de embarazo - y los resultados se comparan con un grupo en lista de espera (grupo control) (Corno y cols., en revisión). Las participantes serán evaluadas en tres momentos: antes de la intervención, después de la intervención y en el seguimiento de 5 semanas. Las variables de resultado incluirían: el bienestar mental, la depresión, la ansiedad relacionada con el embarazo y otras variables relevantes. Este estudio ha sido enviado en formato de artículo a la revista *BMC Pregnancy and Childbirth* y está actualmente en revisión.

Decidimos probar la eficacia del programa *Embarazo y Bienestar* en una pequeña muestra de mujeres embarazadas (N = 6). En el capítulo 4, se presentan los resultados de un estudio de casos realizado con 4 mujeres embarazadas de habla hispana y 2 de habla alemana (Corno y cols., 2017). Las seis mujeres embarazadas participaron en la intervención positiva, la cual tenía una duración de 5 semanas. Cada semana, las participantes fueron contactadas

por correo electrónico y se les pidió realizar una breve evaluación, al final de la cual encontraron el hipervínculo para acceder al siguiente módulo. Al final del último módulo, las participantes recibieron un hipervínculo por correo electrónico para completar la evaluación final. El entrenamiento fue realizado a distancia, mediante plataforma web y correo electrónico. No hubo contacto directo con las participantes en ningún momento.

Los niveles de bienestar mental, depresión, ansiedad relacionada con el embarazo, satisfacción con la vida y apoyo social percibido se midieron en dos momentos: la pre-intervención y la post-intervención. La adherencia a la intervención y la preferencia de los ejercicios también se evaluaron en la post-intervención. Además, 6 ítems relacionados con el bienestar psicológico fueron evaluados semanalmente.

Los resultados mostraron efectos de la intervención en apoyar el bienestar mental prenatal de las mujeres y en la disminución de la sintomatología depresiva. Sin embargo, estos resultados no son concluyentes. Se necesitan estudios futuros controlados para evaluar la viabilidad y los efectos de la intervención en una población más amplia de mujeres embarazadas y compararlos con una condición control o lista de espera. Este estudio ha sido publicado en formato de artículo en la revista indexada *Women and Birth*.

Una de las fortalezas de las intervenciones online es la posibilidad de alcanzar un número consistente de participantes, con o sin un costo mínimo. Por lo tanto, con el fin de implementar la intervención en Italia, hemos realizado dos estudios con el objetivo de validar en italiano dos cuestionarios que incluimos en el protocolo de evaluación de la intervención (Capítulo 3). Específicamente, hemos realizados dos estudios, con el fin de evaluar si la Scale

of Positive and Negative Experiences (SPANE, Diener y cols., 2010) y el Subjective Probability Task (SPT, MacLeod, Byrne y Valentine, 1996) eran instrumentos confiables y válidos para evaluar - respectivamente - el efecto positivo y negativo y el pensamiento dirigido hacia el futuro entre la población italiana.

El **Capítulo 5** presenta el estudio de validación del SPT (MacLeod y cols., 1996) entre una muestra general de habla italiana (N = 345) (Corno, Molinari, y Baños, 2017). El SPT ha sido diseñado para evaluar las expectativas positivas y negativas de las personas hacia el futuro (MacLeod y cols., 1996). El cuestionario consta de 30 ítems divididos en dos sub-escalas: una con 20 ítems referidos a expectativas negativas y la otra con 10 ítems referidos a expectativas positivas. Los resultados del estudio demostraron que la versión italiana del SPT tiene buenas propiedades psicométricas y es un instrumento fiable para evaluar el pensamiento dirigido hacia el futuro. La sub-escala negativa y positiva de la versión italiana del SPT mostraron una buena consistencia interna:  $\alpha = .92$  y  $\alpha = .85$ , respectivamente. Además, nuestros hallazgos confirmaron el papel de las expectativas futuras como correlatos cognitivos de la depresión y la ansiedad (Clark y Watson, 1991; MacLeod y cols., 1996). Creemos que este estudio puede contribuir a la comprensión del papel las expectativas futuras en la ansiedad y la depresión, y además puede ayudar a aumentar la disponibilidad de este instrumento para evaluar el pensamiento dirigido futuro entre la población italiana. Este estudio ha sido publicado en formato de artículo en la revista indexada *Psychiatry Research*.

En el **Capítulo 6** presentamos los resultados de la validación del SPANE (Diener y cols., 2010) entre una muestra general de habla italiana (N = 345) (Corno, Molinari y Baños, 2016). Esta escala es utilizada para evaluar una amplia gama de sentimientos agradables y

desagradables. Esta escala pide a las personas que informen sobre sus sentimientos, después de recordar sus actividades y experiencias durante las 4 semanas anteriores. La escala está compuesta por 12 ítems, 6 relacionados con experiencias positivas y 6 relacionados con experiencias negativas. La versión italiana del SPANE muestra propiedades psicométricas similares a las mostradas en las versiones original y anterior, y presenta una fiabilidad satisfactoria y validez factorial. Las sub-escalas de afecto negativo y positivo de la versión italiana del SPANE mostraron una buena consistencia interna:  $\alpha = .85$  y  $\alpha = .88$ , respectivamente.

Los resultados del análisis factorial confirmatorio apoyan la estructura esperada de dos factores, sentimiento positivo y negativo, que caracterizó las versiones anteriores en diferentes idiomas (Diener y cols., 2010; Silva y Caetano, 2013; Sumi, 2014a, 2014b). Además, como se planteó en la hipótesis, las medidas de afecto negativo, ansiedad, expectativas futuras negativas y depresión correlacionaron positivamente con la sub-escala de experiencias negativas del SPANE, y negativamente con la sub-escala de experiencias positivas del SPANE. En suma, aunque se requieren más estudios para confirmar las características psicométricas de la escala, se espera que la versión italiana del SPANE mejore la investigación teórica y empírica sobre el bienestar de la población italiana. Este estudio ha sido publicado en formato de artículo en la revista indexada *Rivista di Psichiatria*.

Con el fin de evaluar la viabilidad, la aceptación y los posibles beneficios de *Embarazo y Bienestar*, probamos la intervención para observar cómo fue percibida y evaluada en sus usuarios. Pretendíamos identificar los puntos fuertes y débiles que podrían aportar un valor añadido a la implementación y al desarrollo futuro de la intervención. Se realizó un estudio

descriptivo de un solo grupo, con el fin de explorar la forma en que esta intervención sería percibida por las mujeres embarazadas y si se mostraría cualquier evidencia preliminar de la eficacia en el aumento del afecto positivo (Corno y cols., enviado). Participaron en el estudio 70 mujeres embarazadas de habla española, italiana o inglesa. Las mujeres embarazadas tenían entre 21 y 43 años ( $M = 32,71$ ,  $DS = 15,80$ ) y se encontraban entre la cuarta y la treinta y cuatro semana de embarazo al inicio de la intervención. Después de haber recibido el consentimiento informado, enviamos por correo electrónico un enlace a la plataforma web Survey Monkey donde la participante podía responder a los cuestionarios de pre-evaluación y acceder al primer módulo del entrenamiento. Cada semana, durante cinco semanas, después de una breve evaluación, las participantes recibieron acceso gratuito a un nuevo módulo. Se trata de un programa totalmente auto aplicado. El acceso a los módulos es controlado y realizado de forma online por el investigador. Al final del último módulo, las participantes recibían por correo electrónico un enlace para completar la post-evaluación en la plataforma web de Survey Monkey. Se evaluaron datos sobre el afecto positivo y negativo, y sobre el bienestar mental de las embarazadas (6 ítems: autoconfianza, auto-aceptación, satisfacción con la vida, conexión, apoyo social percibido y optimismo) antes y después de la intervención. Además, se evaluó la opinión de las participantes sobre cada ejercicio propuesto en términos de frecuencia de práctica, apreciación del ejercicio, beneficio percibido de la práctica y la facilidad percibida de la práctica. La satisfacción con la intervención se evaluó con una pregunta abierta.

Los resultados mostraron que la mayoría de las participantes informaron que recomendarían la participación en la intervención. En concreto, las mujeres embarazadas

encontraron la intervención útil e interesante. En cuanto a los índices de bienestar mental (es decir, autoconfianza, auto aceptación, satisfacción con la vida, conexión, apoyo social percibido y optimismo), encontramos un aumento estadísticamente significativo sólo para la confianza en uno mismo. Sin embargo, los resultados mostraron una tendencia hacia la mejoría en los otros índices de bienestar, así como en el afecto positivo. Encontramos también una tendencia hacia la disminución del efecto negativo desde la pre-intervención a la post-intervención.

Las participantes destacaron dos debilidades de la intervención: la duración excesiva y la ausencia de beneficios percibidos en la intervención. Estos dos factores han sido investigados e identificados como dos posibles moderadores que pueden tener un impacto en la efectividad de las PPIs (e.g., Lyubomirsky, Sheldon y Schkade, 2005; Sheldon, Boehm y Lyubomirsky, 2012). A pesar de que fue evaluado como el más difícil, la actividad preferida de las participantes en términos de apreciación y beneficio percibido fue el ejercicio de “conectividad”. El objetivo de este ejercicio fue fomentar las relaciones de las mujeres embarazadas, ya que la conexión y el apoyo social se han identificado como factores importantes durante el embarazo (Dunkel Schetter, 2011). Las dos actividades centradas en el optimismo también fueron apreciadas por las mujeres en comparación con la práctica basada en la atención plena del escaneo corporal y las dos actividades de saboreo. El optimismo ha demostrado desempeñar un papel protector en el bienestar y en la salud psicológica materna durante el postparto (Dunkel Schetter, 2011; Grote y Bledsoe, 2007).

En cuanto a la adherencia a la intervención, nuestros resultados confirmaron la relación encontrada en un estudio previo sobre las preferencias por los ejercicios de psicología

positiva, donde las mujeres que reportaron mayor apreciación y beneficio percibido por un ejercicio tenían más probabilidades de completar el ejercicio y hacer las actividades positivas durante más días (Schueller, 2010). En cuanto al contexto del embarazo, la investigación en psicológica positiva aún es muy reciente.

Aunque muy preliminares, nuestros resultados son alentadores. La información recopilada podría ser un punto de partida para investigar qué ejercicio o grupo de ejercicios, qué condiciones óptimas (por ejemplo, duración, formato de intervención), y qué características personales (por ejemplo, motivación), podrían predecir el mejor ajuste para las mujeres embarazadas, con el fin de adaptar intervenciones positivas óptimas para esta población. Este estudio ha sido enviado en formato de artículo en la revista indexada *Journal of Psychosomatic Obstetrics & Gynecology*.

## Discusión

En la última década, las investigaciones han mostrado que las PPIs pueden mejorar el afecto positivo y el bienestar. Recientemente, los investigadores han comenzado a reflexionar e investigar sobre cuestiones más allá de la validación de las PPIs. ¿Cómo, por qué, qué, cuándo y quién se beneficia más de las PPIs? En la discusión de esta tesis doctoral hemos resumido las últimas evidencias sobre los factores que pueden mediar y/o moderar la relación entre el comprometerse en una intervención positiva y la eficacia de la intervención en términos de aumento del bienestar. Específicamente, hemos observado en la literatura cuatro variables mediadoras (pensamientos positivos, emociones positivas, comportamientos positivos y satisfacción de las necesidades) y dos grupos de variables moderadoras



(características propias de la intervención positiva y características propias de cada persona) que pueden influir en la eficacia de las intervenciones positivas. Las investigaciones enseñan que los mayores aumentos en el bienestar que se pueden conseguir desde la práctica de intervenciones positivas, pueden surgir cuando un formato específico de intervención coincide con las preferencias individuales y / o características de la persona, es decir, el grado de “person activity fit”.

Como hemos visto, la investigación científica sobre intervenciones positivas durante el embarazo es todavía muy reciente. Teniendo en cuenta las variables que pueden mediar y/o moderar la eficacia de las intervenciones positivas y los resultados en término de viabilidad y aceptación de la intervención que hemos presentado en el capítulo 7, hemos analizado y propuesto algunos factores específicos relacionados con el embarazo (el apoyo percibido de la familia y de las instituciones, el trimestre de embarazo) que pueden influir sobre la eficacia de las intervenciones positivas en una población de mujeres embarazadas. Además, hemos propuesto futuros pasos para investigar más a fondo qué intervención positiva funciona mejor en las mujeres embarazadas y cuál es la forma óptima de proponer e integrar la práctica de PPIs en la realidad cotidiana de las mujeres embarazadas.

Específicamente, hemos propuesto descomponer el programa *Embarazo y Bienestar*. A través de la serie de ensayos aleatorios controlados, proponemos probar la eficacia de cada actividad positiva originalmente propuesta en *Embarazo y Bienestar* e investigar los mediadores y moderadores potenciales que podrían influir en la relación entre el compromiso en las intervenciones positivas y las ganancias en el bienestar mental de las mujeres embarazadas.

Creemos que la presente tesis doctoral contribuye de forma significativa al emergente campo de estudios sobre el embarazo y la psicología positiva, y esperamos que los lectores estarán inspirados a continuar investigando en este campo.

## Referencias

Agius, A., Xuereb, R.B., Carrick-Sen, D., Sultana, R., y Rankin, J. (2016). The co-existence of depression, anxiety and post-traumatic stress symptoms in the perinatal period: A systematic review. *Midwifery*, 36, 70-79.

Andersson, L., Sundström-Poromaa, I., Wulff, M., Åström, M., y Bixo, M. (2004). Implications of antenatal depression and anxiety for obstetric outcome. *Obstetrics & Gynecology*, 104(3), 467-476.

Ashford, M.T., Olander, E.K., Ayers, S. (2016). Computer-or web-based interventions for perinatal mental health: A systematic review. *Journal of Affective Disorders*, 197, 134-146.

Bolier, L. y Abello, K.M. (2014). Online Positive Psychological Interventions: State of the Art and Future Directions. In A.C. Parks, y S.M. Schueller (Eds.), *The Wiley Blackwell Handbook of Positive Psychological Interventions* (pp. 286-309). Chichester, UK: John Wiley & Sons, Ltd.

Bolier, L., Haverman, M., Westerhof, G.J., Riper, H., Smit, F., y Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health*, 13(1), 1.

Bos, S.C., Macedo, A., Marques, M., Pereira, A.T., Maia, B.R., Soares, M.J., ... y Azevedo, M.H. (2013). Is positive affect in pregnancy protective of postpartum depression?. *Revista Brasileira de Psiquiatria*, 35(1), 5-12.

Clark, L.A., y Watson, D. (1991). Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology, 100*(3), 316.

Collins, N.L., Dunkel Schetter, C., Lobel, M., y Scrimshaw, S.C. (1993). Social support in pregnancy: psychosocial correlates of birth outcomes and postpartum depression. *Journal of Personality and Social Psychology, 65*(6), 1243.

Corno, G., Espinoza, M., y Baños, R.M. (en revisión). A Narrative Review of Positive Psychology Interventions for Women During the Perinatal Period. *Midwifery*.

Corno, G., Espinoza, M., Herrero, R., Molinari, G., Carrillo, A., Etchemendy, E., y Baños, R.M. (en revisión). A Web-based Positive Psychology Intervention for Promoting Women's Well-being During Pregnancy: A Randomized Control Trial. *BMC Pregnancy and Childbirth*.

Corno, G., Etchemendy, E., Espinoza, M., Herrero, R., Molinari, G., Carrillo, A., Drossaert, C., y Baños, R.M. (2017). Effect of a Web-Based Positive Psychology Intervention on Prenatal Well-Being: A Case Series Study. *Women and Birth*.

Corno, G., Molinari, G., y Baños, R.M. (2016). Assessing positive and negative experiences: validation of a new measure of well-being in an Italian population. *Rivista di psichiatria, 51*(3), 110-115.

Corno, G., Molinari, G., y Baños, R.M. (2017). Assessing future expectations and the two-dimensional model of affect in an Italian population. *Psychiatry Research, 249*, 226-231.

Corno, G., Molinari, G., Herrero, R., Etchemendy, E., Espinoza, M., Carrillo, A., y Baños, R.M. (enviado). Enhancing mental well-being during pregnancy: Assessing feasibility of a web-based positive psychology intervention. *Journal of Psychosomatic Obstetrics & Gynecology*.

Dejin-Karlsson, E., Hanson, B.S., Östergren, P.O., Lindgren, A., Sjöberg, N.O., y Marsal, K. (2000). Association of a lack of psychosocial resources and the risk of giving birth to small for gestational age infants: a stress hypothesis. *BJOG: An International Journal of Obstetrics & Gynaecology*, 107(1), 89-100.

Delle Fave, A., Pozzo, M., Bassi, M., y Cetin, I. (2013). A longitudinal study on motherhood and well-being: Developmental and clinical implications. *Terapia psicologica*, 1(1), 21-33.

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D.W., Oishi, S., y Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research*, 97(2), 143-156.

DiPietro, J.A., Ghera, M.M., Costigan, K., y Hawkins, M. (2004). Measuring the ups and downs of pregnancy stress. *Journal of Psychosomatic Obstetrics & Gynecology*, 25(3-4), 189-201.

Dunkel Schetter, C. (2011). Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annual Review of Psychology*, 62, 531-558.

Feldman, P.J., Dunkel-Schetter, C., Sandman, C.A., y Wadhwa, P.D. (2000). Maternal social support predicts birth weight and fetal growth in human pregnancy. *Psychosomatic Medicine*, 62(5), 715-725.

Giurgescu, C., Penckofer, S., Maurer, M.C., y Bryant, F.B. (2006). Impact of uncertainty, social support, and prenatal coping on the psychological well-being of high-risk pregnant women. *Nursing Research*, 55(5), 356-365.

Goodman, S.H., Brogan, D., Lynch, M.E., y Fielding, B. (1993). Social and emotional competence in children of depressed mothers. *Child Development*, 64(2), 516-531.

Grote, N.K., y Bledsoe, S.E. (2007). Predicting postpartum depressive symptoms in new mothers: The role of optimism and stress frequency during pregnancy. *Health & Social Work*, 32(2), 107-118.

Hedegaard, M., Henriksen, T.B., Secher, N.J., Hatch, M.C., y Sabroe, S. (1996). Do stressful life events affect duration of gestation and risk of preterm delivery?. *Epidemiology*, 339-345.

Hone, L.C., Jarden, A., y Schofield, G.M. (2015). An evaluation of positive psychology intervention effectiveness trials using the re-aim framework: A practice-friendly review. *The Journal of Positive Psychology*, 10(4), 303-322.

Huizink, A.C., Robles de Medina, P.G., Mulder, E.J., Visser, G.H., y Buitelaar, J.K. (2003). Stress during pregnancy is associated with developmental outcome in infancy. *Journal of Child Psychology and Psychiatry*, 44(6), 810-818.

Layous, K., Nelson, S.K., y Lyubomirsky, S. (2013). What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *Journal of Happiness Studies*, 14(2), 635-654.

Lee, E.W., Denison, F.C., Hor, K., y Reynolds, R.M. (2016). Web-based interventions for prevention and treatment of perinatal mood disorders: a systematic review. *BMC Pregnancy and Childbirth*, 16(1), 38.

Lobel, M., Yali, A.M., Zhu, W., DeVincent, C., y Meyer, B. (2002). Beneficial associations between optimistic disposition and emotional distress in high-risk pregnancy. *Psychology and Health*, 17(1), 77-95.

Lyubomirsky, S. (2008). *The how of happiness: A scientific approach to getting the life you want*. New York: The Penguin Press.

Lyubomirsky, S., y Layous, K. (2013). How do simple positive activities increase well-being?. *Current Directions in Psychological Science*, 22(1), 57-62.

Lyubomirsky, S., Sheldon, K.M., y Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology*, 9, 111-131.

MacLeod, A.K., Byrne, A., y Valentine, J. D. (1996). Affect, emotional disorder, and future-directed thinking. *Cognition & Emotion*, 10(1), 69-86.

Matvienko-Sikar, K., y Dockray, S. (2017). Effects of a novel positive psychological intervention on prenatal stress and well-being: A pilot randomised controlled trial. *Women and Birth*, 30(2), e111-e118.

McManus, M.A., Khalessi, A.A., Lin, J., Ashraf, J., y Reich, S.M. (2017). Positive feelings during pregnancy, early feeding practices, and infant health. *Pediatrics International*.

Mitchell, J., Vella-Brodrick, D., y Klein, B. (2010). Positive psychology and the internet: A mental health opportunity. *E-Journal of Applied Psychology*, 6(2), 30-41.

O'Connor, T.G., Heron, J., Golding, J., y Glover, V. (2003). Maternal antenatal anxiety and behavioural/emotional problems in children: a test of a programming hypothesis. *Journal of Child Psychology and Psychiatry*, 44(7), 1025-1036.

Osborne, L.M., y Monk, C. (2013). Perinatal depression—the fourth inflammatory morbidity of pregnancy?: theory and literature review. *Psychoneuroendocrinology*, 38, 1929-1952.

Pluess, M., Wurmser, H., Buske-Kirschbaum, A., Papousek, M., Pirke, K. M., Hellhammer, D., y Bolten, M. (2012). Positive life events predict salivary cortisol in pregnant women. *Psychoneuroendocrinology*, 37, 1336-1340.

Pryor, J.E., Thompson, J.M.D., Robinson, E., Clark, P.M., Becroft, D.M.O., Pattison, N.S., ... y Mitchell, E.A. (2003). Stress and lack of social support as risk factors for small-for-gestational-age birth. *Acta Paediatrica*, 92(1), 62-64.

Robertson, E., Grace, S., Wallington, T., y Stewart, D.E. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *General Hospital Psychiatry*, 26, 289-295.



Schueller, S.M. (2010). Preferences for positive psychology exercises. *The Journal of Positive Psychology*, 5(3), 192-203.

Schueller, S.M., y Parks, A.C. (2014). The science of self-help. *European Psychologist*, 19, 145-155.

Schueller, S.M., y Seligman, M.E. (2010). Pursuit of pleasure, engagement, and meaning: Relationships to subjective and objective measures of well-being. *The Journal of Positive Psychology*, 5(4), 253-263.

Seligman, M.E., y Csikszentmihalyi, M. (Eds.) (2000). Positive Psychology [Special Issue] *American Psychologist*, 55(1).

Seligman, M.E., y Csikszentmihalyi, M. (2014). Positive psychology: An introduction. In M. Csikszentmihalyi (Eds.), *Flow and the foundations of positive psychology: The collected works of Mihaly Csikszentmihalyi* (pp. 279-298). Netherlands: Springer.

Sheldon, K.M., Boehm, J.K., y Lyubomirsky, S. (2012). Variety is the spice of happiness: The hedonic adaptation prevention (HAP) model. *Oxford Handbook of Happiness*, 901-914.

Silva, A.J., y Caetano, A. (2013). Validation of the flourishing scale and scale of positive and negative experience in Portugal. *Social Indicators Research*, 110(2), 469-478.

Sin, N.L., y Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, 65(5), 467-487.

Staneva, A.A., Bogossian, F., y Wittkowski, A. (2015). The experience of psychological distress, depression, and anxiety during pregnancy: A meta-synthesis of qualitative research. *Midwifery*, 31, 563-573.

Sumi, K. (2014a). Reliability and validity of Japanese versions of the flourishing scale and the scale of positive and negative experience. *Social Indicators Research*, 118(2), 601-615.

Sumi, K. (2014b). Temporal stability of the japanese versions of the flourishing scale and the scale of positive and negative experience. *Journal of Psychology and Psychotherapy*, 4, 140-56.

Voellmin, A., Entringer, S., Moog, N., Wadhwa, P.D., y Buss, C. (2013). Maternal positive affect over the course of pregnancy is associated with the length of gestation and reduced risk of preterm delivery. *Journal of Psychosomatic Research*, 75(4), 336-340.

World health Organization. (2016). WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization.

# Introduction

Pregnancy is a time of change and demands, which can affect both maternal and infant well-being. The scientific literature have extensively examined and proved that low prenatal well-being can have significant negative physical and psychological consequences both on the mother and on the newborn. Nevertheless, since the World Health Organization recently coined the concept of “positive pregnancy experience”, which includes not only the treatment of diseases, but also health education and health promotion, research on antenatal care has expanded to a salutogenic perspective. In the wake of this perspective, a growing number of studies have examined the potential benefits of positive aspects and protective factors on maternal perinatal well-being and childbirth.

Positive Psychology supports this salutogenic perspective. Many studies conducted in this field have analyzed the benefits of building and increasing personal strengths, positive emotions, and sense of meaning, concluding that raising and enhancing these positive resources may successfully counteract negative symptoms and disorders and buffer against future relapses. Evidence from Positive Psychology studies has shown that it is possible to build and enhance personal strengths, sense of meaning, and positive feelings by practicing some brief positive exercises called Positive Psychology Interventions (PPIs). Recently, researchers have started to investigate the effects of a PPI on women’s prenatal well-being, reporting promising findings in terms of potential direct effects of the positive intervention on women’s prenatal stress.

In the past decade, several meta-analyses have shown that web- or computer-based programs can be as effective as traditional face-to-face programs, and significantly more effective than control conditions, for a variety of mental health disorders (e.g., depression, anxiety, and adjustment disorders) and across different populations. Indeed, recent studies provide preliminary evidence that web-based interventions can be a promising and advisable form of intervention during the prenatal period. PPIs have also been transferred to an online format. Preliminary evidence suggests that Online Positive Psychology Interventions (OPPIs) can effectively enhance well-being and reduce depressive symptoms.

The aim of this thesis is to review the existing scientific literature, and to design and investigate the potential effects and feasibility of a novel online-based positive psychology program on women's prenatal well-being.

Chapter 1 introduces the concept of well-being and the scientific contribute of positive psychology, as well as an overview on maternal well-being during pregnancy. Chapter 2 presents a comprehensive narrative review of PPIs addressed to improve women's mental well-being during the perinatal period. Chapter 3 focuses on the design of "*Embarazo y Bienestar*", a novel web-based positive psychology intervention addressed to support and fosters women's mental well-being during the prenatal period. Chapter 4 reports the results of a case series study about the effects of *Embarazo y Bienestar* on indices of women's prenatal well-being. Chapter 5 and 6 report on two studies that were conducted with the aim to translate and adapt the intervention to the Italian language. Specifically, the validation studies of the Subjective Probability Task (SPT) and the Scale of Positive and Negative Experience (SPANE) are presented. Chapter 7 reports the results of a feasibility study,

conducted in different countries, to investigate acceptance and possible benefits of *Embarazo y Bienestar* among pregnant women. Chapter 8 provides a general overview and discussion of results of the studies that were presented in this thesis. Implications of the intervention, its methodological limitations, as well as recommendations for future research on PPIs in the perinatal period are also discussed.

We think that the present dissertation gives a significant contribution to the emerging field of studies on pregnancy and positive psychology, and we hope that readers would be inspired to continue to investigate in this field.



# Chapter



# 1. Well-being and positive psychology

## 1.1 The concept of well-being

Since ancient times, humans have been questioned about the nature of well-being. Philosophers and theologians have tried to define wellness and happiness (Oishi, & Diener, 2001; Diener, Lucas, & Oishi, 2002; Feldman, 2011). How can we define wellness? Which life conditions can define wellness?

During centuries, two schools of thought have been investigating and theorizing about well-being (Ryan, & Deci, 2001). The first one, named hedonic perspective, finds its roots in the hedonic tradition of the ancient Greece, with the philosopher Aristippus (435 - 360 B.C.) who incited to experience the highest possible evanescent pleasure. This perspective postulates that well-being corresponds to hedonism: the individualistic attempt to reach objectives that a single individual sets for himself (Kahneman, Diener, & Schwarz, 1999). Thus, well-being would consist in the subjective experience of pleasure or happiness (Kahneman et al., 1999; Mitchell, Vella-Brodrick, & Klein, 2010; Ryan, & Deci, 2001). The concept of “*subjective well-being*” (SWB; Diener, & Lucas, 1999) has been formulated and assessed by the hedonic psychology. SWB consists of three dimensions: presence of positive mood, absence of negative mood, and life satisfaction. Therefore, SWB refers to the way a person can evaluate his/her own life and includes both cognitive (e.g., satisfaction), and affective components (e.g., positive and negative emotions) (e.g., Mitchell et al., 2010; Snyder, & Lopez, 2009). SWB is commonly assessed using self-report scales as the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988), which measures the SWB’s affective component, and the



Satisfaction With Life Scale (SWL; Diener, Emmons, Larsen, & Griffin, 1985), which evaluates the SWB's cognitive component.

The second perspective, named eudaimonic, has ancient roots too. Aristotle (384-322 B.C.) rejected the hedonic concept of happiness and well-being, defining it as a vulgar idea that let consider humans as mere slaves of desires (Feldman, 2011; Ryan, & Deci, 2001). The eudaimonic perspective drawn the attention to the mutual positive interaction between individual and collective well-being. It postulates that social environment is the only context where the individual can reach the "real" happiness (Nussbaum, & Sen, 1993). Furthermore, this perspective theorizes that well-being lies in the actualization of human potentials, the fulfillment - or realization - of one's *daimon* - or nature - (Waterman, 1993). When people holistically live in coherence with personal values, they feel vividly alive and authentic. Following the Aristotelian front, Ryff and Singer (1996, 1998, 2000) have investigated and defined well-being as "*psychological well-being*" (PWB; Ryff, 1995; Ryff, & Keyes, 1995; Ryff, & Singer, 1998), "the striving for perfection that represents the realization of one's true potential" (Ryff, 1995, p.100). PWB is composed by six constructs that determine human actualization and promote physical and emotional health (Ryff, & Singer, 1998; Ryan, & Deci, 2001): autonomy (i.e. being self-determining and capable of resisting social pressures), environmental mastery (i.e., having a sense of capability and control in managing the circumstances), personal growth (i.e., considering oneself as developing, flourishing, expanding and uncovered to new experiences), positive relations with others (i.e., having warm, satisfying and trusting relations), purpose in life (i.e., having objectives and a sense of directedness in life), and self-acceptance (i.e., be aware and accept multiple aspects of oneself,

including positive and negative ones) (Delle Fave, Pozzo, Bassi, & Cetin, 2013; Ryff, 1989). Ryff has designed a self-report questionnaire to assess PWB, the Psychological Well-Being Scale, which has been validated in different forms and languages (e.g., Ryff, 1989; Ryff, & Keyes, 1995).

Although these two models are the most investigated, there has been a wide debate over the suitability of this dual approach. Indeed, it has been proposed that these perspectives are not mutually exclusive and some combined models have been theorized and investigated (Kashdan, Biswas-Diener, & King, 2008; Keyes, Shmotkin, & Ryff, 2002; Ryan, & Deci, 2001). One example of integrated model is the theory of happiness proposed by Seligman and Csikszentmihalyi (2000, 2014). These authors deconstructed happiness into three components: pleasure, engagement, and meaning. Pleasure appears to equate to SWB, whereas engagement and meaning are closer to the eudaimonic concept of PWB (Mitchell et al., 2010). Another example of combined model is Keyes' mental health continuum (Keyes, 2005, 2007), which included three factors: emotional well-being, psychological well-being, and social well-being. Thus, this model combines SWB, PWB and adds a third factor, social well-being.

A concept that is largely accepted and is similar to the Keyes' model is the concept of "*mental well-being*". It includes both hedonic - the subjective experience of happiness and life satisfaction - and eudaimonic - good relationships with others, positive psychological functioning and self-fulfillment - aspects (Stewart-Brown, & Janmohamed, 2008). Mental well-being acquired relevant social importance during the last century. In 1948 the World Health Organization (WHO), in fact, recognized the multidimensional nature of health, which cannot

be conceived merely as an absence of disease, and it has been defined as a complete psychological, physiological, and social health state. This definition implies that mental health is more than just the absence of a mental disorder; indeed, there is no health without mental health (WHO, 2004). Specifically, “mental health is a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community” (WHO, 2004). Mental health is defined by multiple socio-economic (e.g., persistent socio-economic pressure, poverty, rapid social change, gender discrimination, social exclusion), psychological (e.g., personality factors), personal (e.g., unhealthy lifestyle), and biological (e.g., genetic factors) factors (WHO, 2004).

Benefits of well-being have been largely demonstrated (e.g., Lyubomirsky, King, & Diener, 2005) and they include improved productivity at work, more satisfying and longer lasting marriages, more meaningful relationships and greater social support, increased energy and activity (e.g., Keyes, & Grzywacz, 2005; Lyubomirsky et al., 2005), heightened self-confidence, self-regulation, individual creativity, prosocial behavior, and ability to cope (Lyubomirsky et al., 2005). Well-being is also positively associated with better physical health (e.g., less pain reported, lowered stress levels, and strengthened immune system) (e.g., Diener, & Chan, 2011; Howell, Kern, & Lyubomirsky, 2007; Lamers, Bolier, Westerhof, Smit, & Bohlmeijer, 2012; Lyubomirsky et al., 2005), having less health care uptake, reduced risk of developing mental symptoms and disorders (Keyes, Dhingra, & Simoes, 2010; Wood, & Joseph, 2010), and reduced mortality risks in people with physical disease (Lamers et al., 2012).

The interest of psychology on the study and promotion of wellbeing has increased significantly in the last decades. Since its birth, psychology had been mainly focused on the treatment and amelioration of psychopathology. Nevertheless, in the 1960, beginning with a shift in focus toward prevention, the theoretical and research interests of psychology have been attracted by the study of growth (Deci, 1975), mental health and well-being (Diener, 2009; Seligman, Steen, Park, & Peterson, 2005). As we are going to discover in the next paragraph, positive psychology found a place in this trend. Moving beyond a “treatment-centric” approach, positive psychology’s interests, studies and interventions have been focused on the enhancement and promotion of human well-being (Seligman et al., 2005).

## 1.2 The contribute of positive psychology

Until the II World War, psychology mainly had three distinct objectives: treating mental disorders, fulfilling and making productive people’s lives, and identifying and enhancing excellences and high talents (Seligman, & Csikszentmihalyi, 2000, 2014). After the war, psychology’s focus shifted to evaluating and curing individual suffering. From the empirical point of view, there had been an explosion in researches on the effects of negative environmental conditions (e.g. physical and sexual abuse), and on psychological disorders. Either the clinical framework was centered on a repairing-damage perspective: repair damaged childhoods, damaged habits, and damaged brains. Thus, two of the three psychology’s missions, enhancing the quality of people’s lives and nurturing high talents, had been completely forgotten (Cuijpers, van Straten, Andersson, & van Oppen, 2008). Psychology became a victimology, a science largely about healing and pathology (Seligman, & Csikszentmihalyi, 2000, 2014).

The pioneering work by, for instance, Rogers (e.g., 2006), Maslow (e.g., Maslow, 2013; Maslow, Frager, & Cox, 1970), Ryan and Deci (e.g., 2000), and Ryff and Singer (1998), had given the prerequisites for the birth of the positive psychology science. The denomination ‘positive psychology’ was proposed by Martin Seligman at the beginning of his mandate as president of the American Psychological Association (Seligman, 1999). In a brief communication, he defined positive psychology as:

*“A reoriented science that emphasizes the understanding and building of the most positive qualities of an individual: optimism, courage, work ethic, future mindedness, interpersonal skill, the capacity for pleasure and insight, and social responsibility”* (Seligman, 1999).

In 2000, the American Psychologist dedicated its issue to the emerging science of positive psychology: the study of positive character, emotions and institutions (Seligman, & Csikszentmihalyi, 2000):

*“[...] psychology is not just the study of pathology, weakness, and damage; it is also the study of strength and virtue. Treatment is not just fixing what is broken; it is nurturing what is best. Psychology is not just a branch of medicine concerned with illness or health; it is much larger. It is about work, education, insight, love, growth, and play”* (Seligman, & Csikszentmihalyi, 2000, p.7).

Positive psychology is the scientific study of optimal human functioning. It argues not for a dismissal of the importance to focus on negative states of mind, but for a more integrated comprehension of mental health, in which negative and positive aspects would play a role.

Positive psychology encompasses three levels. At a subjective level it is about valued subjective experiences: satisfaction, contentment, and well-being (for the past), optimism and hope (for the future), and happiness and flow (in the present). At the individual level, positive psychology refers to positive individual characteristics (e.g., virtues, talents, character strengths, or interests) as for instance, ability to love, forgiveness, high talent, wisdom, courage, interpersonal skills, originality, spirituality, perseverance, aesthetic sensibility, and future mindedness. At a group level, it is about positive institutions and civic virtues that inspire individuals to be a better citizen: nurturance, altruism, moderation, responsibility, civility, tolerance, and work ethic (e.g., Delle Fave, 2004, 2007; Seligman, & Csikszentmihalyi, 2000). Thus, the aim of this new positive science is to investigate, understand, and promote the factors that permit individuals, communities, and societies to flourish (Seligman, & Csikszentmihalyi, 2000).

Erroneously, it could be easy to think that the focus of positive psychology is only on positive aspects of the human life. On the contrary, the peculiarity of this science is to pay more attention to the aspects that contribute to generate and enhance the human flourishing without excluding or denying that the negative aspects are intrinsically related to many domains of our experience (Vázquez, & Chaves, 2016; Vazquez, & Hervas, 2013). In fact, many positive psychology researches are focused on the emerging and enhancing our strengths in order to face a highly adverse situation (e.g. illness, terrorist attack, trauma, loses). It is the case, for instance, of resilience and post-traumatic growth (e.g. Hefferon, 2012; Reivich, Seligman, & McBride, 2011; Vázquez, Pérez-Sales, & Ochoa, 2014).

Positive psychology suggests a new kind of perspective to interpret and treat psychopathologies: the positive psychotherapy (PPT; Seligman, Rashid, & Parks, 2006). Positive psychotherapy proposes that depression can be treated effectively not only by focalizing on decreasing negative symptoms, but also by directly and primarily building and increasing personal strengths, positive emotions, and sense of meaning. Many studies in the positive psychology field have analyzed the nature and benefits of focusing on these targets, concluding that it is possible that directly building these positive resources may successfully counteract negative symptoms, disorders, and may also buffer against future relapses (Lee Duckworth, Steen, & Seligman, 2005; Seligman et al., 2006; Sin, & Lyubomirsky, 2009). The more one experiences positive emotions, the more he/she can improve his/her psychological capital, which will be useful during difficult and challenging situations. Specifically, Pressman and Cohen (2005) suggested two pathways through which positive affect can have an impact on the individual's health. One pathway regards the direct effects of positive affect on behaviors and biological systems important for health. For instance, high positive affect is directly correlated with engaging more in healthy behaviors, and perceiving greater social support (Vázquez, & Chaves, 2016). The second pathway highlights the stress-buffering role of positive affect, which reduces the negative stress effects on health. With her Broaden and Build theory, Barbara Fredrickson proposed a theoretical framework about the functions of positive emotions (Fredrickson, 1998, 2001). Positive emotions broaden our scope of attention and cognition, encouraging us to be open to new experiences, to explore new environments, to experiment, create, and build. Positive emotions also have an enduring effects, building physical (e.g. healthy habits), social (e.g., close and mutual relationships), intellectual (e.g.,

cognitive flexibility, creativity), and psychological resources (e.g., resilience, and optimism) (Cohen, Alper, Doyle, Treanor, & Turner, 2006; Kok et al., 2013; Scheier, & Carver, 1993; Vázquez, & Chaves, 2016). In a long term perspective, people who experience more positive emotions report better life quality and functioning, more satisfying relationships, greater life expectancies, and fewer symptoms (Diener, & Chan, 2011; Fredrickson, 2003; Lyubomirsky et al., 2005; Pressman, & Cohen, 2012; Vázquez, & Chaves, 2016). Evidences supported the hypothesis of an “undoing effect” of positive emotions: positive affect helps to return faster to a normal state after a stressful experience (Fredrickson, 1998, 2009). Furthermore, Tugade and Fredrickson (2004) found that positive emotions undo the cardiovascular aftereffects (e.g., increased blood pressure, accelerated heart rate, increased vasoconstrictions) of negative emotions, and that positive emotions can help to find an alternative positive meaning in stressful situations. Thus, when we experience positive emotions and we live positive experiences we are building a kind of armor that will help us to face future negative and stressful events and can help to prevent psychological and physical problems (e.g., Meyers, & Meyers, 2003). Speaking of which, Fredrickson and Joiner (2002) talked about an upward spiraling effect of positive emotions and wider thinking: people who experience positive emotions have more probabilities to find meaning in negative events, and this meaning-making process, in turn, leads to higher positive emotions (Lee Duckworth et al., 2005).

As we saw above, one goal of positive psychology is to increase well-being, and research suggests that this is possible through brief exercises termed “positive psychology



interventions” (PPIs; Lyubomirsky, Sheldon, & Schkade, 2005; Schueller, & Parks, 2014; Seligman et al., 2005; Sheldon, & Lyubomirsky, 2006).

### *1.2.1 Applying positive psychology: Positive Psychology Interventions (PPIs)*

Lyubomirsky, Sheldon and Schkade (2005) theorized that three key factors can determine happiness: a person’s genetic predisposition for happiness, circumstantial factors (e.g., socio-economic status, level of education), and intentional cognitive, motivational, and behavioral activities that can affect well-being. The authors proposed that this third factor is the most workable and amenable to change. Longitudinal researches have supported this theory (e.g., Fordyce, 1977; Lyubomirsky et al., 2005; Sin, & Lyubomirsky, 2009), demonstrating that well-being can be fostered via interventions that propose intentional cognitive and behavioral activities, called positive psychology interventions (PPIs). According to Lyubomirsky (2008), PPIs are programs “aimed at increasing positive feelings, positive behaviors, or positive cognitions as opposed to ameliorating pathology or fixing negative thoughts of maladaptive behavior patterns” (p.469). Furthermore, the authors specified that a PPI has to enhance well-being in a long-term perspective. Therefore, Sin and Lyubomirsky (2009) exclude mood induction interventions, which are designed to increase mood in a short-term perspective.

Recent meta-analyses confirm that on average, these techniques lead to reliable and sustainable boosts in well-being and can buffer against future disorders (Bolier, Haverman, Westerhof, Riper, Smit, & Bohlmeijer, 2013; Hone, Jarden, & Schofield, 2015; Sin, & Lyubomirsky, 2009). Specifically, a meta-analysis conducted by Sin and Lyubomirsky (2009) shows that PPIs can be effective in improving well-being ( $r = 0.29$ , standardized mean

difference Cohen's  $d = 0.61$ ) and help to decrease depressive symptom levels in clinical populations ( $r = 0.31$ , Cohen's  $d = 0.65$ ). Bolier et al. (2013) synthesized the results about the effectiveness of 39 studies on PPIs. As the previous study cited above, the results showed that PPIs significantly reduce depressive symptoms and enhance psychological and subjective well-being. Specifically, Bolier et al. (2013) reported the effect sizes varied between studies (ranging from below 0 to 2.4). On average, they were in the small to moderate range (the mean effect size on depression was 0.23, on psychological well-being was 0.20, and on subjective well-being was 0.34). Moreover, although further studies are necessary given the actual small number of studies, small but still significant effects were found for psychological and subjective well-being at follow-up from three to six months. This can indicate that effects were partly enduring over time. Furthermore, Bolier et al. (2013), comparing the results of the meta-analysis conducted by Sin and Lyubomirsky (2009), interpreted the lower effect sizes as due to the different type of studies included (e.g., only randomized controlled trials included, more recent studies included). In a more recent meta-analysis Weiss and colleagues (2016) found a moderate effect size (Cohen's  $d = 0.44$ ;  $z = 5.62$ ;  $p < .001$ ) which was lower than the one reported by Sin and Lyubomirsky (2009), but higher to the one reported by Bolier (2015). Moreover, Weiss and colleagues found that interventions addressed to the psychological well-being promotion seemed to suit more for individuals who reported psychological or somatic problems. The authors explained these findings by the fact that clinical subjects can have lower levels of PWB at the beginning of the intervention, thus they could have more opportunities of improvement (Weiss et al., 2016).

Positive activities as performing acts of kindness (Lyubomirsky et al., 2005; Sheldon, Boehm, & Lyubomirsky, 2012), counting one's blessings (e.g., Emmons, & McCullough, 2003), writing gratitude letters (e.g., Boehm, Lyubomirsky, & Sheldon, 2011; Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011), writing about one's best possible self (e.g., Layous, Nelson, & Lyubomirsky 2013; Meevissen, Peters, & Alberts, 2011), or using one's strengths in a new way (e.g., Seligman et al., 2005), can improve well-being, decrease and contrast depression and anxiety by increasing positive emotion, engagement, and meaning in life. Furthermore, experimental longitudinal studies have found that increased positive emotions lead to social, occupational, and health benefits (Lyubomirsky et al., 2005), and foster growth and coping skills (Fredrickson, & Joiner, 2002; Fredrickson, Tugade, Waugh, & Larkin, 2003). Specifically focusing on engaging and meaningful activities has been found to be linked with greater occupational success and higher incomes (Schueller, & Seligman, 2010).

PPIs are cognitive and behavioral interventions designed to enhance and boost well-being (Schueller, 2010; Sin, & Lyubomirsky, 2009). In the next paragraph, we will review the determinants that constitute the building blocks of PPIs.

### *1.2.2. Determinants of well-being: the building blocks of PPIs*

Researchers have translated constructs, findings, and theories based on well-being, interpersonal functioning (i.e., savoring, kindness, gratitude, and positive responding), and positive emotions into cognitive-behavioral activities defined as positive psychology interventions (PPIs). PPIs typically include one or more positive exercises. These exercises are cost-effective, brief, simple, can be easily integrated in the daily life, and can be self-administered (Seligman et al., 2005; Schueller, 2010; Schueller, & Parks, 2014). The most

prevalent outcome measures used to evaluate the effectiveness of PPIs regards subjective well-being, which is linked with enhancing positive emotions and decreasing negative emotions (e.g., depressive symptoms), and increasing cognitive evaluations (e.g., happiness, and life satisfaction). But, how do PPIs enhance well-being? In the next paragraphs we will identify and describe the determinants that contributes to fostering well-being and that constitute the building blocks of many PPIs.

### *1.2.2.1 Gratitude*

In one of the first PPIs directed to enhance gratitude, Wood, Froh, and Geraghty (2010) defined this construct as a general disposition of noticing and being appreciative of what is good in one's life. More specifically, Schueller and Parks (2014) described gratitude as an emotion linked to the deliberation on something positive that has occurred and to the recognition of who or what was responsible of it. Gratitude-centered interventions propose two types of gratitude-boosting activities: grateful reflections and gratitude-motivated exercises. Gratitude reflection requires reflecting on the cause of what one feels grateful about. One example of gratitude reflections is the gratitude journaling. In gratitude journaling, people individually reflect and write down what they are thankful for. In some cases, the instructions highlight the importance to write the thing or event that one is grateful for and the reason why that thing/event happened (Seligman et al., 2005). However, positive effects have been found with the single act of noticing the thing/event (Emmons, & McCollough, 2003).

Sometimes the gratitude intervention can entail more than one actor. This is the case of the gratitude visit exercise, which boosts the public expression of gratitude. This exercise

requires that the person write a gratitude letter to someone that he or she never properly thanked. Then, once have written the gratitude testimonial, the instructions emphasize the importance of conducting a visit and reading the letter to the recipient in person (Seligman et al., 2005). Seligman and colleagues (2005) reported that the gratitude visit exercise generated the largest initial effect in terms of increased happiness, whether the gratitude letter had better effects in a long-time perspective. Nevertheless, some other studies suggested that simply writing the gratitude letter could be an effective tool to boost well-being (Boehm et al., 2011; Lyubomirsky et al., 2011; Schueller, 2012). Gratitude interventions have been demonstrated to be effective in increasing positive emotions, enhancing physical health, and decreasing depressive symptoms (e.g., Wood et al., 2010).

#### *1.2.2.2. Savoring*

The practice and concept of savoring find their roots in the mindfulness tradition. Specifically, savoring descends from one basic mindfulness activities: the deliberate and systematic act to attend to every feature of an experience (Kabat-Zinn, 2009). Thus, savoring is characterized by the deliberated act of descending pleasure from an experience, focusing, without preoccupations or distractions (i.e. being absorbed), on the positive aspects of the experience (Parks, & Biswas-Diener, 2013). Specifically, the objective of this practice is to intensify (by focused awareness) and lengthen (by elaboration skills) the momentary pleasure derived by an experience (Peterson, 2006).

Different savoring activities have been developed. Ordinarily, these activities are brief activities that can involve or not a sensorial experience. One example of a savoring exercise that include a sensory experience is the widely used raisin-savoring exercise. Individuals are

asked to focus on each sensorial characteristics of the raisin (e.g., taste, smell, solidity, etc.). This exercise can be applied to different sensory experiences: visual (e.g., a breath-taking panorama, a beautiful paint), auditory (e.g., a symphony, the sound of the wind through the trees), tactile (e.g., a massage, a hug), gustatory (e.g., an ice-cream, a coffee), olfactory (e.g., the perfume of a flower, the smell of an incense), or any combination of them (Bryant, & Veroff, 2007; Parks, & Biswas-Diener, 2013; Schueller, 2010).

No-sensory savoring experiences are activities that bring one's focus of attention to the impermanence of a present experience and lead to better savor it. These activities are based on the memory-building technique. One can fully savor a present moment, for instance, taking pictures (e.g., "mindful photography" exercise; Kurtz, & Lyubomirsky, 2012). The memory-building technique leads to the "reminiscence", which allows to savor one's memory of a pleasant past moment (Bryant, Smart, & King, 2005; Parks, & Biswas-Diener, 2013). Whereas reminiscence is a cognitive activity that entails the use of imagery as one revokes a past moment, memory-building technique promotes enjoyment in the moment (Parks, & Biswas-Diener, 2013).

Several studies have investigated the effect of savoring interventions. In their study, Kurtz and Lyubomirsky (2012) found that participants who took "mindful pictures" for two weeks reported a significant higher positive mood comparing to participants who were instructed to take pictures without a specific instruction. Other studies shown that reminiscence leads to increasing positive affect, life satisfaction, as well as improvements in anxious and depressive symptoms (Bryant et al., 2005). Particularly, using deliberately reminiscence with older population led to benefits on life satisfaction (e.g., Cook, 1998).

### 1.2.2.3. Strengths

Strengths are positive characteristics of individuals that are socially morally valued, that are fulfilling, and that are trait-like (Peterson, & Seligman, 2004; Schueller, & Parks, 2014). A strength intervention is an activity that entails the identification, use, and/or promotion of one's personal strength. Generally speaking, strength interventions are based on a common paradigm: take a strengths test (e.g. the Values in Action Survey of Strengths, VIA; Peterson, & Seligman, 2006), receive feedback on one's strengths, and change one's behavior in order to use one's strengths more often (Parks, & Biswas-Diener, 2013).

Identifying and using one's strengths every day leads to increases in happiness and decreases in depressive symptoms after one month of practice. These results are maintained at six-month follow-up among the participants who continued to practice it. A crucial feature of this activity is the actual use of one's strengths. In fact, only learn about one's personal strength has shown to be equivalent to practice a placebo activity (Seligman et al., 2005).

Identify and enhance the development of one's strengths have both psychological and motivational benefits. Improving strengths, in fact, feels intrinsically encouraging people, thus they are more motivated to engage in a strengths-development process (Parks, & Biswas-Diener, 2013). Recently it has been proposed to make some changes to the signature strengths paradigm. For instance, Schwartz and Sharpe (2006) suggested that the activity should not be aimed just to use one's strengths more often, but also to use them well and appropriately. Following this line, it has been proposed to offer also guidelines to help people to use their strengths in a good way (Parks, & Biswas-Diener, 2013). For instance, Haidt (2002) has proposed a list of concrete ideas for situations in which the 24 VIA strengths can be applied.

#### *1.2.2.4. Meaning and optimism*

As we have seen above in the paragraph on gratitude, life narratives and disclosure writing have numerous benefits over people's construction of meaning, their well-being, health, and emotional adjustment (e.g. Frattaroli, 2006; McAdams, Reynolds, Lewis, Patten, & Bowman, 2001). Another way to enhance meaning is through increasing hope and optimism for the future. Specifically, the belief that one's objectives are within one's reach is a central component of well-being (Snyder, 2002).

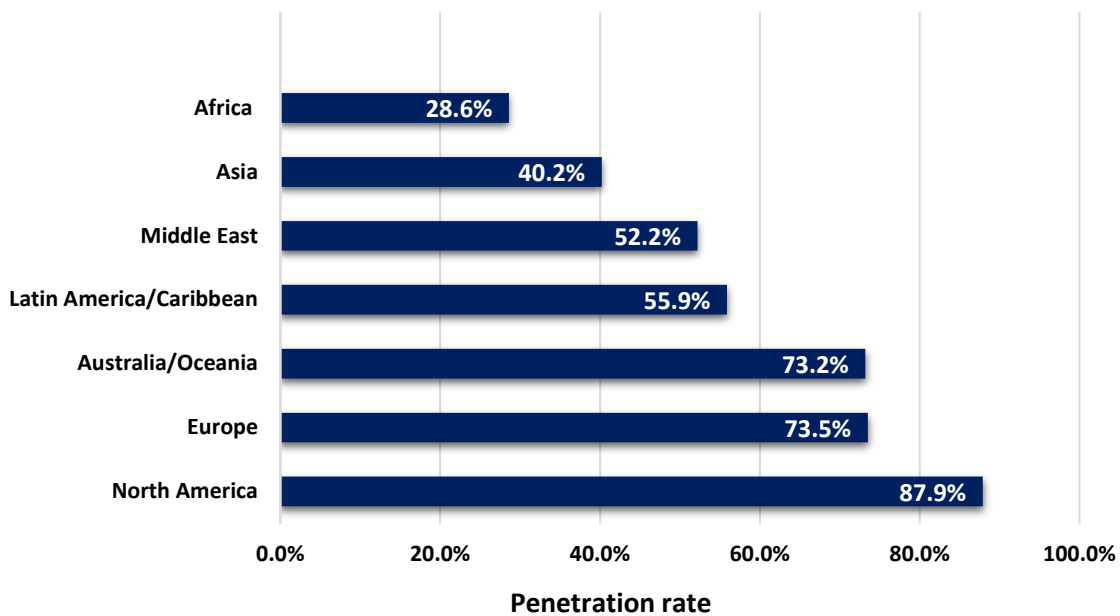
The Best Possible Self intervention (BPS; King, 2001) promotes focus on one's life objectives by requiring people to visualize and write in detail about their "ideal future life". Possible selves have been defined as idiographic representations of objectives (Markus, & Nurius, 1986) among different domains (e.g., relational, professional, health), that people can imagine for themselves (Sheldon, & Lyubomirsky, 2006). Generally, a BPS exercise asks to an individual to reflect, visualize and write about his/her best possible future selves in different domains. Then, the individual is asked to think and write the "baby steps" that he/she should reach in order to achieve the final goal (Layous et al., 2013). Performing these exercises every day have shown to be associated with a significant immediate increase in positive mood, an increase in subjective well-being at 3 weeks, and a decrease illness at 5 months follow-up (King, 2001). Moreover, writing about one's possible selves is associate with other positive outcomes. BPS is an exercise that allows clarifying and restructuring one's priorities, gain insights into one's emotions, values, and reasons; it is therefore related with an increased self-regulation (Sheldon, & Lyubomirsky, 2006). Thinking, visualizing and writing about personal goals, can reduce goal conflict (Pennebaker, 1998), bring clarity and awareness to the priorities



and motivations (Emmons, 1986; Little, 1989; Omodei, & Wearing, 1990; Sheldon, & Lyubomirsky, 2006). Therefore, the BPS exercise can improve psychological adjustment (Rivkin, & Taylor, 1999), gain a feeling of control and awareness about personal goals (Schueller, & Parks, 2014; Lyubomirsky, Sousa, & Dickerhoof, 2006; Roberts, Dutton, Spreitzer, Heaphy, & Quinn, 2005).

### *1.2.3. Online positive psychology interventions*

In the last decade, computer-or web-based interventions have been used to enhance the access to treatments. Global Internet penetration is increasing constantly: in 2012, the worldwide internet penetration was at 34%, whether currently stands at 46.4%, but this rate is higher if we consider singularly the geographic areas (Internet World Stats, 2016) (see Figure 1). Internet is accessible at any time and from different locations, allowing users to access to the net at their own pace and convenience. As the availability of Internet and familiarity with new technologies increase, a growing number of users can have access to the web contents from different places. Internet has the ability to reach a wide range of populations as people who live in rural areas, or who wish to maintain anonymity (Christensen, Griffiths, & Evans, 2002; Griffiths, Lindenmeyer, Powell, Lowe, & Thorogood, 2006; Korp, 2006; Ritterband, Thorndike, Cox, Kovatchev, & Gonder-Frederick, 2009; Ybarra, & Eaton, 2005). Since a key objective of the promotion of mental health is to propose and deliver interventions that are affordable and reachable to everyone, Internet can be an effective medium to deliver mental health interventions.



**Figure 1.** Internet world penetration rates by geographic regions. *Note.* Source: Internet World Stats (<http://www.internetworldstats.com/stats.htm>). Penetration rates are based on a world population of 7.259.902.243 and 3.366.261.156 estimated internet users on November 30 2015.

Ritterband and colleagues (2003) defined online interventions for mental health as “Interventions typically focused on behavioral issues, with the goal of instituting behavior change and subsequent symptom improvement. They are usually self-paced, interactive and tailored to the user, and they make use of the multimedia format offered by the Internet” (pg. 527). People can access to the web contents of an intervention with no or minimal costs, without or with a minimal assistance from a therapist or other mental health professional (e.g., Ashford, Olander, & Ayers, 2016; Griffiths, & Christensen, 2007; Hayward, MacGregor, Peck, & Wilkes, 2007; Kaltenthaler et al., 2006; Mitchell et al., 2010; Muñoz, 2010). Thus, the user can access to the information while keeping his/her anonymity, at the time and place more convenient for him/her and without need for human interaction. Although the text-based format is the most common, web interventions can be enriched with interactive (e.g., the user

can interact with the web elements as move the objects on the screen) and multimedia elements (e.g., audio, video, graphics, pictures, and animations). Using multimedia formats and allowing the user to interact with the web contents can make the intervention more dynamic, and can enhance the interest, engagement, and program adherence (Abbott, Klein, & Ciechowski, 2008; Barak, Klein, & Proudfoot, 2009; Mitchell et al., 2010; Ritterband et al., 2009).

Clearly, the use of Internet for mental health care has its disadvantages. Although the digital divide (i.e., the gap between people that can or cannot have access to the Internet) has been reducing, there are still some sections of the global population who have low or no access to the net (e.g., elderly, and poverty-stricken people). Moreover, computers and in general new media (e.g., tablet, and smartphone) skills are required to access to the web, as well as a propensity to surf the net and to use new technologies (e.g. some people may prefer face-to-face interactions or reading paper books instead of reading digital documents). Online mental health interventions raise also some particular ethical issues, as confidentiality and anonymity, and duty of care (e.g., how to be sure that participants are not minors). For this reason, international guidelines are being developed to address many of these concerns (e.g., Barak et al., 2009; Ritterband, Andersson, Christensen, Carlbring, & Cuijpers, 2006).

The efficacy of these programs for mental health treatment and prevention is well established. Previous meta-analysis shown that web-or computer-based programs can be as effective as the traditional face-to-face ones, and significantly more effective than control conditions for a variety of metal health disorders (e.g., depression, anxiety, and adjustment disorders) (e.g., Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010; Barak, Hen, Boniel-Nissim,

& Shapira, 2008; Clarke, Kuosmanen, & Barry, 2015), and health behaviors (e.g., smoking, healthy eating attitudes, weight loss, and physical activity) (e.g., Baños et al., 2015; Oliver et al., 2015). Moreover, these interventions are acceptable and effective across different populations as children and adolescents (e.g., Calear, Christensen, Mackinnon, Griffiths, & O’Kearney, 2009; Calear, & Christensen, 2010; Richardson, Stallard, & Velleman, 2010; Siemer, Fogel, & Van Voorhees, 2011), students (e.g., Farrer et al., 2013), and older adults (e.g., Preschl, Wagner, Forstmeier, & Maercker, 2011).

The brief duration and simplicity of positive psychology exercises make ideal their online implementation. Indeed, Internet played a major role in the earlier years of positive psychology. We can define online positive psychology interventions (OPPIs) expanding the Ritterband and colleagues definition of online interventions (2003) by adding “improvement of well-being and resilience”, and not just “symptom improvement” (Bolier, 2015; Bolier, & Abello, 2014; Mitchell et al., 2010).

The evaluation of the first positive psychology skills was performed online on [www.authentichappiness.org](http://www.authentichappiness.org), the website that is still one of the most important point of reference for the evaluation of PPIs and for the communication of the positive psychology science. Positive psychology exercises have been applied also on social network. The three good things in life exercise was integrated into Facebook using an application. Users could complete the gratitude journal online and share it with their friends (Munson, Lauterbach, Newman, & Resnick, 2010).

PPIs have been performed also as smartphone application, as in the case of Live Happy, an iPhone application based on Sonja Lyubomirsky's research (Parks, Della Porta, Pierce, Zilca, & Lyubomirsky, 2012). Via this applications, users could have access to eight different happiness exercises (i.e. savoring the moment, remembering happy days, acts of kindness journal, strengthening social relationships, goal evaluation and tracking, gratitude journal, expressing gratitude personally, and thinking optimistically) according to their personal preferences and schedules (Parks et al., 2012). In their study, Parks and colleagues found that the use of Live Happy was linked to increases in well-being. They found that the higher number of positive activities completed and the greater variety of exercises practiced was positively correlated with increased mood and happiness (Parks et al., 2012).

In conclusion, Internet and the new media can play a critical role to disseminate positive psychology interventions into real-world settings (Bolier, 2015). Nevertheless, although preliminary evidences suggest that some OPPIs can effectively enhance well-being and reduce depressive symptoms, the mixed findings within the small number of studies indicated that more high-quality researches are needed to strengthen their evidence-base and to better understand which are their more effective features (Baños, Etchemendy, Carrillo-Vega, & Botella, 2016; Baños, Etchemendy, Mira, Riva, Gaggioli, & Botella, 2017; Bolier, 2015; Bolier, & Abello, 2014; Bolier et al., 2013; Clarke et al., 2015; Mitchell et al., 2010).

## 2. Pregnancy: A challenging time

### 2.1. Well-being during pregnancy

Pregnancy is no longer considered as an easy period in the women life, who can face both physical and psychological challenges and problems. A high importance has been given to the physical health and health habits during pregnancy. A considerable amount of studies have investigated the negative effects of poor health habits during pregnancy as smoking tobacco (e.g., Cnattingius, 2004; Fitzpatrick, Gray, & Quigley, 2016; Li et al., 2015; Linnet et al., 2003), alcohol consumption (e.g., Clarren, & Smith, 1978; Patra, Bakker, Irving, Jaddoe, Malini, & Rehm, 2011; Sokol, Delaney-Black, & Nordstrom, 2003; Streissguth, Bookstein, Barr, Sampson, O'malley, & Young, 2004), unhealthy diet and obesity (e.g., Boney, Verma, Tucker, & Vohr, 2005; Cedergren, 2004; Cnattingius, Bergström, Lipworth, & Kramer, 1998), and gestational diabetes mellitus (e.g., Buchanan, & Xiang, 2005; Crowther, Hiller, Moss, McPhee, Jeffries, & Robinson, 2005).

As well as physical aspects can have a severe impact on prenatal well-being, also psychological factors can have an equal or even higher negative impact on maternal and fetal well-being. Maternal psychological well-being is a wide concept that include psychological (e.g., distress, anxiety, mental health, depression, coping, and problem solving) and social (e.g. social support, culture, work environment) factors related to motherhood (Zafar et al., 2014). Particularly, maternal psychological well-being subsists along a spectrum. At the negative pole of this spectrum there are mental health conditions of differing levels of severity, ranging from distress (e.g., Mulder, De Medina, Huizink, Van den Bergh, Buitelaar, & Visser, 2002; Talge,

Neal, & Glover, 2007; Yali, & Lobel, 1999), mild to moderate pre and post-natal depression (e.g., Brockington, 2004; Deave, Heron, Evans, & Emond, 2008; Haga, Drozd, Brendryen, & Slinning, 2013), anxiety disorders (e.g., Borri et al., 2008; Goodman et al., 2014; Sutter-Dallay, Giaccone-Marcésche, Glatigny-Dallay, & Verdoux, 2004; Uguz, Gezginc, Kayhan, Sari, & Büyüköz, 2010) to more severe conditions as post-traumatic stress disorder (PTSD; e.g., Maggioni, Margola, & Filippi, 2006; Söderquist, Wijma, & Wijma, 2004), bipolar disorder, and psychosis (e.g., Jones, Chandra, Dazzan, & Howard, 2014). Low maternal well-being is also associated with low levels of positive affect, lack of perceived social support, low self-esteem, life satisfaction, and happiness (O'Leary, 2015). Perinatal mental health problems are common. Up to 20% of women develop a mental illness during pregnancy or within the first year after the childbirth (Bauer, Parsonage, Knapp, Lemmi, & Adelaja, 2014). Perinatal mental health problems represent a major public health issue as they have a negative impact on women and on the healthy physical, emotional, and cognitive development of the baby (Bauer et al., 2014).

## 2.2. Prenatal depression

Prenatal depression, which includes antenatal and postpartum depression, has been extensively studied. Its incidence has been estimated to be at 15% in women who live in the developed countries, and at 20-40% in women who lived in the developing world (e.g., Ashford et al., 2016; Osborne, & Monk, 2013; O'Leary, 2015). Antenatal depression has been found to be associated with consequences on the fetus and newborn in terms of, for example, lower orienting and motor abilities, lower attentiveness and expressivity (e.g., Abrams, Field, Scafidi, & Prodromidis, 1995; Lundy, Field, & Pickens, 1996; Zuckerman, Bauchner, Parker, & Cabral,

1990), increased fetal activity (Dieter et al., 2001), prematurity and low birthweight (Field et al., 2001). Moreover, the results of Field and colleagues (2001) shown that prenatal depression and biochemistry explained between 8 and 21% of the variance in neonatal neurobehavioral profiles. Antenatal depression is also one of the strongest predictors of postpartum depression (O'Leary, 2015; Robertson, Grace, Wallington, & Stewart, 2004). Women who suffers from baby blues commonly experience hopelessness, tearfulness, inadequacy, guilt, inability to enjoy the arrival of the baby, anxiety and agitation, scarce memory and concentration, sleeping problems, social isolation, fatigue, and suicidal thoughts (Haga et al., 2013; Robertson et al, 2004). Furthermore, women with postpartum depression are less capable to engage in developmental activities important for the newborn, as playing and talking with the baby. This lack can have an important influence on the baby's socioemotional and cognitive development (Goodman, Brogan, Lynch, & Fielding, 1993) and the child's attachment style (Bonari, Bennett, Einarson, & Koren, 2004; Haga et al., 2013).

### 2.3. Prenatal anxiety

Although the high number of studies on perinatal depression and the well-established strong co-morbidity between depression and anxiety, the understanding of perinatal anxiety disorders is still at an initial stage (Goodman et al., 2014; Van den Bergh, Mulder, Mennes, & Glover, 2005). The incidence of anxiety disorders during pregnancy can vary from 12.2 to 39% (e.g., Borri et al., 2008; Goodman et al., 2014; Sutter-Dallay et al., 2004). Specifically, generalized anxiety disorder (GAD) is the most widespread among pregnant women with rates up to 10.5% (Adewuya, Ola, Aloba, & Mapayi, 2006; Goodman et al., 2014). An even greater number of pregnant women experience subclinical levels of anxiety (e.g., Andersson,



Sundstrom-Poromaa, Wulff, Astrom, & Bixo, 2006; Heron, O'Connor, Evans, Golding, Glover 2004). Some inner pregnancy factors can contribute to enhance the vulnerability of these women to experience anxiety. These factors are, for instance, physical discomfort, hormonal and physiological changes, fears about the childbirth and pregnancy or childbirth complications, feels of uncertainty, and increased perceived stress (Wenzel, & Stuart, 2011). Prenatal anxiety is associated with an increased risk of alcohol and tobacco use of pregnant women (Alvik, Heyerdahl, Haldorsen, & Lindemann, 2006; Goodwin, Keyes, Simuro, 2007), increased negative pregnancy-related symptoms (e.g. nausea, vomit) (Swallow, Lindow, Masson, & Hay, 2004), and obstetric complications (Andersson et al., 2004; Fisk, & Glover, 1999). Prenatal anxiety has also an impact on the fetal neurodevelopment, and later child behavioral–emotional development (e.g., Alder, Fink, Bitzer, Hosli, Holzgreve, 2007; Glover, & O'Connor, 2006; Goodman et al., 2014; Dunkel Schetter, & Tanner, 2012). Specifically, newborn babies showed less good scores at neurological examination (Ferreira, 1960), in behavioral states (Gottlieb, 2014), and cardiac vagal tone (Montagu, 1962). Pre-school children and children shown behavioral and emotional problems, poor attention, and hyperactivity (Roberts et al., 2005). Specifically, Van den Bergha and colleagues (2005) reported that mothers in the top 15% for antenatal anxiety symptoms shown to have a doubled risk for attention deficit/hyperactivity Disorder (ADHD) in their child at age 7. Finally, during adolescence, they showed to perform impulsive behaviors (Van den Bergha et al., 2005). These regulation problems found in children of mothers who were highly anxious/stressed during pregnancy could be related to the fetal programming (the phenomenon whereby changes in the fetal environment, can cause perdurable changes in

structure and function) of the Hypothalamic–Pituitary–Adrenal-axis, limbic system, and prefrontal cortex. However, it is still not clear how fetal programming works in humans, and in which specific ways some disturbances can alter the neurobehavioral development (Van den Bergha et al., 2005).

## 2.4. Prenatal distress

It has been estimated that 25% of all pregnant women experience prenatal stress (O'Leary, 2015; Yali, & Lobel, 1999). It can be caused by different factors and/or events called stressors. Pregnant women can be affected by stressors as family responsibilities, employment conditions, financial problems, lack of perceived support from the institutions, and pregnancy-related concerns. Pregnancy-specific stressors include worries about the childbirth and parenting, concerns about the baby's health, physical symptoms, body changes, relationship strains, and lack of perceived social support (e.g., Affonso, Liu-Chiang, & Mayberry, 1999; Lobel, Cannella, Graham, DeVincent, Schneider, & Meyer, 2008; Misra, O'Campo, & Strobino, 2001; Yali, & Lobel, 1999). A wide variety of stressors, both chronic and acute, has shown to be linked to altered child outcome (Glover, 2011). The effects of some acute disasters (i.e. 9/11, Chernobyl, and a Canadian ice storm) (e.g., Laplante, Brunet, Schmitz, Ciampi, & King, 2008; Yehuda, Engel, Brand, Seckl, Marcus, & Berkowitz, 2005) as well as milder stressors (e.g. daily hassles, or pregnancy-specific stressors) have been demonstrated to have altered child effects (Glover, 2011). Many studies have identified which outcomes can be increased by prenatal stress. Dunkel Schetter and colleagues (Dunkel Schetter, & Glynn, 2010; Dunkel Schetter, 2011) provide an exhaustive review about the adverse effects of stress on birth outcomes in terms of pre-term birth and low birth weight. Stress during pregnancy is associated

to increased risk for the child to develop ADHD (e.g., Huizink, de Medina, Mulder, Visser, & Buitelaar, 2002; O'Connor, Heron, Golding, & Glover, 2003; Rodriguez, & Bohlin, 2005; Van Den Bergh, & Marcoen, 2004), anxiety (e.g., Bergman, Sarkar, O'Connor, Modi, & Glover, 2007; Van Den Bergh & Marcoen, 2004), and conduct disorder (e.g., Barker, & Maughan, 2009). Other risks are developing an altered function of the HPA axis (e.g., Gutteling, de Weerth, & Buitelaar, 2005; Van den Bergh, Van Calster, Smits, Van Huffel, & Lagae, 2008; Yehuda et al., 2005), and cognitive deficits (e.g., Bergman et al., 2007; Laplante et al., 2008). The timing at which the women experience stress during pregnancy is also an important variable that has to be taken in consideration (e.g., Littleton, Bye, Buck, & Amacker, 2010; O'Leary, 2015). Evidences suggested that stressful events occurring at an early stage of pregnancy, are experiences as more stressful than events occurring at the last stages (e.g., Glynn, Wadhwa, Dunkel Schetter, Chicz-DeMet, & Sandman, 2001; Glynn, Dunkel Schetter, Wadhwa, & Sandman, 2004; O'Leary, 2015). Nevertheless, it has been suggested that a mild level of prenatal stress may alter the child outcome in a positive way, specifically increasing mental and motor development (DiPietro, Novak, Costigan, Atella, & Reusing, 2006). This can be explained by the fact that mild-moderate levels of stress in healthy women can enhance the fetal development. It has been argued also that these levels of stress might increase vigilance (anxiety) and the rate of physical maturation (motor development) that can be used in future times of stress perceived by the child (Glover, 2011).

### 3. Outline of this dissertation

As we have seen, the scientific literature has extensively examined and proved that low prenatal well-being can have significant negative physical and psychological consequences

both on the mother and on the newborn. Nevertheless, since the WHO has recently coined the concept of “positive pregnancy experience”, which includes not only treatment of diseases, but also health education, and health promotion (WHO, 2016), research on antenatal care has expanded to a salutogenic perspective. In the wake of this perspective, a growing number of research have been examining the potential benefits of positive aspects and protective factors on maternal perinatal well-being and childbirth. Furthermore, this salutogenic perspective is supported by Positive Psychology and, recently, researchers have started to investigate the effects of PPIs on women’s perinatal well-being. The aim of this thesis is to review the existing scientific literature, and to investigate the potential effects and feasibility of a novel online-based positive psychology program on women’s prenatal well-being.

**Chapter 2** presents a narrative review of PPIs addressed to improve women’s mental well-being during the perinatal period. Systematic searches of four online databases were conducted in combination with manual searches of reference lists. Studies published between 2000 and 2017 about mental health interventions that include at least one PPI addressed to women during the perinatal period were included. Two intervention programs were identified and critically reviewed. This comprehensive narrative review has synthesized the first positive interventions in the wake of a new salutogenic model of pregnancy care.

**Chapter 3** focuses on the design of *Embarazo y Bienestar*, a novel web-based positive psychology intervention addressed to support and fosters women’s mental well-being during the prenatal period. Specifically, the chapter presents the study protocol of *Embarazo y Bienestar*. The objective of this study is to provide data from a Randomized Control Trial (RCT)

to assess the effectiveness of this protocol among pregnant women, compared to a waiting list control group.

**Chapter 4** reports the results of a case series study about the effects of *Embarazo y Bienestar* on indices of women's prenatal well-being. Specifically, data from six women are presented. The findings of this study indicate potential effects of the intervention on supporting mental well-being and decreasing depressive symptomatology in pregnant women.

**Chapter 5 and 6** report on two studies that were conducted with the aim to translate and adapt the intervention to the Italian language. Specifically, the Subjective Probability Task (SPT; MacLeod, Byrne, & Valentine, 1996) and the Scale of Positive and Negative Experience (SPANE; Diener et al., 2010) have been validated in an Italian-speaking population.

**Chapter 7** reports the results of a feasibility study, conducted in different countries, to investigate acceptance and possible benefits of *Embarazo y Bienestar* among pregnant women.

**Chapter 8** will provide a general overview and discussion of results of the studies that were presented in this thesis. Implications of the intervention, its methodological limitations, as well as recommendations for future research on PPIs in the perinatal period will be discussed.

## 4. References

Abbott, J.A.M., Klein, B., & Ciechomski, L. (2008). Best practices in online therapy. *Journal of Technology in Human Services, 26*(2-4), 360-375.

Abrams, S.M., Field, T., Scafidi, F., & Prodromidis, M. (1995). Newborns of depressed mothers. *Infant Mental Health Journal, 16*(3), 233-239.

Adewuya, A.O., Ola, B.A., Aloba, O.O., & Mapayi, B.M. (2006). Anxiety disorders among Nigerian women in late pregnancy: a controlled study. *Archives of Women's Mental Health, 9*(6), 325-328.

Affonso, D.D., Liu-Chiang, C.Y., & Mayberry, L.J. (1999). Worry: Conceptual dimensions and relevance to childbearing women. *Health Care for Women International, 20*(3), 227-236.

Alder, J., Fink, N., Bitzer, J., Hösli, I., & Holzgreve, W. (2007). Depression and anxiety during pregnancy: a risk factor for obstetric, fetal and neonatal outcome? A critical review of the literature. *The Journal of Maternal-Fetal & Neonatal Medicine, 20*(3), 189-209.

Alvik, A., Heyerdahl, S., Haldorsen, T., & Lindemann, R. (2006). Alcohol use before and during pregnancy: a population-based study. *Acta Obstetrica et Gynecologica Scandinavica, 85*(11), 1292-1298.

Andersson, L., Sundström-Poromaa, I., Wulff, M., Åström, M., & Bixo, M. (2006). Depression and anxiety during pregnancy and six months postpartum: A follow-up study. *Acta Obstetrica et Gynecologica Scandinavica, 85*(8), 937-944.

Andrews, G., Cuijpers, P., Craske, M.G., McEvoy, P., & Titov, N. (2010). Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: a meta-analysis. *PloS One*, *5*(10), e13196.

Ashford, M.T., Olander, E.K., & Ayers, S. (2016). Computer-or web-based interventions for perinatal mental health: A systematic review. *Journal of Affective Disorders*, *197*, 134-146.

Baños, R.M., Etchemendy, E., Carrillo-Vega, A., & Botella, C. (2016). Positive Psychological Interventions and Information and Communication Technologies. In D. Villani, P. Ciproso, A. Gaggioli, & G. Riva (Eds.), *Integrating Technology in Positive Psychology Practice* (pp. 38-58). IGI Global.

Baños, R.M., Etchemendy, E., Mira, A., Riva, G., Gaggioli, A., & Botella, C. (2017). Online Positive interventions to Promote Well-being and resilience in the Adolescent Population: A Narrative review. *Frontiers in Psychiatry*, *8*.

Baños, R.M., Mensorio, M.S., Cebolla, A., Rodilla, E., Palomar, G., Lisón, J., & Botella, C. (2015). An internet-based self-administered intervention for promoting healthy habits and weight loss in hypertensive people who are overweight or obese: a randomized controlled trial. *BMC Cardiovascular Disorders*, *15*(1), 1.

Barak, A., Hen, L., Boniel-Nissim, M., & Shapira, N.A. (2008). A comprehensive review and a meta-analysis of the effectiveness of internet-based psychotherapeutic interventions. *Journal of Technology in Human Services*, *26*(2-4), 109-160.

Barak, A., Klein, B., & Proudfoot, J.G. (2009). Defining internet-supported therapeutic interventions. *Annals of Behavioral Medicine*, *38*(1), 4-17.

Barker, E.D., & Maughan, B. (2009). Differentiating early-onset persistent versus childhood-limited conduct problem youth. *American Journal of Psychiatry*, *166*(8), 900-908.

Bauer, A., Parsonage, M., Knapp, M., Lemmi, V., & Adelaja, B. (2014). *Costs of perinatal mental health problems*. London, UK: London School of Economics and Political Science.

Bergman, K., Sarkar, P., O'connor, T.G., Modi, N., & Glover, V. (2007). Maternal stress during pregnancy predicts cognitive ability and fearfulness in infancy. *Journal of the American Academy of Child & Adolescent Psychiatry*, *46*(11), 1454-1463.

Boehm, J.K., Lyubomirsky, S., & Sheldon, K.M. (2011). A longitudinal experimental study comparing the effectiveness of happiness-enhancing strategies in Anglo Americans and Asian Americans. *Cognition & Emotion*, *25*(7), 1263-1272.

Bolier, J.M. (2015). *Positive psychology online: Using the internet to promote flourishing on a large scale* (Unpublished doctoral dissertation), Universiteit Twente, Twente, Netherlands.

Bolier, L. & Abello, K.M. (2014) Online Positive Psychological Interventions: State of the Art and Future Directions. In A.C. Parks, & S.M. Schueller (Eds.), *The Wiley Blackwell Handbook of Positive Psychological Interventions* (pp. 286-309). Chichester, UK: John Wiley & Sons, Ltd.

Bolier, L., Haverman, M., Westerhof, G.J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health*, *13*(1), 1.



Bonari, L., Bennett, H., Einarson, A., & Koren, G. (2004). Risks of untreated depression during pregnancy. *Canadian Family Physician, 50*(1), 37-39.

Boney, C.M., Verma, A., Tucker, R., & Vohr, B.R. (2005). Metabolic syndrome in childhood: association with birth weight, maternal obesity, and gestational diabetes mellitus. *Pediatrics, 115*(3), e290-e296.

Borri, C., Mauri, M., Oppo, A., Banti, S., Rambelli, C., Ramacciotti, D., ... & Ricciardulli, S. (2008). Axis I psychopathology and functional impairment at the third month of pregnancy: Results from the Perinatal Depression-Research and Screening Unit (PND-ReScU) study. *The Journal of Clinical Psychiatry, 69*(10), 1617-1624.

Bryant, F.B., Smart, C.M., & King, S.P. (2005). Using the past to enhance the present: Boosting happiness through positive reminiscence. *Journal of Happiness Studies, 6*(3), 227-260.

Bryant, F.B., & Veroff, J. (2007). *Savoring: A new model of positive experience*. Lawrence Erlbaum Associates Publishers.

Brockington, I. (2004). Postpartum psychiatric disorders. *The Lancet, 363*(9405), 303-310.

Buchanan, T.A., & Xiang, A.H. (2005). Gestational diabetes mellitus. *Journal of Clinical Investigation, 115*(3), 485.

Calear, A.L., & Christensen, H. (2010). Review of internet-based prevention and treatment programs for anxiety and depression in children and adolescents. *Medical Journal of Australia*, 192(11), S12.

Calear, A.L., Christensen, H., Mackinnon, A., Griffiths, K.M., & O'Kearney, R. (2009). The YouthMood Project: a cluster randomized controlled trial of an online cognitive behavioral program with adolescents. *Journal of Consulting and Clinical Psychology*, 77(6), 1021.

Cedergren, M.I. (2004). Maternal morbid obesity and the risk of adverse pregnancy outcome. *Obstetrics & Gynecology*, 103(2), 219-224.

Christensen, H., Griffiths, K.M., Evans, K. (2002). e-Mental Health in Australia: Implications of the Internet and Related Technologies for Policy. ISC Discussion Paper No 3. Commonwealth Department of Health and Ageing, Canberra.

Clarke, A.M., Kuosmanen, T., & Barry, M.M. (2015). A systematic review of online youth mental health promotion and prevention interventions. *Journal of Youth and Adolescence*, 44(1), 90-113.

Clarren, S.K., & Smith, D.W. (1978). The fetal alcohol syndrome. *New England Journal of Medicine*, 298(19), 1063-1067.

Cnattingius, S. (2004). The epidemiology of smoking during pregnancy: smoking prevalence, maternal characteristics, and pregnancy outcomes. *Nicotine & Tobacco Research*, 6(2), S125-S140.

Cnattingius, S., Bergström, R., Lipworth, L., & Kramer, M.S. (1998). Prepregnancy weight and the risk of adverse pregnancy outcomes. *New England Journal of Medicine*, *338*(3), 147-152.

Cohen, S., Alper, C.M., Doyle, W.J., Treanor, J.J., & Turner, R.B. (2006). Positive emotional style predicts resistance to illness after experimental exposure to rhinovirus or influenza A virus. *Psychosomatic Medicine*, *68*(6), 809-815.

Cook, E.A. (1998). Effects of reminiscence on life satisfaction of elderly female nursing home residents. *Health Care for Women International*, *19*(2), 109-118.

Crowther, C.A., Hiller, J.E., Moss, J.R., McPhee, A.J., Jeffries, W.S., & Robinson, J.S. (2005). Effect of treatment of gestational diabetes mellitus on pregnancy outcomes. *New England Journal of Medicine*, *352*(24), 2477-2486.

Cuijpers, P., van Straten, A., Andersson, G., & van Oppen, P. (2008). Psychotherapy for depression in adults: a meta-analysis of comparative outcome studies. *Journal of Consulting and Clinical Psychology*, *76*(6), 909.

Deave, T., Heron, J., Evans, J., & Emond, A. (2008). The impact of maternal depression in pregnancy on early child development. *BJOG: An International Journal of Obstetrics & Gynaecology*, *115*(8), 1043-1051.

Deci, E.D. (1975). *Intrinsic motivation*. Springer US.

Delle Fave, A. (2004). Editorial-Positive Psychology and the pursuit of complexity. *Ricerche di Psicologia*, *27*, 7-12.

Delle Fave, A. (Ed.) (2007). *La condivisione del benessere. Il contributo della psicologia positiva* (Vol. 297). Milano: Franco Angeli.

Delle Fave, A., Pozzo, M., Bassi, M., & Cetin, I. (2013). A longitudinal study on motherhood and well-being: Developmental and clinical implications. *Terapia Psicologica, 1*(1), 21-33.

Diener, E. (2009). Subjective well-being. In E. Diener (Ed.), *The science of well-being: The collected works of Ed Diener* (Vol. 37, pp.11-58). Netherlands: Springer Science & Business Media.

Diener, E., & Chan, M.Y. (2011). Happy people live longer: Subjective well-being contributes to health and longevity. *Applied Psychology: Health and Well-Being, 3*(1), 1-43.

Diener, E., Emmons, R.A., Larsen, R.J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment, 49*(1), 71-75.

Diener, E., & Lucas, R.E. (1999). Personality and subjective well-being. In D. Kahneman, E. Diener, & N. Schwartz (Eds.), *Well-Being: the foundations of hedonic psychology* (213-230). New York: Russell Sage Foundation.

Diener, E., Lucas, R.E., & Oishi, S. (2002). Subjective well-being. *Handbook of Positive Psychology, 63-73*.

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D.W., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research, 97*(2), 143-156.

Dieter, N.I., Field, T., Hernandez-Reif, M., Jones, N.A., Lecanuet, J.P., Salman, F.A., Redzepi, M.J. (2001). Maternal depression and increased fetal activity. *Journal of Obstetrics and Gynaecology*, 21(5), 468-473.

DiPietro, J.A., Novak, M.F., Costigan, K.A., Atella, L.D., & Reusing, S.P. (2006). Maternal psychological distress during pregnancy in relation to child development at age two. *Child Development*, 77(3), 573-587.

Dunkel Schetter, C. (2011). Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annual Review of Psychology*, 62, 531-558.

Dunkel Schetter, C., & Glynn, L.M. (2010). Stress in pregnancy: empirical evidence and theoretical issues to guide interdisciplinary research. In R.J. Contrada, & A. Baum (Eds.), *The handbook of stress science* (pp. 321-343). New York: Springer.

Dunkel Schetter, C., & Tanner, L. (2012). Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Current Opinion in Psychiatry*, 25(2), 141.

Emmons, R.A. (1986). Personal strivings: An approach to personality and subjective well-being. *Journal of Personality and Social Psychology*, 51(5), 1058.

Emmons, R.A., & McCullough, M.E. (2003). Counting blessings versus burdens: an experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology*, 84(2), 377.

Farrer, L., Gulliver, A., Chan, J.K., Batterham, P.J., Reynolds, J., Calear, A., ... & Griffiths, K.M. (2013). Technology-based interventions for mental health in tertiary students: systematic review. *Journal of Medical Internet Research*, 15(5), e101.

Feldman, R.S. (2011). *Essentials of understanding psychology*. Boston: McGraw-Hill.

Ferreira, A.J. (1960). The pregnant woman's emotional attitude and its reflection on the newborn. *American Journal of Orthopsychiatry*, 30(3), 553.

Field, T., Diego, M.A., Dieter, J., Hernandez-Reif, M., Schanberg, S., Kuhn, C., ... & Bendell, D. (2001). Depressed withdrawn and intrusive mothers' effects on their fetuses and neonates. *Infant Behavior and Development*, 24(1), 27-39.

Fisk, N.M., & Glover, V. (1999). Association between maternal anxiety in pregnancy and increased uterine artery resistance index: cohort based study. *BMJ*, 318(7177), 153-157.

Fitzpatrick, K.E., Gray, R., & Quigley, M.A. (2016). Women's longitudinal patterns of smoking during the pre-conception, pregnancy and postnatal period: evidence from the UK Infant Feeding Survey. *PloS one*, 11(4), e0153447.

Fordyce, M.W. (1977). Development of a program to increase personal happiness. *Journal of Counseling Psychology*, 24(6), 511.

Frattaroli, J. (2006). Experimental disclosure and its moderators: a meta-analysis. *Psychological Bulletin*, 132(6), 823.

Fredrickson, B.L. (1998). What good are positive emotions?. *Review of General Psychology*, 2(3), 300.

Fredrickson, B.L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*(3), 218.

Fredrickson, B.L. (2003). The value of positive emotions. *American Scientist*, *91*(4), 330-335.

Fredrickson, B.L. (2009). *Positivity*. New York: Three Rivers Press.

Fredrickson, B.L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, *13*(2), 172-175.

Fredrickson, B.L., Tugade, M.M., Waugh, C.E., & Larkin, G.R. (2003). What good are positive emotions in crisis? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11th, 2001. *Journal of Personality and Social Psychology*, *84*(2), 365.

Glover, V. (2011). Annual research review: prenatal stress and the origins of psychopathology: an evolutionary perspective. *Journal of Child Psychology and Psychiatry*, *52*(4), 356-367.

Glover, V., & O'Connor, T. (2006). Maternal anxiety: its effect on the fetus and the child. *British Journal of Midwifery*, *14*(11).

Glynn, L.M., Dunkel Schetter, C., Wadhwa, P.D., & Sandman, C.A. (2004). Pregnancy affects appraisal of negative life events. *Journal of Psychosomatic Research*, *56*(1), 47-52.

Glynn, L.M., Wadhwa, P.D., Dunkel Schetter, C., Chicz-DeMet, A., & Sandman, C.A. (2001). When stress happens matters: effects of earthquake timing on stress responsivity in pregnancy. *American Journal of Obstetrics and Gynecology*, *184*(4), 637-642.

Goodman, S.H., Brogan, D., Lynch, M.E., & Fielding, B. (1993). Social and emotional competence in children of depressed mothers. *Child Development*, *64*(2), 516-531.

Goodman, J.H., Guarino, A., Chenausky, K., Klein, L., Prager, J., Petersen, R., ... & Freeman, M. (2014). CALM Pregnancy: results of a pilot study of mindfulness-based cognitive therapy for perinatal anxiety. *Archives of Women's Mental Health*, *17*(5), 373-387.

Goodwin, R.D., Keyes, K., & Simuro, N. (2007). Mental disorders and nicotine dependence among pregnant women in the United States. *Obstetrics & Gynecology*, *109*(4), 875-883.

Gottlieb, G. (2014). *Synthesizing nature-nurture: Prenatal roots of instinctive behavior*. New York: Psychology Press.

Griffiths, K.M., & Christensen, H. (2007). Internet-based mental health programs: A powerful tool in the rural medical kit. *Australian Journal of Rural Health*, *15*(2), 81-87.

Griffiths, F., Lindenmeyer, A., Powell, J., Lowe, P., & Thorogood, M. (2006). Why are health care interventions delivered over the internet? A systematic review of the published literature. *Journal of Medical Internet Research*, *8*(2), e10.

Gutteling, B.M., de Weerth, C., & Buitelaar, J. K. (2005). Prenatal stress and children's cortisol reaction to the first day of school. *Psychoneuroendocrinology*, *30*(6), 541-549.



Haga, S.M., Drozd, F., Brendryen, H., & Slinning, K. (2013). Mamma mia: a feasibility study of a web-based intervention to reduce the risk of postpartum depression and enhance subjective well-being. *JMIR Research Protocols*, 2(2).

Haidt, J. (2002). *It's more fun to work on strengths than weaknesses (but it may be better for you)*. (Unpublished manuscript). Retrieved from Monash University.

Hayward, L., MacGregor, A.D., Peck, D.F., & Wilkes, P. (2007). The feasibility and effectiveness of computer-guided CBT (FearFighter) in a rural area. *Behavioural and Cognitive Psychotherapy*, 35(04), 409-419.

Hefferon, K. (2012). Bringing back the body into positive psychology: The theory of corporeal posttraumatic growth in breast cancer survivorship. *Psychology*, 3(12), 1238.

Heron, J., O'Connor, T.G., Evans, J., Golding, J., Glover, V., & ALSPAC Study Team. (2004). The course of anxiety and depression through pregnancy and the postpartum in a community sample. *Journal of Affective Disorders*, 80(1), 65-73.

Hone, L.C., Jarden, A., & Schofield, G.M. (2015). An evaluation of positive psychology intervention effectiveness trials using the re-aim framework: A practice-friendly review. *The Journal of Positive Psychology*, 10(4), 303-322.

Howell, R.T., Kern, M.L., & Lyubomirsky, S. (2007). Health benefits: Meta-analytically determining the impact of well-being on objective health outcomes. *Health Psychology Review*, 1(1), 83-136.

Huizink, A.C., De Medina, P.G.R., Mulder, E.J., Visser, G.H., & Buitelaar, J.K. (2002). Psychological measures of prenatal stress as predictors of infant temperament. *Journal of the American Academy of Child & Adolescent Psychiatry*, 41(9), 1078-1085.

Jones, I., Chandra, P.S., Dazzan, P., & Howard, L.M. (2014). Bipolar disorder, affective psychosis, and schizophrenia in pregnancy and the post-partum period. *The Lancet*, 384(9956), 1789-1799.

Kabat-Zinn, J. (2009). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York: Bantam Books Trade Paperbacks.

Kahneman, D., Diener, E., & Schwarz, N. (Eds.). (1999). *Well-being: Foundations of hedonic psychology*. Russell Sage Foundation.

Kaltenthaler, E., Brazier, J., De Nigris, E., Tumur, I., Ferriter, M., Beverley, C., ... & Sutcliffe, P. (2006). Computerised cognitive behaviour therapy for depression and anxiety update: a systematic review and economic evaluation. *Health Technology Assessment*, 10(33), 1-186.

Kashdan, T.B., Biswas-Diener, R., & King, L.A. (2008). Reconsidering happiness: The costs of distinguishing between hedonics and eudaimonia. *The Journal of Positive Psychology*, 3(4), 219-233.

Keyes, C.L. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology*, 73(3), 539.

Keyes, C.L. (2007). Promoting and protecting mental health as flourishing: a complementary strategy for improving national mental health. *American Psychologist*, 62(2), 95.

Keyes, C.L., Dhingra, S.S., & Simoes, E.J. (2010). Change in level of positive mental health as a predictor of future risk of mental illness. *American Journal of Public Health*, 100(12), 2366-2371.

Keyes, C.L., & Grzywacz, J.G. (2005). Health as a complete state: The added value in work performance and healthcare costs. *Journal of Occupational and Environmental Medicine*, 47(5), 523-532.

Keyes, C.L., Shmotkin, D., & Ryff, C.D. (2002). Optimizing well-being: the empirical encounter of two traditions. *Journal of Personality and Social Psychology*, 82(6), 1007.

King, L.A. (2001). The health benefits of writing about life goals. *Personality and Social Psychology Bulletin*, 27(7), 798-807.

Kok, B.E., Coffey, K.A., Cohn, M.A., Catalino, L.I., Vacharkulksemsuk, T., Algoe, S.B., ... & Fredrickson, B.L. (2013). How positive emotions build physical health perceived positive social connections account for the upward spiral between positive emotions and vagal tone. *Psychological Science*, 24(7), 1123-1132.

Korp, P. (2006). Health on the Internet: implications for health promotion. *Health Education Research*, 21(1), 78-86.

Kurtz, J.L., & Lyubomirsky, S. (2012). Using mindful photography to increase positive emotion and appreciation. In J. Froh, & A.C., Parks, (Eds.), *Activities for Teaching Positive Psychology: A Guide for Instructors* (pp. 133-136). Washington, DC: American Psychological Association Press.

Lamers, S.M., Bolier, L., Westerhof, G.J., Smit, F., & Bohlmeijer, E.T. (2012). The impact of emotional well-being on long-term recovery and survival in physical illness: a meta-analysis. *Journal of Behavioral Medicine, 35*(5), 538-547.

Laplante, D.P., Brunet, A., Schmitz, N., Ciampi, A., & King, S. (2008). Project Ice Storm: prenatal maternal stress affects cognitive and linguistic functioning in 5½-year-old children. *Journal of the American Academy of Child & Adolescent Psychiatry, 47*(9), 1063-1072.

Layous, K., Nelson, S.K., & Lyubomirsky, S. (2013). What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *Journal of Happiness Studies, 14*(2), 635-654.

Lee Duckworth, A., Steen, T.A., & Seligman, M.E. (2005). Positive psychology in clinical practice. *Annual Review of Clinical Psychology, 1*, 629-651.

Li, L., Peters, H., Gama, A., Carvalhal, M.I.M., Nogueira, H.G.M., Rosado-Marques, V., & Padez, C. (2015). Maternal smoking in pregnancy association with childhood adiposity and blood pressure. *Pediatric Obesity, 11*, 202-209.

Linnet, K.M., Dalsgaard, S., Obel, C., Wisborg, K., Henriksen, T.B., Rodriguez, A., ... & Jarvelin, M.R. (2003). Maternal lifestyle factors in pregnancy risk of attention deficit

hyperactivity disorder and associated behaviors: review of the current evidence. *American Journal of Psychiatry*, 160(6), 1028-1040.

Little, B.R. (1989). Personal projects analysis: Trivial pursuits, magnificent obsessions, and the search for coherence. In D.M. Buss, & N. Cantor (Eds.), *Personality psychology* (pp. 15-31). New York: Springer-Verlag.

Littleton, H.L., Bye, K., Buck, K., & Amacker, A. (2010). Psychosocial stress during pregnancy and perinatal outcomes: a meta-analytic review. *Journal of Psychosomatic Obstetrics & Gynecology*, 31(4), 219-228.

Lobel, M., Cannella, D. L., Graham, J.E., DeVincent, C., Schneider, J., & Meyer, B.A. (2008). Pregnancy-specific stress, prenatal health behaviors, and birth outcomes. *Health Psychology*, 27(5), 604.

Lundy, B., Field, T., & Pickens, J. (1996). Newborns of mothers with depressive symptoms are less expressive. *Infant Behavior and Development*, 19(4), 419-424.

Lyubomirsky, S. (2008). *The how of happiness: A scientific approach to getting the life you want*. New York: The Penguin Press.

Lyubomirsky, S., Dickerhoof, R., Boehm, J.K., & Sheldon, K.M. (2011). Becoming happier takes both a will and a proper way: an experimental longitudinal intervention to boost well-being. *Emotion*, 11(2), 391.

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: does happiness lead to success?. *Psychological Bulletin*, 131(6), 803.

Lyubomirsky, S., Sheldon, K.M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology, 9*(2), 111.

Lyubomirsky, S., Sousa, L., & Dickerhoof, R. (2006). The costs and benefits of writing, talking, and thinking about life's triumphs and defeats. *Journal of Personality and Social Psychology, 90*(4), 692.

Maggioni, C., Margola, D., & Filippi, F. (2006). PTSD, risk factors, and expectations among women having a baby: a two-wave longitudinal study. *Journal of Psychosomatic Obstetrics & Gynecology, 27*(2), 81-90.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist, 41*(9), 954.

Maslow, A.H. (2013). *Toward a psychology of being*. Start Publishing LLC.

Maslow, A.H., Frager, R., & Cox, R. (1970). *Motivation and personality*. In J. Fadiman, & C. McReynolds (Eds.) (Vol. 2, pp. 1887-1904). New York: Harper & Row.

McAdams, D.P., Reynolds, J., Lewis, M., Patten, A.H., & Bowman, P.J. (2001). When bad things turn good and good things turn bad: Sequences of redemption and contamination in life narrative and their relation to psychosocial adaptation in midlife adults and in students. *Personality and Social Psychology Bulletin, 27*(4), 474-485.

MacLeod, A.K., Byrne, A., Valentine, J.D. (1996). Affect, emotional disorder, and future-directed thinking. *Cognition & Emotion, 10*(1), 69-86.

Meevissen, Y.M., Peters, M.L., & Alberts, H.J. (2011). Become more optimistic by imagining a best possible self: Effects of a two week intervention. *Journal of Behavior Therapy and Experimental Psychiatry*, 42(3), 371-378.

Meyers, J., & Meyers, B. (2003). Bi-directional influences between positive psychology and primary prevention. *School Psychology Quarterly*, 18(2), 222.

Misra, D.P., O'Campo, P., & Strobino, D. (2001). Testing a sociomedical model for preterm delivery. *Paediatric and Perinatal Epidemiology*, 15(2), 110-122.

Mitchell, J., Vella-Brodrick, D., & Klein, B. (2010). Positive psychology and the internet: A mental health opportunity. *E-Journal of Applied Psychology*, 6(2), 30-41.

Montagu, M.F. (1962). *Prenatal influences*. Charles C. Thomas.

Mulder, E.J., De Medina, P.R., Huizink, A.C., Van den Bergh, B.R., Buitelaar, J.K., & Visser, G.H. (2002). Prenatal maternal stress: effects on pregnancy and the (unborn) child. *Early Human Development*, 70(1), 3-14.

Muñoz, R.F. (2010). Using evidence-based internet interventions to reduce health disparities worldwide. *Journal of Medical Internet Research*, 12(5), e60.

Munson, S.A., Lauterbach, D., Newman, M.W., & Resnick, P. (2010, June). Happier together: integrating a wellness application into a social network site. In T. Ploug, P. Hasle, H. Oinas-Kukkonen (Eds.), *Persuasive Technology* (vol. 6137, pp. 27-39). Springer Berlin Heidelberg.

Nussbaum, M., & Sen, A. (Eds.). (1993). *The quality of life*. Oxford: Oxford University Press.

O'Connor, T.G., Heron, J., Golding, J., & Glover, V. (2003). Maternal antenatal anxiety and behavioural/emotional problems in children: a test of a programming hypothesis. *Journal of Child Psychology and Psychiatry*, 44(7), 1025-1036.

O'Leary, K. 2015. The effect of positive psychological interventions on psychological and physical well-being during pregnancy. DClinPsych Thesis, University College Cork.

Oishi, S., & Diener, E. (2001). Goals, culture, and subjective well-being. *Personality and Social Psychology Bulletin*, 27(12), 1674-1682.

Oliver, E., Cebolla, A., Dominguez, A., Gonzalez-Segura, A., de la Cruz, E., Albertini, S., ... & Baños, R. (2015, August). MEAL Project—Modifying Eating Attitudes and Actions through Learning. In *9th International Technology, Education and Development Conference, March* (pp. 2-4).

Omodei, M.M., & Wearing, A.J. (1990). Need satisfaction and involvement in personal projects: Toward an integrative model of subjective well-being. *Journal of Personality and Social Psychology*, 59(4), 762.

Osborne, L.M., & Monk, C. (2013). Perinatal depression—the fourth inflammatory morbidity of pregnancy?: theory and literature review. *Psychoneuroendocrinology*, 38(10), 1929-1952.



Parks, A.C., & Biswas-Diener, R. (2013). Positive interventions: Past, present and future. In T. Kashdan, & J. Ciarrochi (Eds.), *Bridging Acceptance and Commitment Therapy and Positive Psychology: A practitioner's guide to a unifying framework* (pp. 140-165).

Parks, A.C., Della Porta, M.D., Pierce, R.S., Zilca, R., & Lyubomirsky, S. (2012). How do people pursue happiness in their everyday lives?: The characteristics and behaviors of happiness seekers. *Emotion, 12*(6), 1222.

Patra, J., Bakker, R., Irving, H., Jaddoe, V.W., Malini, S., & Rehm, J. (2011). Dose–response relationship between alcohol consumption before and during pregnancy and the risks of low birthweight, preterm birth and small for gestational age (SGA)—a systematic review and meta-analyses. *BJOG: An International Journal of Obstetrics & Gynaecology, 118*(12), 1411-1421.

Pennebaker, J.W. (1998). Conflict and canned meat. *Psychological Inquiry, 9*(3), 219-220.

Peterson, C. (2006). *A primer in positive psychology*. Oxford University Press.

Peterson, C., & Seligman, M.E. (2004). *Character strengths and virtues: A handbook and classification*. Oxford University Press.

Peterson, C., & Seligman, M.E. (2006). The Values in Action (VIA) classification of strengths. In M. Csikszentmihalyi, & I.S. Csikszentmihaly (Eds.), *A life worth living: Contributions to positive psychology* (pp. 29-48). Oxford University Press.

Preschl, B., Wagner, B., Forstmeier, S., & Maercker, A. (2011). E-health interventions for depression, anxiety disorder, dementia, and other disorders in old age: A review. *Journal of CyberTherapy and Rehabilitation*, 4, 371-86.

Pressman, S.D., & Cohen, S. (2005). Does positive affect influence health?. *Psychological Bulletin*, 131(6), 925.

Pressman, S.D., & Cohen, S. (2012). Positive emotion word use and longevity in famous deceased psychologists. *Health Psychology*, 31(3), 297.

Reivich, K.J., Seligman, M.E., & McBride, S. (2011). Master resilience training in the US Army. *American Psychologist*, 66(1), 25.

Richardson, T., Stallard, P., & Velleman, S. (2010). Computerised cognitive behavioural therapy for the prevention and treatment of depression and anxiety in children and adolescents: a systematic review. *Clinical Child and Family Psychology Review*, 13(3), 275-290.

Ritterband, L.M., Andersson, G., Christensen, H.M., Carlbring, P., & Cuijpers, P. (2006). Directions for the international society for research on internet interventions (ISRII). *Journal of Medical Internet Research*, 8(3), e23.

Ritterband, L.M., Gonder-Frederick, L.A., Cox, D.J., Clifton, A.D., West, R.W., & Borowitz, S.M. (2003). Internet interventions: in review, in use, and into the future. *Professional Psychology: Research and Practice*, 34(5), 527.

Ritterband, L.M., Thorndike, F.P., Cox, D.J., Kovatchev, B.P., & Gonder-Frederick, L.A. (2009). A behavior change model for internet interventions. *Annals of Behavioral Medicine, 38*(1), 18-27.

Rivkin, I.D., & Taylor, S.E. (1999). The effects of mental simulation on coping with controllable stressful events. *Personality and Social Psychology Bulletin, 25*(12), 1451-1462.

Roberts, L.M., Dutton, J.E., Spreitzer, G.M., Heaphy, E.D., & Quinn, R.E. (2005). Composing the reflected best-self portrait: Building pathways for becoming extraordinary in work organizations. *Academy of Management Review, 30*(4), 712-736.

Robertson, E., Grace, S., Wallington, T., & Stewart, D.E. (2004). Antenatal risk factors for postpartum depression: a synthesis of recent literature. *General Hospital Psychiatry, 26*(4), 289-295.

Rodriguez, A., & Bohlin, G. (2005). Are maternal smoking and stress during pregnancy related to ADHD symptoms in children?. *Journal of Child Psychology and Psychiatry, 46*(3), 246-254.

Rogers, C.R. (2006). *Client-centered therapy: Its current practice, implications and theory*. Boston, MA: Houghton Mifflin.

Ryan, R.M., & Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68.

Ryan, R.M., & Deci, E.L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*(1), 141-166.

Ryff, C.D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological wellbeing. *Journal of Personality & Social Psychology*, 57 (6), 1069-1081.

Ryff, C.D. (1995). Psychological well-being in adult life. *Current Directions in Psychological Science*, 4(4), 99-104.

Ryff, C.D., & Keyes, C.L.M. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, 69(4), 719.

Ryff, C.D., & Singer, B. (1996). Psychological well-being: Meaning, measurement, and implications for psychotherapy research. *Psychotherapy and Psychosomatics*, 65(1), 14-23.

Ryff, C.D., Singer B. (1998). The contours of positive human health. *Psychological Inquiry*, 9, 1–28.

Ryff, C.D., Singer, B. (2000). Interpersonal flourishing: a positive health agenda for the new millennium. *Personality and Social Psychology Review*, 4, 30–44.

Scheier, M.F., & Carver, C.S. (1993). On the power of positive thinking: The benefits of being optimistic. *Current Directions in Psychological Science*, 2(1), 26-30.

Schueller, S.M. (2010). Preferences for positive psychology exercises. *The Journal of Positive Psychology*, 5(3), 192-203.

Schueller, S.M. (2012). Personality fit and positive interventions: Extraverted and introverted individuals benefit from different happiness increasing strategies. *Psychology*, 3(12), 1166.

Schueller, S.M., & Parks, A.C. (2014). The science of self-help. *European Psychologist*, 19, 145-155.

Schueller, S.M., & Seligman, M.E. (2010). Pursuit of pleasure, engagement, and meaning: Relationships to subjective and objective measures of well-being. *The Journal of Positive Psychology*, 5(4), 253-263.

Schwartz, B., & Sharpe, K.E. (2006). Practical wisdom: Aristotle meets positive psychology. *Journal of Happiness Studies*, 7(3), 377-395.

Seligman, M.E. (1999). The president's address. *American Psychologist*, 54(8), 559-562.

Seligman, M.E., & Csikszentmihalyi, M. (Eds.) (2000). Positive Psychology [Special Issue] *American Psychologist*, 55(1).

Seligman, M.E., & Csikszentmihalyi, M. (2014). Positive psychology: An introduction. In M. Csikszentmihalyi (Eds.), *Flow and the foundations of positive psychology: The collected works of Mihaly Csikszentmihalyi* (pp. 279-298). Netherlands: Springer.

Seligman, M.E., Rashid, T., & Parks, A.C. (2006). Positive psychotherapy. *American Psychologist*, 61(8), 774.

Seligman, M.E., Steen, T.A., Park, N., & Peterson, C. (2005). Positive psychology progress: empirical validation of interventions. *American Psychologist*, 60(5), 410.

Sheldon, K.M., Boehm, J.K., & Lyubomirsky, S. (2012). Variety is the spice of happiness: The hedonic adaptation prevention (HAP) model. *Oxford Handbook of Happiness*, 901-914.

Sheldon, K.M., & Lyubomirsky, S. (2006). How to increase and sustain positive emotion: The effects of expressing gratitude and visualizing best possible selves. *The Journal of Positive Psychology*, 1(2), 73-82.

Siemer, C.P., Fogel, J., & Van Voorhees, B.W. (2011). Telemental health and web-based applications in children and adolescents. *Child and Adolescent Psychiatric Clinics of North America*, 20(1), 135-153.

Sin, N.L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology*, 65(5), 467-487.

Snyder, C.R. (2002). Hope theory: Rainbows in the mind. *Psychological Inquiry*, 13(4), 249-275.

Snyder, C.R., & Lopez, S.J. (Eds.). (2009). *Oxford handbook of positive psychology*. Oxford University Press, USA.

Söderquist, J., Wijma, K., & Wijma, B. (2004). Traumatic stress in late pregnancy. *Journal of Anxiety Disorders, 18*(2), 127-142.

Sokol, R.J., Delaney-Black, V., & Nordstrom, B. (2003). Fetal alcohol spectrum disorder. *Jama, 290*(22), 2996-2999.

Stewart-Brown, S., & Janmohamed, K. (2008). Warwick-Edinburgh Mental Well-being Scale. User guide. Version, 1.

Streissguth, A.P., Bookstein, F.L., Barr, H.M., Sampson, P.D., O'malley, K., & Young, J.K. (2004). Risk factors for adverse life outcomes in fetal alcohol syndrome and fetal alcohol effects. *Journal of Developmental & Behavioral Pediatrics, 25*(4), 228-238.

Sutter-Dallay, A.L., Giaconne-Marcasche, V., Glatigny-Dallay, E., & Verdoux, H. (2004). Women with anxiety disorders during pregnancy are at increased risk of intense postnatal depressive symptoms: a prospective survey of the MATQUID cohort. *European Psychiatry, 19*(8), 459-463.

Swallow, B.L., Lindow, S.W., Masson, E.A., & Hay, D.M. (2004). Psychological health in early pregnancy: relationship with nausea and vomiting. *Journal of Obstetrics and Gynaecology, 24*(1), 28-32.

Talge, N.M., Neal, C., & Glover, V. (2007). Antenatal maternal stress and long-term effects on child neurodevelopment: how and why?. *Journal of Child Psychology and Psychiatry, 48*(3-4), 245-261.

Tugade, M.M., & Fredrickson, B.L. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personality and Social Psychology, 86*(2), 320.

Uguz, F., Gezginc, K., Kayhan, F., Sarı, S., & Büyüköz, D. (2010). Is pregnancy associated with mood and anxiety disorders? A cross-sectional study. *General Hospital Psychiatry, 32*(2), 213-215.

Van den Bergh, B.R., & Marcoen, A. (2004). High antenatal maternal anxiety is related to ADHD symptoms, externalizing problems, and anxiety in 8-and 9-year-olds. *Child Development, 75*(4), 1085-1097.

Van den Bergh, B.R., Mulder, E.J., Mennes, M., & Glover, V. (2005). Antenatal maternal anxiety and stress and the neurobehavioural development of the fetus and child: links and possible mechanisms. A review. *Neuroscience & Biobehavioral Reviews, 29*(2), 237-258.

Van den Bergh, B.R., Van Calster, B., Smits, T., Van Huffel, S., & Lagae, L. (2008). Antenatal maternal anxiety is related to HPA-axis dysregulation and self-reported depressive symptoms in adolescence: a prospective study on the fetal origins of depressed mood. *Neuropsychopharmacology, 33*(3), 536.

Vázquez, C., & Chaves, C. (2016). Positive Psychology. In H. Friedman (Eds.), *Encyclopedia of Mental Health (Second Edition)* (pp. 290–299). Oxford: Elsevier Inc.

Vazquez, C., & Hervas, G. (2013). Addressing current challenges in cross-cultural measurement of well-being: The Pemberton Happiness Index. In H.H. Knoop, & A. Delle Fave (Eds.), *Well-Being and Cultures: Perspectives from Positive Psychology* (pp. 31-49). New York: Springer Science + Business Media Dordrecht.

Vázquez, C., Pérez-Sales, P., & Ochoa, C. (2014). Posttraumatic growth: challenges from a cross-cultural viewpoint. In G.A. Fava, & C. Ruini (Eds.), *Increasing Psychological Well-being in Clinical and Educational Settings. Cross-Cultural Advancements in Positive Psychology* (vol 8., pp. 57-74). Dordrecht: Springer.

Waterman, A.S. (1993). Two conceptions of happiness: contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology, 64*, 678–91.

Watson, D., Clark, L.A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: the PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063.

Weiss, L.A., Westerhof, G.J., & Bohlmeijer, E.T. (2016). Can We Increase Psychological Well-Being? The Effects of Interventions on Psychological Well-Being: A Meta-Analysis of Randomized Controlled Trials. *PLoS One*, *11*(6), e0158092.

Wenzel, A., & Stuart, S.C. (2011). *Anxiety in childbearing women: Diagnosis and treatment*. American Psychological Association.

Wood, A.M., Froh, J.J., & Geraghty, A.W. (2010). Gratitude and well-being: A review and theoretical integration. *Clinical Psychology Review*, *30*(7), 890-905.

Wood, A.M., & Joseph, S. (2010). The absence of positive psychological (eudemonic) well-being as a risk factor for depression: A ten year cohort study. *Journal of Affective Disorders*, *122*(3), 213-217.

World Health Organization. (2004). Promoting mental health: Concepts, emerging evidence, practice: Summary report. Geneva: World Health Organization.

World health Organization. (2016). WHO recommendations on antenatal care for a positive pregnancy experience. Geneva: World Health Organization.

Yali, A.M., & Lobel, M. (1999). Coping and distress in pregnancy: an investigation of medically high risk women. *Journal of Psychosomatic Obstetrics & Gynecology*, *20*(1), 39-52.

Ybarra, M.L., & Eaton, W.W. (2005). Internet-based mental health interventions. *Mental Health Services Research*, *7*(2), 75-87.

Yehuda, R., Engel, S.M., Brand, S.R., Seckl, J., Marcus, S.M., & Berkowitz, G.S. (2005). Transgenerational effects of posttraumatic stress disorder in babies of mothers exposed to the World Trade Center attacks during pregnancy. *The Journal of Clinical Endocrinology & Metabolism*, *90*(7), 4115-4118.

Zafar, S., Sikander, S., Haq, Z., Hill, Z., Lingam, R., Skordis-Worrall, J., ... & Rahman, A. (2014). Integrating maternal psychosocial well-being into a child-development intervention: the five-pillars approach. *Annals of the New York Academy of Sciences*, *1308*(1), 107-117.



Zuckerman, B., Bauchner, H., Parker, S., & Cabral, H. (1990). Maternal depressive symptoms during pregnancy, and newborn irritability. *Journal of Developmental & Behavioral Pediatrics, 11*(4), 190-194.

# Chapter



## A narrative review of positive psychology interventions for women during the perinatal period

THIS CHAPTER IS SUBMITTED TO *MIDWIFERY* AND IT IS CURRENTLY UNDER REVIEW AS: CORNO, G., ESPINOZA, M., & BAÑOS, R.M. A NARRATIVE REVIEW OF POSITIVE PSYCHOLOGY INTERVENTIONS FOR WOMEN DURING THE PERINATAL PERIOD.

## Abstract

**Objective:** to identify and critically review the current evidence about the use of Positive Psychology Interventions (PPIs) designed to improve women's mental well-being during the perinatal period. **Design:** this review follows the approach of a narrative review. A systematic search of four online databases, PsycINFO, PubMed, Medline, and Embase, was conducted, along with a manual search of reference lists. The review comprises studies published between 2000 and 2017 about mental health interventions that include at least one PPI for women during the perinatal period. **Findings:** this comprehensive narrative review has identified two intervention programs that have included at least one perinatal PPI. Regarding their structure, both interventions were online-based and gratitude was the PPI common to both. Both interventions targeted mental health well-being during the perinatal period. Data about the effectiveness of the programs are available only for the gratitude and mindfulness-based intervention. The findings from the pilot study indicated potential direct effects of the positive intervention on self-reported stress and physiological stress. Feasibility data are available for the Mamma Mia intervention program, highlighting the potential positive impact of early interventions during pregnancy and postpartum. **Key conclusions:** this narrative review has synthesized the first promising studies in the wake of a new model of positive interventions aimed to maximize and support women's well-being during the perinatal period. Nevertheless, much more research is required to establish which, how, and for whom PPIs can be suitable.

# 1. Introduction

Pregnancy is a time of important changes and challenges that can impact both maternal and infant well-being. The nature, pervasiveness, and detrimental consequences of negative feelings (e.g., stress, depression, anxiety) during pregnancy have been extensively examined and documented (e.g., Agius et al., 2016; Staneva et al., 2015). For instance, the incidence of prenatal depression has been estimated at 15% in women who live in developed countries, and 20-40% in women who live in the developing world (e.g., Ashford et al., 2016; Osborne and Monk, 2013). Antenatal depression is also one of the strongest predictors of postpartum depression (O'Leary, 2015; Robertson et al., 2004). Women suffering from postpartum depression are less capable of engaging in important developmental activities for the newborn. This deficiency can have an important influence on the baby's socioemotional and cognitive development (Goodman et al., 1993) and the child's attachment style (Bonari et al., 2004; Haga et al., 2013). Perceived stress is also common in pregnant women; in fact, it has been reported that 25% of women experience prenatal stress (Dunkel-Schetter, 2011). Low prenatal well-being can also impact the newborn's health because it is also associated with preterm childbirth, low baby weight, and even neurocognitive development problems of the fetus and less emotional regulation abilities during infancy and childhood (Bell, and Andersson, 2016; Huizink et al., 2003).

Recently, the World Health Organization (WHO, 2016) highlighted the priority of expanding the concept of health beyond survival, embracing a perspective that maximizes the population's health and potential (WHO, 2016). Specifically regarding antenatal care, the WHO

coined the concept of a “positive pregnancy experience”, which includes not only the treatment of diseases, but also health education and health promotion (WHO, 2016). This shift in focus from treatment to prevention and health promotion is supported by the emerging field of positive psychology.

Positive Psychology is the scientific study of optimal human functioning, and it aims to identify and promote the factors that allow individuals and communities to thrive (Seligman and Csikszentmihalyi, 2000). Many studies conducted in this field have analyzed the benefits of building and enhancing personal strengths, positive emotions, and a sense of meaning, concluding that increasing and promoting these positive resources may successfully counteract negative symptoms and psychological disorders, and possibly buffer against future relapses (Lee et al., 2005; Fredrickson, 1998, 2009; Seligman et al., 2006; Sin and Lyubomirsky, 2009; Tugade and Fredrickson, 2004).

Some preliminary evidence highlights the relevance and beneficial effects of cultivating maternal positive affect in the context of pregnancy and childbirth. Recently, Pluess et al. (2012) tested the effect of positive life events on cortisol levels in a sample of 60 pregnant women. Consistent with previous studies (e.g., Bostock et al., 2011; Polk et al., 2005; Steptoe et al., 2005), the authors found that positive life events predicted significantly lower cortisol levels (Pluess et al., 2012), suggesting that positive life experiences during the prenatal period can represent a form of psychosocial support that may attenuate or even fully buffer the negative effects of adverse influences on pregnant women and the developing fetus (Pluess et al., 2012). Positive affect (PA) was also shown to be associated with length of gestation (Voellmin et al., 2013). Indeed, maternal PA may exert its positive effect on gestation length

by also impacting maternalplacental-fetal endocrine and immune physiology (Voellmin et al., 2013). A recent study demonstrated that PA in pregnancy could be a protective factor against postpartum depression (Bos et al., 2013) and affect feeding practices. McManus et al. (2017) found that positive maternal feelings during pregnancy were associated with better feeding practices, and that these feeding habits were associated with fewer common childhood diseases (McManus, et al., 2017).

The role of optimism has also been studied in relation to the prenatal period. Antenatal optimism was shown to play a protective role in postpartum psychological well-being (Grote and Bledsoe, 2007). Furthermore, optimistic pregnant women who experienced frequent perceived stress during pregnancy were much less at risk of developing clinically relevant depressive symptoms at 6 and 12 months postpartum, compared to those who were pessimists (Grote and Bledsoe, 2007). Optimistic pregnant women were also more likely to be involved in healthy behaviors (Dunkel-Schetter, 2011) and cope more adaptively (Dunkel-Schetter, 2011; Lobel et al., 2002) than pessimists.

Another psychosocial aspect that has been shown to have an important impact on maternal well-being is perceived social support during pregnancy. Pregnant women who reported higher levels of social support also reported low indices of distress and uncertainty, a greater sense of control over pregnancy-related changes, and better self-image (e.g., DunkelSchetter et al., 1996; Giurgescu et al., 2006). Indeed, various studies point to the association between perceived availability of support, support satisfaction, quality of support, and actual received support and significantly less anxiety, prenatal and postpartum depression, fewer stressors, and better health (e.g., Carissoli et al., 2016; Oakley et al., 1996).

Perceived social support has also been associated with more optimal fetal movement (Dunkel-Schetter, 2011), decreased risk of preterm birth (Dejin-Karlsson et al., 2000; Pryor et al., 2003), a better childbirth process (i.e., reduced labor length and birth complications, more spontaneous onset of labor, and natural childbirth) (e.g., Collins et al., 1993), and higher birth weight (Feldman et al., 2000; Hedegaard et al., 1996).

Evidence from Positive Psychology studies has shown that it is possible to build and enhance personal strengths, sense of meaning, and positive feelings by practicing some brief positive exercises called Positive Psychology Interventions (PPIs). According to Lyubomirsky (2008), PPIs are activities “aimed at increasing positive feelings, positive behaviors, or positive cognitions as opposed to ameliorating pathology or fixing negative thoughts of maladaptive behavior patterns” (p.469). PPIs such as performing acts of kindness (Lyubomirsky et al., 2005; Sheldon et al., 2012), counting one’s blessings (e.g., Emmons and McCullough, 2003), writing gratitude letters (e.g., Boehm et al., 2011; Lyubomirsky et al., 2011), writing about one’s best possible self (Layous et al., 2013; Meevissen et al., 2011), or using one’s strengths in a new way (Seligman et al., 2005) can improve well-being and decrease and combat depression and anxiety by increasing positive emotion, engagement, and meaning.

Considering the relevance of promoting wellbeing and mental health during pregnancy, and taking into account the benefits that PPIs can provide in this regard, it would be valuable to apply and investigate the effectiveness of these interventions in women in the perinatal period.

The aim of this article is to conduct a narrative review to identify and examine the current evidence about PPIs designed to improve women’s mental well-being during the perinatal period, in order to have a clear representation of the state of the art of the research in this field.

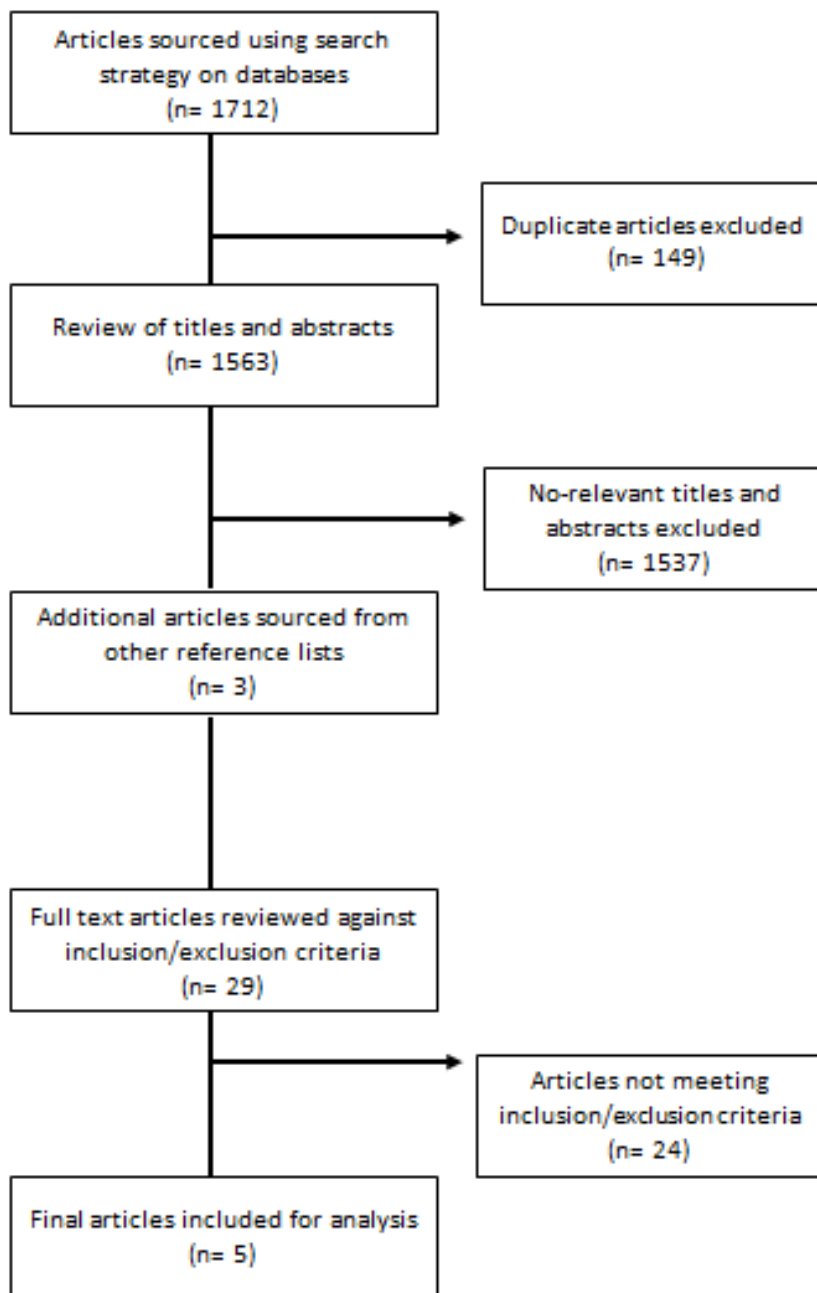
## 2. Methods

A comprehensive search of four selected online databases, PsycINFO, PubMed, Medline, and Embase, was conducted. These databases were searched using the terms “positive psychology”, “intervention”, “positive psychology intervention”, “pregnancy”, “pregnant”, “prenatal”, “antenatal”, “perinatal”, “postnatal”, “postpartum”, “well-being”, “mental health”. Because the American Psychologist issue dedicated to Positive Psychology (Seligman and Csikszentmihalyi, 2000) has commonly been considered the official birth of this emerging science, the search strategy included literature published between the years 2000 and 2017.

The results of the literature search are shown in Figure 1. The initial search terms resulted in 1712 articles, but 149 duplicated articles were excluded (with 1563 remaining). Titles and abstracts were reviewed for pertinence (excluding 1537 articles), and 26 papers remained for further evaluation. Furthermore, 3 additional relevant articles that had not been identified through the electronic search were hand-searched and included in the revision. The remaining 29 articles were evaluated based on the inclusion and exclusion criteria (see Table 1). As a result, 24 papers were excluded, and 5 articles met the specific criteria for inclusion in this narrative review. Table 2 outlines details of the 2 studies examined. Two review authors



independently assessed all the potential articles, and any ambiguity or disagreement was resolved through assessment by a third review author. A list of excluded studies is available from the authors on request.



**Fig. 1** Search results

**Table 1**

Inclusion/exclusion criteria.

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<b>Inclusion criteria</b>
<ul style="list-style-type: none"> <li>• Women in the perinatal period</li> <li>• Mental health interventions that include at least one PPI</li> <li>• Literature published between 2000 and 2017</li> <li>• Primary or original research (qualitative, quantitative, and/or mixed methods) and/or protocols of interventions about which primary feasibility and/or effectiveness data have been published</li> <li>• Studies published in the English language</li> </ul>
<b>Exclusion criteria</b>
<ul style="list-style-type: none"> <li>• Pregnancy and HIV prevention interventions</li> <li>• Stillbirth miscarriage interventions</li> <li>• Drug abuse interventions</li> <li>• Literature that does not meet critical appraisal</li> </ul>

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**Table 2**

Summary table of the included studies.

Intervention	Period of focus	Intervention characteristics	Authors	Sample size	Study design
Mamma Mia	Pregnancy and postpartum	- Positive Psychology, metacognitive therapy, and couples therapy based intervention	Haga et al., 2013	103	Feasibility study
			Drozd et al., 2015		Intervention mapping protocol
		- Web-based intervention	Andersen, 2015 (Master Thesis)	10	Usability study
Gratitude and mindfulness intervention	Pregnancy	- Gratitude and mindfulness based intervention	O'Leary, 2015 (Doctoral Thesis)	46	Randomized Control Trial
			Matvienko-Sikar and Dockray, 2017	46	Pilot randomized controlled trial
		- Web-based intervention			
		- 2 sessions (3 weeks)			

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## 2.1. Synthesis of the interventions

Due to the scarce number of findings, the results of the review are presented as descriptions of the interventions used in the detected studies and the main findings.

### *2.1.1. Mamma Mia: a web-based intervention*

Mamma Mia (Haga et al., 2013) is a web-based self-administered intervention addressed to pregnant women and women who just gave birth. This program has three aims: (1) to prevent the risk of developing postpartum depression, (2) to treat pregnant women and/or new mothers who report mild-to-moderate symptoms of depression, and (3) to enhance subjective well-being during the perinatal period. These overall goals can be broken down into several performance objectives: (a) cope adaptively with becoming a parent; (b) engage in positive parent-infant interactions; (c) engage in proactive and positive physical and mental activities; (d) get help and support if depression is indicated; (e) cope adaptively with symptoms of depression (Drozd et al., 2015). Mamma Mia consists of 44 sessions over a total period of 11 months, divided into three phases. The pregnancy phase consists of 16 sessions delivered weekly from gestation week 22 to week 40. The second phase is the intense maternity phase, which starts when the newborn is 1-2 weeks old and lasts for 6 weeks. This second phase is characterized by 18 sessions delivered 3 times per week. The last phase is the low-intensity maternity phase, and it lasts from the 9th to the 26th week postpartum. In this third phase, 10 sessions are delivered, with some variation in frequency. Access to the session is provided by email and proceeds in a predetermined/standardized sequence of webpages (i.e. tunneled information structure). To achieve the main objectives proposed, Mamma Mia includes six theory-based methods: (1) assessment of depressive symptoms, (2) metacognitive

therapy, (3) positive psychology, (4) couples therapy, (5) breastfeeding, and (6) psychoeducation. A partner version is available with the same components (except for breastfeeding and psychoeducation). Regarding the positive psychology component, the program includes PPIs that aim to foster or facilitate gratitude, socialization, kindness, and optimism (see Table 3). Participants are instructed to try each intervention and then use those they find most useful and relevant for them (Drozd et al., 2015). Haga et al. (2013) investigated the feasibility and acceptance of the program, combining quantitative survey data with semi-structured interviews. The typical user in their study was a highly-educated, employed woman in a relationship and pregnant for the first time. On average, women in the pregnancy phase completed 7 to 16 sessions, whereas users in the maternity phase completed 12 sessions. Participants appreciated the quality and relevance of the information provided, and the frequency of the intervention schedule was found to be appropriate. They evaluated Mamma Mia as a user-friendly and credible intervention, but they reported that a major weakness was the lack of accessibility by tablet and smartphone. Other suggested improvements were to provide more sessions during the gestation and personalize the contents for couples versus singles and first-time parents versus second-time parents. Andersen (2015) also explored acceptability and persuasive features with 10 users of the program. She observed overall satisfaction with the intervention (provides support for task performance, has credibility) although some weaknesses were detected, such as dissatisfaction with the tunneled sequence of modules. Currently, no data are available about the effectiveness of the program for perinatal depression and subjective well-being.

### *2.1.2. Gratitude and mindfulness online intervention*

This gratitude and mindfulness online intervention is aimed to improve mental wellbeing of women during gestation (O'Leary, 2015; Matvienko-Sikar and Dockray, 2017). The web-based intervention includes a gratitude-diary component and a mindfulness listening component (see Table 3). All the components were specifically adapted to pregnancy. The effect of this intervention on prenatal stress, cortisol levels, and well-being has been assessed with a pilot randomized control trial. Women (n= 46) between weeks 10 and 22 of their pregnancy were asked to use the mindfulness and gratitude intervention 4 times a week for 3 weeks in all. Measures of salivary cortisol, gratitude, prenatal stress, and satisfaction with life were completed at baseline and at 1.5- and 3-week post-intervention. The pilot study was completed by 36 women, and the results show that women assigned to the intervention condition had significant reductions in reported prenatal stress compared to a treatment-as-usual group (TAU). Moreover, in a within-subject examination, intervention participants showed significant reductions in both waking and evening cortisol levels. No significant differences between the two conditions were found on depression, satisfaction with life, mindfulness, gratitude, or cortisol awakening response. Participants' experiences of using the intervention were not collected; therefore, there are no data on intervention acceptability. Regarding adherence and attrition, O'Leary (2015) reported a 78.26% retention rate and suggested that participants with low social support and high prenatal stress were more likely to drop out. Moreover, a high level of engagement with the intervention was described (average number of diary entries was 7.88), with no significant differences between intervention conditions.

**Table 3**

Synthesis of the PPIs included in the interventions.

<b>Interventions</b>	<b>Positive Psychology Intervention</b>	<b>Description</b>
Mamma Mia	Gratitude	<ul style="list-style-type: none"> <li>● Counting one's blessing</li> <li>● Writing down 3 good things that happened during the day</li> <li>● Writing a letter of gratitude</li> <li>● Saying "thank you" more often than usual</li> </ul>
	Socialization	<ul style="list-style-type: none"> <li>● Calling a friend and inviting him/her out</li> <li>● Mapping one's social network</li> </ul>
	Kindness	<ul style="list-style-type: none"> <li>● Performing acts of kindness to others, keeping track of these acts and planning them ahead of time</li> </ul>
	Optimism	<ul style="list-style-type: none"> <li>● Best possible self exercise (i.e. imagining scenarios of a future life in which many goals have been reached and where one's potential has been fulfilled)</li> </ul>
	Engagement	<ul style="list-style-type: none"> <li>● Filling out a list of pleasant activities, finding a goal for each activity, and scheduling one or more of them during the week</li> </ul>
Gratitude and mindfulness intervention	Gratitude	<ul style="list-style-type: none"> <li>● Gratitude diary (i.e. listing up to 5 things one felt grateful for during the previous 24h)</li> </ul>

**Table 4**

Summary of measures included

<b>Mama Mia</b>		<b>Gratitude and mindfulness intervention</b>	
Haga et al., 2013	Andersen, 2015	O'Leary, 2015	Matvienko-Sikar and Dockray, 2017
- Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) <sup>a</sup>	- Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) <sup>d</sup>	- Gratitude during Pregnancy Scale <sup>f</sup>	- Prenatal Distress Scale (PDQ; Yali and Lobel, 1999) <sup>f</sup>

- Perceived Usefulness (VAS) <sup>b</sup>	- Satisfaction with Life Scale (SWLS; Diener et al., 1985) <sup>d</sup>	- Mindfulness Attention Awareness Scale (MAAS; Brown and Ryan, 2003) <sup>f</sup>	- Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) <sup>f</sup>
- Perceived ease-of use. (VAS) <sup>b</sup>	- Positive and Negative affect (PANAS; Watson et al., 1988) <sup>d</sup>	- Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) <sup>f</sup>	- Gratitude during Pregnancy Scale <sup>f</sup>
- Perceived credibility (VAS) <sup>b</sup>	- Semi-structured interview <sup>e</sup>	- Prenatal Distress Scale (PDQ; Yali and Lobel, 1999) <sup>f</sup>	- Mindfulness Attention Awareness Scale (MAAS; Brown and Ryan, 2003) <sup>f</sup>
- User satisfaction (VAS) <sup>b</sup>		- Satisfaction with Life Scale (SWLS; Diener et al., 1985) <sup>f</sup>	- Satisfaction with Life Scale (SWLS; Diener et al., 1985) <sup>f</sup>
- Unobtrusiveness (VAS) <sup>b</sup>		- Subjective Happiness Scale (SHS; Lyubomirsky and Lepper, 1999) <sup>f</sup>	- Subjective Happiness Scale (SHS; Lyubomirsky and Lepper, 1999) <sup>f</sup>
- Technical problems (yes/no option) <sup>b</sup>		- Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) <sup>f</sup>	- Multidimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988) <sup>f</sup>
- Improvements suggestions (open-ended question) <sup>b</sup>		- Jenkins Sleep Questionnaire (JSQ; Jenkins et al., 1988) <sup>f</sup>	- Jenkins Sleep Questionnaire (JSQ; Jenkins et al., 1988) <sup>f</sup>
- Semi-structured interview <sup>c</sup>		- Salivary Cortisol <sup>g</sup>	- Salivary Cortisol <sup>g</sup>

<sup>a</sup>Assessed 3 times during pregnancy and 4 times after birth. <sup>b</sup>Assessed during pregnancy at 4 and 8 weeks after enrollment and during the postnatal phase at 2 and 4 weeks after enrollment. <sup>c</sup>Description of appeal, usability, strengths, opportunities, limitations, and challenges of Mamma Mia program. Participants in pregnancy and maternity phase. <sup>d</sup>Assessed at baseline. <sup>e</sup>Focus on strengths, weaknesses, opportunities, and threats. Questions about appeal, treatment fidelity, and implementation. <sup>f</sup>Assessed at baseline, 1.5 weeks and 3 weeks. <sup>g</sup>Assessed at baseline, 1.5 weeks and 3 weeks Each sampling period lasted 2 consecutive days.

### 3. Discussion

The aim of this narrative review was to identify and examine perinatal interventions that included at least one PPI. This comprehensive narrative review has identified only two intervention programs that included at least one prenatal PPI. Therefore, a first conclusion of this review is that, although the importance of promoting well-being during the perinatal period has been demonstrated, research on interventions in this field is still in its infancy.

Regarding their structure, both interventions were online-based, and so they were delivered using a distance approach (i.e., web platform, e-mails, and text messages). There was no personal contact with the participants during the intervention period. Mamma Mia follows a predetermined/tunneled sequence of web pages, whereas the order of the two components of the gratitude – mindfulness- based intervention was counterbalanced. The users of Mamma Mia appreciated the online format, but they suggested making the program available for tablets and smartphones in order to increase its accessibility. Additionally, they found the amount of information to be suitable, whereas they suggested increasing the frequency of the intervention schedule during the pregnancy phase. These data highlight the importance of early interventions during pregnancy, with benefits that can also be extended through the postpartum phase. Regarding the gratitude and mindfulness-based intervention, participants' experiences and opinions about using the intervention were not collected.

Gratitude was the PPI common to the two interventions. In Mamma Mia, the positive psychology component was composed of different PPIs that also covered the dimensions of optimism, socialization, kindness, and engagement. The second intervention, however,



included only a gratitude PPI specifically adapted to include aspects related to the pregnancy experience.

Both interventions targeted mental health well-being during the perinatal period. Specifically, the aim of Mamma Mia was to reduce the risk of postpartum depression and enhance subjective well-being during pregnancy and the first weeks after childbirth, whereas the target of the second intervention was prenatal stress and well-being during pregnancy. The findings of the pilot study indicated potential direct effects of the gratitude and mindfulness-based intervention on self-reported stress, compared to the TAU group, and on physiological stress (i.e. waking and evening cortisol) within the intervention group. These preliminary data present evidence for the usefulness of a short positive psychology intervention during pregnancy. Nevertheless, future studies are needed to explore the mechanisms and power of each intervention component. Furthermore, the results of this review highlight the need for controlled studies that assess the effects of these interventions on women's well-being, quality of life, and emotional symptomatology.

Regarding the measures implemented in the two intervention programs, it is noteworthy that the Mamma Mia program, although focused on promoting wellbeing, did not include any positive variable for feedback purposes (as it did with depression scores). Given that the two publications on this program are feasibility studies, there is no information about what type of outcome measures would be considered by the authors. However, it seems that there is agreement about the usefulness of including specific psychosocial perinatal measures, such as the Edinburgh Postnatal Depression Scale (EPDS) or the Prenatal Distress Scale (PDQ), in these types of programs.

## 4. Conclusion

In recent years, at both the institutional level and in the research field, there has been a shift from a treatment-centric perspective to a perspective more focused on promoting and supporting well-being in perinatal care. The first findings from this positive perspective have demonstrated the potential benefits of positive aspects (e.g. positive affect, positive life events) and protective factors (e.g., optimism, perceived social support) on the course of the pregnancy and the physical and psychological health of both the mother and the baby after the delivery. Evidence from the emerging field of Positive Psychology has shown that it is possible to build and enhance these positive aspects and protective factors by practicing some brief positive exercises, called Positive Psychology Interventions. Therefore, PPIs could be a valid tool to foster and support prenatal well-being. This comprehensive narrative review has explored the literature about interventions for women during the perinatal period that include at least one PPI. The results of this review show that the research in this field is still in its infancy. Further research is required to answer different questions. Future studies should adapt and include different PPIs in order to investigate which ones are more appropriate for women during the perinatal period. As pregnancy is a transition period during which women have to cope with and adapt to their new role and schedules, it is important to develop and assess different intervention structures and contents (e.g. group intervention, couple intervention) in terms of feasibility and suitability. Furthermore, the effects of interventions should be evaluated in randomized control trials and longitudinal studies in order to examine for whom (e.g., in terms of trimester of pregnancy, age, relationship status) and how long they can provide potential benefits. This narrative review has synthesized the first promising

studies in the wake of a new model of interventions aimed to maximize and support women's well-being during the perinatal period, but much more research is required to establish which PPIs are suitable, how they should be carried out, and for whom.

## 5. References

- Agius, A., Xuereb, R. B., Carrick-Sen, D., Sultana, R., Rankin, J., 2016. The co-existence of depression, anxiety and post-traumatic stress symptoms in the perinatal period: A systematic review. *Midwifery*. 36, 70-79.
- Andersen, C.E., 2015. A Web-Based Intervention for Postpartum Depression. An Assessment of User Acceptability and Information System Evaluation. Master's thesis, University of Oslo.
- Ashford, M.T., Olander, E.K., Ayers, S., 2016. Computer-or web-based interventions for perinatal mental health: A systematic review. *J Affect Disorders*. 197, 134-146.
- Bell, A.F., Andersson, E., 2016. The birth experience and women's postnatal depression: A systematic review. *Midwifery*. 39, 112-123.
- Boehm, J.K., Lyubomirsky, S., Sheldon, K.M., 2011. A longitudinal experimental study comparing the effectiveness of happiness-enhancing strategies in Anglo Americans and Asian Americans. *Cogn Emot*. 25, 1263-1272.
- Bonari, L., Bennett, H., Einarson, A., Koren, G., 2004. Risks of untreated depression during pregnancy. *Can Fam Physician*. 50, 37-39.
- Bos, S.C., Macedo, A., Marques, M., Pereira, A.T., Maia, B.R., Soares, M.J., ... Azevedo, M.H., 2013. Is positive affect in pregnancy protective of postpartum depression?. *Rev Bras Psiquiatr*. 35, 5-12.
- Bostock, S., Hamer, M., Wawrzyniak, A. J., Mitchell, E. S., Steptoe, A., 2011. Positive emotional style and subjective, cardiovascular and cortisol responses to acute laboratory stress. *Psychoneuroendocrino*. 36, 1175-1183.
- Brown, K.W., Ryan, R.M., 2003. The benefits of being present: mindfulness and its role in psychological well-being. *J Pers Soc Psycho*. 84, 822.
- Carissoli, C., Villani, D., Riva, G., 2016. An Emerging Model of Pregnancy Care: The Introduction of New Technologies. In: Villani, D., Cipresso, P., Gaggioli, A., Riva, G. (Eds.). *Integrating Technology in Positive Psychology Practice*. IGI Global. pp. 164-193.
- Collins, N.L., Dunkel-Schetter, C., Lobel, M., Scrimshaw, S.C., 1993. Social support in pregnancy: psychosocial correlates of birth outcomes and postpartum depression. *J Pers Soc Psychol*. 65, 1243.
- Cox, J.L., Holden, J.M., Sagovsky, R., 1987. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry*. 150, 782-786.

- Dejin-Karlsson, E., Hanson, B.S., Östergren, P.O., Lindgren, A., Sjöberg, N.O., Marsal, K., 2000. Association of a lack of psychosocial resources and the risk of giving birth to small for gestational age infants: a stress hypothesis. *BJOG*. 107, 89-100.
- Diener, E.D., Emmons, R.A., Larsen, R.J., Griffin, S., 1985. The satisfaction with life scale. *J Pers Assess*. 49, 71-75.
- Drozd, F., Haga, S.M., Brendryen, H., Slinning, K., 2015. An Internet-based intervention (Mamma Mia) for postpartum depression: mapping the development from theory to practice. *JMIR Res Protoc*, 4.
- Dunkel-Schetter, C., 2011. Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annu Rev Psychol*. 62, 531-558.
- Dunkel-Schetter, C., Sagrestano, L.M., Feldman, P., Killingsworth, C., 1996. Social support and pregnancy. In: Pierce, G.R., Sarason, B.R., Sarason, I.G. (Eds.) *Handbook of social support and the family*. Springer US. pp. 375-412.
- Emmons, R.A., McCullough, M.E., 2003. Counting blessings versus burdens: an experimental investigation of gratitude and subjective well-being in daily life. *J Pers Soc Psychol*. 84, 377.
- Feldman, P.J., Dunkel-Schetter, C., Sandman, C.A., Wadhwa, P.D., 2000. Maternal social support predicts birth weight and fetal growth in human pregnancy. *Psychosom Med*. 62, 715-725.
- Fredrickson, B.L., 1998. What good are positive emotions?. *Rev Gen Psychol*. 2, 300.
- Fredrickson, B.L., 2009. *Positivity*. Harmony Books.
- Giurgescu, C., Penckofer, S., Maurer, M.C., Bryant, F.B., 2006. Impact of uncertainty, social support, and prenatal coping on the psychological well-being of high-risk pregnant women. *Nurs Res*. 55, 356-365.
- Goodman, S.H., Brogan, D., Lynch, M.E., Fielding, B., 1993. Social and emotional competence in children of depressed mothers. *Child Dev*. 64, 516-531.
- Grote, N.K., Bledsoe, S.E., 2007. Predicting postpartum depressive symptoms in new mothers: The role of optimism and stress frequency during pregnancy. *Health Soc Work*. 32, 107-118.
- Haga, S.M., Drozd, F., Brendryen, H., Slinning, K., 2013. Mamma mia: a feasibility study of a web-based intervention to reduce the risk of postpartum depression and enhance subjective well-being. *JMIR Res Prot*. 2, e29.

- Hedegaard, M., Henriksen, T.B., Secher, N.J., Hatch, M.C., Sabroe, S., 1996. Do Stressful Life Events Affect Duration of Gestation and Risk of Preterm Delivery?. *Epidemiology*. 7, 339-345.
- Huizink, A.C., Robles de Medina, P.G., Mulder, E.J., Visser, G.H., Buitelaar, J.K., 2003. Stress during pregnancy is associated with developmental outcome in infancy. *J Child Psychol Psyc*. 44, 810-818.
- Layous, K., Nelson, S.K., Lyubomirsky, S., 2013. What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *J Happiness Stud*. 14, 635-654.
- Lee Duckworth, A., Steen, T.A., Seligman, M.E., 2005. Positive psychology in clinical practice. *Annu Rev Clin Psychol*. 1, 629-651.
- Lobel, M., Yali, A.M., Zhu, W., DeVincent, C., Meyer, B., 2002. Beneficial associations between optimistic disposition and emotional distress in high-risk pregnancy. *Psychol Health*. 17, 77-95.
- Lyubomirsky, S., 2008. *The how of happiness: A scientific approach to getting the life you want*. Penguin.
- Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., Sheldon, K.M., 2011. Becoming happier takes both a will and a proper way: an experimental longitudinal intervention to boost well-being. *Emotion*. 11, 391.
- Lyubomirsky, S., King, L., Diener, E., 2005. The benefits of frequent positive affect: does happiness lead to success?. *Psychol Bull*. 131, 803.
- Matvienko-Sikar, K., Dockray, S., 2016. Effects of a novel positive psychological intervention on prenatal stress and well-being: A pilot randomized controlled trial. *Women Birth*.30, e111-e118.
- McManus, M.A., Khalessi, A.A., Lin, J., Ashraf, J., Reich, S.M., 2017. Positive feelings during pregnancy, early feeding practices, and infant health. *Pediatr Int*.
- Meevissen, Y.M., Peters, M.L., Alberts, H.J., 2011. Become more optimistic by imagining a best possible self: Effects of a two week intervention. *J Behav Ther Exp Psychiatry*. 42, 371-378.
- O'Leary, K., 2015. *The effect of positive psychological interventions on psychological and physical well-being during pregnancy*. DCLinPsych Thesis, University College Cork.
- Oakley, A., Hickey, D., Rajan, L., Rigby, A.S., 1996. Social support in pregnancy: does it have long-term effects?. *J Reprod Infant Psychol*. 14, 7-22.

- Osborne, L.M., Monk, C., 2013. Perinatal depression—the fourth inflammatory morbidity of pregnancy?: theory and literature review. *Psychoneuroendocrino.* 38, 1929-1952.
- Pluess, M., Wurmser, H., Buske-Kirschbaum, A., Papousek, M., Pirke, K.M., Hellhammer, D., Bolten, M., 2012. Positive life events predict salivary cortisol in pregnant women. *Psychoneuroendocrino.* 37, 1336-1340.
- Polk, D.E., Cohen, S., Doyle, W.J., Skoner, D.P., Kirschbaum, C., 2005. State and trait affect as predictors of salivary cortisol in healthy adults. *Psychoneuroendocrino.* 30, 261-272.
- Pryor, J.E., Thompson, J.M.D., Robinson, E., Clark, P.M., Becroft, D.M.O., Pattison, N.S., ... Mitchell, E.A., 2003. Stress and lack of social support as risk factors for small-for-gestational-age birth. *Acta Paediatr.* 92, 62-64.
- Robertson, E., Grace, S., Wallington, T., Stewart, D.E., 2004. Antenatal risk factors for postpartum depression: a synthesis of recent literature. *Gen Hosp Psychiat.* 26, 289-295.
- Seligman, M.E., Csikszentmihalyi, M., 2000. Positive Psychology. [Special Issue] *Am Psychol.* 55.
- Seligman, M.E., Rashid, T., Parks, A.C., 2006. Positive psychotherapy. *Am Psychol*, 61, 774.
- Seligman, M.E., Steen, T.A., Park, N., Peterson, C., 2005. Positive psychology progress: empirical validation of interventions. *American Psychologist.* 60, 410.
- Sheldon, K.M., Boehm, J.K., Lyubomirsky, S., 2012. Variety is the spice of happiness: The hedonic adaptation prevention (HAP) model. *Oxford Handbook of Happiness*, 901-914.
- Sin, N.L., Lyubomirsky, S., 2009. Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *J Clin Psychol.* 65, 467-487.
- Staneva, A.A., Bogossian, F., Wittkowski, A., 2015. The experience of psychological distress, depression, and anxiety during pregnancy: A meta-synthesis of qualitative research. *Midwifery.* 31, 563-573.
- Stephoe, A., Wardle, J., Marmot, M., 2005. Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes. *P Natl Acad Sci USA.* 102, 6508-6512.
- Tugade, M.M., Fredrickson, B.L., 2004. Resilient individuals use positive emotions to bounce back from negative emotional experiences. *J Pers Soc Psychol.* 86, 320.
- Voellmin, A., Entringer, S., Moog, N., Wadhwa, P.D., Buss, C., 2013. Maternal positive affect over the course of pregnancy is associated with the length of gestation and reduced

risk of preterm delivery. *J Psychosom Res.* 75, 336-340.

Watson, D., Clark, L.A., Tellegen, A., 1988. Development and validation of brief measures of positive and negative affect: the PANAS scales. *J Pers Soc Psychol.* 54, 1063.

World Health Organization. 2016. WHO recommendations on antenatal care for a positive pregnancy experience.

Yali, A.M., Lobel, M., 1999. Coping and distress in pregnancy: An investigation of medically high risk women. *J Psychosom Obstet Gynecol.* 20, 39-52.



# Chapter



## A web-based positive psychology intervention for promoting women's well-being during pregnancy: A Randomized Control Trial

THIS CHAPTER IS SUBMITTED TO *BMC PREGNANCY AND CHILDBIRTH* AND IT IS CURRENTLY UNDER REVIEW AS: CORNO, G., ESPINOZA, M., HERRERO, R., MOLINARI, G., CARRILLO, A., ETCHEMENDY, E., & BAÑOS, R.M. A WEB-BASED POSITIVE PSYCHOLOGY INTERVENTION FOR PROMOTING WOMEN'S WELL-BEING DURING PREGNANCY: A RANDOMIZED CONTROL TRIAL

## Abstract

**Background:** The detrimental effects of low maternal well-being during pregnancy on women's and babies' health and on the course of the pregnancy have been widely investigated. In the wake of a salutogenic perspective, a growing number of studies have examined the potential benefits of positive aspects and protective factors on maternal prenatal well-being. This perspective is supported by the emerging field of Positive Psychology, and, recently, researchers have started to investigate the effects of Positive Psychology interventions on women's prenatal well-being, reporting promising findings. Indeed, recent systematic reviews provide preliminary evidence that the Internet can be a promising and appropriate medium to implement interventions during the perinatal period. This study seeks to evaluate the efficacy of a web-based Positive Psychology intervention designed to promote and enhance women's prenatal well-being. We intend to study the effect of the intervention on women's well-being, and the results will be compared to a waiting list control group. This paper presents the study protocol.

**Methods:** A randomized control trial with restricted randomization will be conducted. 164 women will be assigned to blocks (i.e., trimester of gestation: first, second, or third trimester) at pre-randomization. Within each block, subjects will be randomly allocated to one of two conditions: a) Positive Psychology Internet-based Intervention condition (PPIBI, totally self-applied) or b) Waiting List control condition (WL). The intervention program will last five weeks and be completely self-administered. Participants will be assessed at three points: before the intervention, after the intervention, and at 5-week follow-up. The outcome variables will

include mental well-being, depression, pregnancy-related anxiety, and other relevant variables.

**Discussion:** The literature highlights the priority of developing and assessing the effectiveness of programs addressed to promoting and enhancing women's prenatal well-being. This study aims to the effectiveness of a novel, web-based, Positive Psychology program for pregnant women, designed to support women's well-being during the prenatal period.

**Trial registration:** [Clinicaltrials.gov: NCT03158649](https://clinicaltrials.gov/ct2/show/study/NCT03158649).

# 1. Background

## 1.1. Introduction

Pregnancy is a challenging time for women, and changes and demands encountered during this period can impact both maternal and infant well-being. The nature, pervasiveness, and detrimental consequences of negative feelings (e.g., stress, depression, anxiety) during pregnancy have been extensively examined and documented. Incidence of prenatal depression has been estimated at 15% in women living in developed countries, and at 20-40% in women living in the developing world [1, 2]. Prevalence of anxiety disorders during pregnancy can vary from 12.2 to 39% [3-6]. Specifically, generalized anxiety disorder is the most widespread among pregnant women, with rates of up to 10.5% [5, 7]. An even greater number of pregnant women experience subclinical levels of anxiety [8-10]. Perceived stress is also common in pregnant women; in fact, it has been reported that 25% of women experience prenatal stress [11]. Low maternal well-being during pregnancy can have broad negative consequences on women's health and on the course of the pregnancy. For instance, antenatal depression is one of the strongest predictors of postpartum depression [12, 13], whereas prenatal anxiety is associated with an increased risk of alcohol and tobacco use in pregnant women [14, 15], increased negative pregnancy-related symptoms [16], and obstetric complications [17, 18]. Low maternal well-being can also have significant and wide-ranging consequences for the child's health. It can impact the newborn's health because it is also associated with preterm childbirth, low baby weight, and even neurocognitive development problems in the fetus, the child's attachment style, and emotional regulation abilities during infancy and childhood [19-24].

The identification and treatment of the disorders associated with the perinatal period have traditionally attracted researchers' attention. Nevertheless, since the World Health Organization recently coined the concept of a positive pregnancy experience, which includes not only the treatment of diseases, but also health education and health promotion [25], research on antenatal care has expanded to a salutogenic perspective. In the wake of this perspective, a growing number of studies have examined the potential benefits of positive aspects and protective factors on maternal prenatal well-being. Some preliminary results highlight the relevance and beneficial effects of cultivating maternal prenatal positive affect. Recent studies have shown that women's prenatal positive affect was a protective factor against postpartum depression, whereas negative affect was a predictor of this disorder [26]. Maternal positive affect was also found to be associated with length of gestation and lowered risk of preterm delivery [27]. Women's prenatal positive feelings have also been shown to have wide-ranging effects because they have been associated with better feeding practices, and these feeding habits have been associated with fewer common childhood diseases [28]. Furthermore, different studies have demonstrated that positive life events significantly predicted lower morning cortisol levels in late pregnancy [29-32]. Because increased maternal cortisol during pregnancy can have a negative effect on fetal development, these findings indicate that prenatal positive life experiences can attenuate - or even fully buffer - the negative effects of adverse influences on pregnant women and the developing fetus [29]. Antenatal optimism has also been shown to play a protective role in postpartum psychological well-being [33]. Furthermore, results show that optimistic pregnant women are also more likely to be involved in healthy behaviors [11] and cope more adaptively than pessimistic ones

[11, 34]. Prenatal maternal perceived social support has been widely studied. Various studies point to the association between perceived social support and significantly less anxiety, prenatal and postpartum depression, and distress and uncertainty, as well as a greater sense of control over pregnancy-related changes, improved self-image, and better health [35-38]. Indeed, perceived social support has also been associated with more optimal fetal movement [11], a decreased risk of preterm birth [39, 40], a better childbirth process [41], and higher birth weight [42, 43]. Furthermore, a growing number of studies have assessed the effects of mindfulness interventions on women's prenatal well-being. Findings from a recent systematic review indicate potential benefits of mindfulness interventions on maternal prenatal well-being, especially in terms of decreased levels of negative affect, depression, and anxiety during pregnancy [44].

This salutogenic perspective is supported by the emerging field of Positive Psychology. Many studies conducted in this field have analyzed the benefits of building and increasing personal strengths, positive emotions, and sense of meaning, concluding that raising and enhancing these positive resources may successfully counteract negative symptoms and disorders and buffer against future relapses [45-50]. Evidence from Positive Psychology studies has shown that it is possible to build and enhance personal strengths, sense of meaning, and positive feelings by practicing some brief positive exercises called Positive Psychology Interventions (PPIs) [51]. Recently, researchers have started to investigate the effects of a PPI on women's prenatal well-being, reporting promising findings in terms of potential direct effects of the positive intervention on women's prenatal stress, compared to a treatment-as-usual control condition [52].

In the past decade, many web-based interventions have been designed and found to be effective for the promotion of mental health and the prevention and treatment of different disorders. Several meta-analyses have shown that web- or computer-based programs can be as effective as traditional face-to-face programs, and significantly more effective than control conditions, for a variety of mental health disorders (e.g., depression, anxiety, and adjustment disorders) and across different populations [53, 54]. Web-based interventions offer several potential advantages. They can overcome existing barriers, such as service availability and waiting time, and greater anonymity may encourage individuals to seek help and/or reveal more sensitive health information. Women are increasingly using the Internet as a source of health-related information during pregnancy [55]. They can access the web contents of an intervention at no or minimal cost and at the most convenient time and place for them. These advantages can be particularly suitable for pregnant women, taking into account the demanding schedule of coping with pregnancy and a new baby [1]. Furthermore, the anonymity offered by web-based interventions might help pregnant women to overcome the stigma of seeking and accessing help [1]. Indeed, recent systematic reviews provide preliminary evidence that web-based interventions can be a promising and appropriate form of intervention during the perinatal period [1, 56]. Nevertheless, studies have focused more on the postpartum period and on targeting depression, highlighting the need to cover the research gap in interventions delivered in the prenatal period and designed to promote maternal mental well-being. PPIs have also been transferred to an online format. Preliminary evidence suggests that Online Positive Psychology Interventions (OPPIs) can effectively enhance well-being and reduce depressive symptoms [57].

We have developed the protocol for a web-based Positive Psychology program addressed to promoting and enhancing women's prenatal well-being. This intervention program will last five weeks and be completely self-administered. We intend to study the effect of the intervention on levels of mental well-being, depression, pregnancy-related anxiety, and other relevant variables, and the results will be compared to a waiting list control group.

## 2. Methods/Design

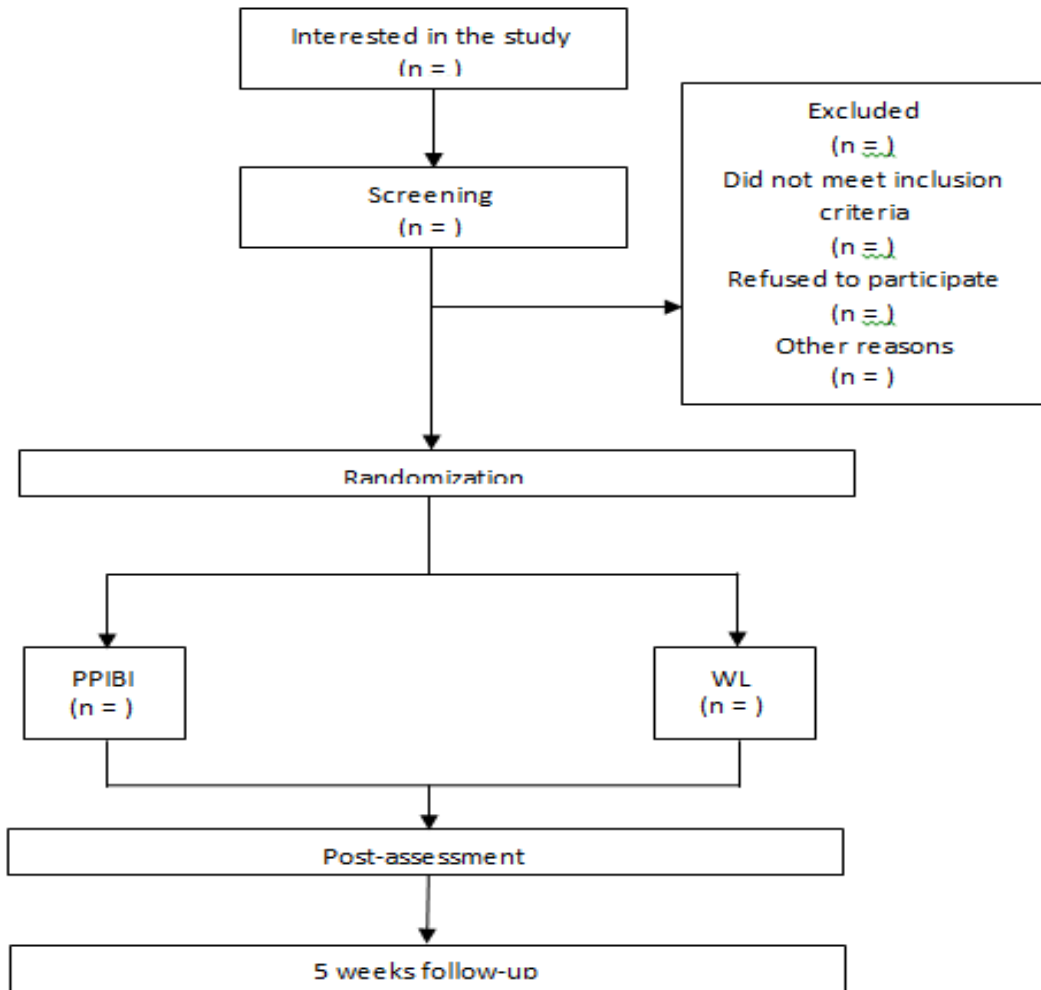
### 2.1. Study design

A randomized control trial (RCT) with restricted randomization will be conducted. First, participants will be assigned to blocks, based on the trimester of gestation (i.e. first, second, or third trimester) at pre-randomization. Within each block, subjects will be randomly allocated to one of two conditions: a) *Positive Psychology Internet-based Intervention* condition (*PPIBI*, totally self-applied) or b) *Waiting List control* condition (*WL*). For ethical reasons, participants in the control condition will be offered the possibility of receiving the intervention after spending time on the waiting list (5 weeks). Measures will be taken at post-randomization, after the intervention, and at 5-week follow-up. The study was registered under [clinicaltrials.gov](http://clinicaltrials.gov) (NCT03158649) and will be conducted following the CONSORT statement (Consolidated Standards of Reporting Trials, <http://www.consort-statement.org>) [58, 59], the CONSORT-EHEALTH guidelines [60], and the SPIRIT guidelines (Standard Protocol Items: Recommendations for Interventional Trials) [61, 62]. Figure 1 shows the study flowchart.



## 2.2. Sample size and power calculations

To determine the sample size, the effect sizes found in the literature about OPPIs were considered. A recent study on OPPIs [57] indicated effect sizes, using Cohen's  $d$ , ranging from 0.01 to 0.56 for psychological well-being and from 0.02 to 0.36 for depression. Adopting a conservative approach, we assumed an effect size of 0.3 (Cohen's  $d$ ), which, according to Cohen [63], can correspond to an effect size of medium magnitude. A series of repeated-measures mixed ANOVAs were performed for the statistical analysis; thus, calculations of the sample size cannot be based on Cohen's  $d$  index, but rather on the  $f$  index [63]. Following Cohen [63],  $f = 0.15$  corresponds to an effect size of medium magnitude (and equivalent to  $d = 0.3$ ). Therefore, considering a power of 0.80 and an alpha of 0.05, a total sample of 126 participants (63 participants per condition) is required to warrant these conditions. Furthermore, a 30% dropout rate was taken into consideration, as indicated in the literature on Internet-based interventions [53, 64]. Thus, the required sample size should be a total of 164 participants (82 participants per condition). These calculations were performed with the software program G\*Power 3.1 [65].



**Fig 1.** Study flowchart

### 2.3. Ethics

This trial received approval from the Ethics Committee of the Universitat de Valencia (Valencia, Spain) (23 April 2015) and from the Ethics Committee of the Health Department of Arnau de Villanova Hospital (Valencia, Spain 21 December 2016), and it will be conducted in compliance with the study protocol, the Declaration of Helsinki, and good clinical practice. Data security/confidentiality will be guaranteed, and all pertinent Spanish and European legislation on privacy will be observed and respected. The consent form will be explained and required from all participants. Important protocol modifications will be communicated to

relevant parties (i.e., trial participants, registries, journals, ethical committee, and researchers).

## 2.4. Eligibility criteria

The trial will be conducted in a community sample of pregnant women. The study sample will include pregnant women who are 18 years old or more, in the 34<sup>th</sup> week of pregnancy or less, and intending to keep the baby. They are required to have adequate knowledge to understand and read Spanish and have regular access to the Internet. Participants who show a clinical profile (i.e. reported levels of depression and anxiety severity) will be included, but they will also be encouraged to seek treatment alternatives suited to their specific needs.

## 2.5. Recruitment and randomization

The study will be advertised online via websites dedicated to pregnancy and maternity and non-professional social-networks (i.e., Facebook and Instagram). Furthermore, posters will be placed in the gynecology service of the Benimamet Medical Center (Valencia, Spain) and promoted during the childbirth preparation courses provided by different professional services. Women interested in the study will be directed to the research website (<http://pospre.wixsite.com/ebinsc>), where they will find further information about the study and what participation entails, as well as the hyperlink to the informed consent form. People interested in participating will fill in the online informed consent form and be assessed based on the inclusion criteria. If the woman fulfills the study criteria, she will be randomly assigned to one of the two experimental conditions. The allocation schedule of the participants in each

group (i.e. first, second, and third trimester) will be generated through a randomization website (<https://www.random.org/>). Patients will agree to participate before the random allocation and without knowing to which condition they will be assigned. However, for practical reasons, participants and researchers will not be blind to the treatment conditions. After the registration, the clinical team will contact participants by e-mail to inform them about the condition to which they have been assigned. Participants will be free at any time to withdraw from the treatment or the study without giving any explanation.

## 2.6. Positive Psychology Internet-based Intervention

The intervention program is called “*Embarazo y Bienestar*” (“*Pregnancy and Well-being*”). *Embarazo y Bienestar* is a modular, self-paced program mainly designed to foster women’s prenatal well-being by practicing some positive psychology-based exercises. The intervention program consists of four intervention modules, one welcome module, and a final summary page:

**M0. Welcome to *Embarazo y Bienestar*** The purpose of this module is to welcome women to the program, describe its structure, explain the objectives, and provide brief descriptions of each module. Program information is written in an encouraging tone designed to motivate women to participate in the program.

**M1. Mindfulness and self-acceptance** This module provides a brief description of mindfulness and teaches participants to be connected to their body through the practice of the body scan exercise. Body scan is a mindfulness practice that helps to understand the difference between thinking about a sensation and experiencing it [66]. A video will guide participants through the exercise (Table 1).

**M2. Savoring** The second module focuses on savoring, which aims to enhance and extend momentary pleasant experiences [67, 68]. The module encourages participants to improve this ability by engaging in two exercises: the three good things in life and the savoring the moment exercises (Table 1).

**M3. Connectedness** The aim of this module is to encourage women to reflect on the relations with their loved ones and take steps to improve them. The connectedness exercise helps participants to be fully aware of the importance of social relations and enhance them by finding a way to be closer to loved ones (Table 1).

**M4. Optimism** The last module is dedicated to developing and increasing a positive attitude toward the future. This module consists of two sections. Each session lasts one week. During the first week, participants will discover the power of life narratives and be guided in thinking about what their future best possible self could be like. Then, during the second week, they will be asked to think about the steps they should take to reach their best possible self (Table 1).

**Resume** This page provides a brief summary of the contents and objectives accomplished during the program. It also encourages them to continue to practice the activities and incorporate them in their daily routine.

## 2.7. Adaptation to the web

*Embarazo y Bienestar* has been developed using the Wix web platform (<http://www.wix.com/>). Participants can access the website through a PC, tablet, or smartphone, and they can do the modules anywhere and at their own pace.

The first three modules will be activated at a rate of one per week, whereas module 4 will last for two weeks. In order to access the modules, participants will receive an email with a hyperlink. By activating the link, they will be asked to answer a few questions about the

previous module (i.e., exercise evaluation and compliance with the intervention), and at the end of the survey they will find the hyperlink to access the following module. Participants who stop accessing the intervention for more than one week after it is posted will receive a reminder email. *Embarazo y Bienestar* is a completely self-applied program. Technical assistance (i.e., web accessibility problems) will be granted and provided if necessary.

The program recommends practicing the activities for an entire week. All the modules include multimedia (i.e. video and pictures) and interactive elements. The modules always follow the same structure: a first theoretical page in which the content and rationale for each PPI is explained, followed by the exercise page. In addition, at the end of the exercise page, a summary of the exercise tasks is provided. The web platform also has three complementary tools that appear on the main menu and are always freely accessed: 1) “Home”, that is, the starting page where a brief description of the intervention is provided; 2) “About us”, which is the page where the participant can access information about the research team that developed the program; 3) “Birth education”, which contains general information and recommendations (i.e. exams, nutrition, physical changes) to follow during pregnancy (based on the World Health Recommendations for Improving Maternal and Newborn Health: [http://www.who.int/maternal\\_child\\_adolescent/documents/who\\_mps\\_0705/en/](http://www.who.int/maternal_child_adolescent/documents/who_mps_0705/en/)).

**Table 1**

Intervention program structure

Week	Name of module	Dimension of module	Description of exercise
1	“Mindfulness and Self-acceptance”	Mindfulness and self-acceptance	<i>Body scan exercise</i> [66] Participants are asked to listen to an audio recording that guides them to pay attention to various areas of their body and their breathing, gently observing these body parts and allowing other thoughts to recede
2	“Savoring”	Savoring	<i>Three good things in life exercise</i> [68] Participants identify three good things that went well each day and why <i>Savoring the moment exercise</i> [68] Participants take a picture of something that is beautiful or meaningful and write a short description about what they appreciate and value in it
3	“Connectedness ”	Connectedness and social support	<i>Connectedness exercise</i> Participants identify and draw a graphic about their most important relationships and find an activity to do together
4	“Optimism. Part 1”	Optimism and life satisfaction	<i>Best possible self exercise</i> [69] Participants visualize and write their ideal future life in as much detail as possible
5	“Optimism. Part 2”	Optimism and life satisfaction	<i>Baby steps exercise</i> [69] Participants write a list of goals and initial steps toward achieving their best possible self

## 2.8. Measures

Women will be assessed at baseline, post-intervention, and 5-week follow-up. Assessments will be conducted via a commercial online survey system ([www.surveymonkey.com](http://www.surveymonkey.com)). Participants will receive email reminders for each assessment time. The variables and assessment times are summarized in Table 2.

### 2.8.1. Primary outcomes measures

**Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) [70]** It assesses subjective well-being and psychological functioning. The WEMWBS consists of 14 items, and respondents are

asked to describe their experiences during a two-week reference period on a five-point frequency scale ranging from 1 to 5. The total score can yield a maximum of 70 points. For the original WEMWBS, Cronbach's alpha was 0.89 for the student sample and 0.91 for the population sample [70]. The Spanish version of this instrument has also shown high internal consistency ( $\alpha = 0.90$ ) [71].

### *2.8.2. Secondary outcomes measures*

***Socio-demographic variables*** The following socio-demographic data will be collected: age, education, occupation, country of residency, and marital status. In order to contact them, participants will be asked to provide an email address.

***Pregnancy-related variables*** Women will be asked to provide information about their pregnancy: current week of pregnancy, previous children, planned/unplanned pregnancy, and future relationship with the baby.

***Health-related variables*** Women will be asked to provide information about their mental and physical health, specifically: if they are currently under psychological treatment and if they have received a diagnosis, if they use drugs, and if they have medical problems.

***Patient Health Questionnaire-9 (PHQ-9)*** [72] It is a 9-item instrument, based on the DSM-IV diagnostic criteria, that measures depression severity. The items are scored on a four-point scale, ranging from 0 to 3. Cut-off points of 5, 10, 15, and 20 represent the thresholds for mild, moderate, moderately severe, and severe depression, respectively. Previous studies have shown that the scale has good internal consistency ( $\alpha = 0.89$ ), and its validity and reliability as a diagnostic measure, as well as its utility in assessing depression severity, have been well



established [72, 73]. The Spanish version of the PHQ-9 has also shown high internal consistency ( $\alpha = 0.89$ ) [74].

***Pregnancy Related Anxiety Scale (PRAS)*** [75] This 10-item self-report scale evaluates the frequency or extent to which pregnant women are worried or concerned about their health, their baby's health, labor and childbirth, and caring for a newborn. Responses are given on a four-point scale ranging from 1 to 4, and the total scores range between 10 and 40. The PRAS has shown acceptable internal reliability in both the English ( $\alpha = 0.78$ ) and Spanish ( $\alpha = 0.80$ ) versions [75].

***Satisfaction With Life Scale (SWLS)*** [76] This is a self-report measure of global life satisfaction. Respondents are asked to indicate the extent to which they agree with each of 5 items on a seven-point scale ranging from 1 to 7. The maximum total score is 35. The original SWLS has high internal consistency ( $\alpha = 0.87$ ) [76], as does the Spanish SWLS version ( $\alpha = 0.88$ ) [77].

***Multidimensional Scale of Perceived Social Support (MSPSS)*** [78] This instrument assesses the adequacy of perceived social support from three different sources: family, friends, and significant others. Respondents are asked to report the extent of their agreement with each of 12 items on a seven-point scale ranging from 1 to 7. The reliability of the total original scale is 0.88. The three subscales also show good internal consistency. For the significant other, family, and friends subscales, the values are  $\alpha = 0.91$ ,  $\alpha = 0.87$ , and  $\alpha = 0.85$ , respectively [78].

***Scale of Positive and Negative Experience (SPANE)*** [79] The SPANE is a brief 12-item scale with six items devoted to positive experience and six items designed to assess negative experience. Responses are given on a five-point scale ranging from 1 to 5. The positive and

negative scales are scored separately. Both the total positive (SPANE-P) and negative (SPANE-N) scores can range from 6 to 30. The two scores can be combined by subtracting the negative score from the positive score, and the resulting SPANE-B scores can range from -24 to 24. The original SPANE has shown high internal consistency for all three subscales (SPANE-P:  $\alpha = 0.87$ ; SPANE-N:  $\alpha = 0.81$ ; SPANE-B:  $\alpha = .89$ ) [79].

**Subjective Probability Task (SPT)** [80] This questionnaire assesses positive and negative future expectancies. Respondents are asked to estimate the probability of each of 30 items happening to him/her in the future on a seven-point scale ranging from 1 to 7. The SPT is composed by two subscales: one with 20 items referring to negative expectancies, and the other with 10 items referring to positive expectancies. An independent subtotal for each subscale has to be calculated. The negative expectancies subtotal score ranges from 20 to 140, while the positive expectancies subtotal score ranges from 10 to 70. The original version of the SPT showed good internal consistency ( $\alpha = .90$  for the negative items and  $\alpha = .86$  for the positive items) [80].

**Psychological Well-Being Scale - 29 items (PWBS-29)** [81] This scale is a theoretically grounded instrument that measures multiple facets of the construct of psychological well-being theorized by Ryff [81]. This construct includes six dimensions (i.e., autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance). The response scale is a 6-point continuum, ranging from 1 to 6. The 29-item Spanish version proposed and validated by Diaz et al. [82] has shown good internal consistency for all six subscales, with values ranging from 0.70 (purpose in life subscale) to 0.84 (self-acceptance subscale).

**Self-Compassion Scale- Short Form (SCS-SF)** [83] This instrument is the short form of the original SCS developed by Neff [84]. The SCS-SF is composed of 12 items and has been shown to support the same six-factor structure (i.e., Self-Kindness, Self-Judgment, Common Humanity, Mindfulness, and Over-Identification) as the original 26-item version [83]. The SCS-SF has shown good internal consistency (i.e.,  $\alpha = 0.87$  for the Dutch SCS-SF, and  $\alpha = 0.86$  for the English SCS-SF), whereas the internal consistency for each of the SCS-SF subscales was relatively low (ranging between 0.55 and 0.81 for the Dutch SCS-SF, and 0.54 and 0.75 for the English SCS-SF) [83]. Nevertheless the Spanish SCS-SF version has shown better psychometric proprieties: Cronbach's  $\alpha$  for the total SCS-SF was 0.85, ranging from 0.71 to 0.77 for the 6 subscales [85].

### ***2.8.3. Post-module measures***

Scores related to mental well-being will also be obtained after each module. Specifically, six items will assess different factors related to well-being (i.e., self-confidence, self-acceptance, satisfaction with life, connectedness, perceived social support, and optimism). Moreover, participants will be asked to indicate the frequency with which they engaged in each of the daily exercises (e.g., *“How many times did you actually do the connectedness exercise during the past week?”*).

### ***Exercise preferences and satisfaction with the intervention***

Exercise preferences will be assessed through four questions designed to measure the participant's opinion about each positive exercise proposed by the program (i.e., *“How many times did you actually practice the exercise during the past week?”*; *“How much did you enjoy the exercise?”*, *“How much did you benefit from the exercise?”*, *“How difficult was the exercise*

for you?”). Participants’ general preferences for the positive activities will be assessed with four items (i.e., “Which exercise from Embarazo y Bienstar is your favorite?”; “Which exercise from Embarazo y Bienestar do you like least?”; “Which exercise was the most difficult to practice?”; “Which exercise was the easiest to practice?”). A single item will also be included to assess the participant’s general opinion about the intervention (i.e. “Would you recommend the program Embarazo y Bienstar? Why or why not?”).

## 2.9. Data analyses

Intention-to-treat (ITT) and per protocol analyses will be conducted following the CONSORT recommendations [58]. First, relevant statistical analyses will be performed to verify proper randomization (i.e., independent sample t test for equivalence of the groups). Descriptive statistics for the variables included in the study will be carried out. Furthermore, a series of repeated-measures mixed ANOVAs with planned contrast (2X2X3) will be performed, taking into consideration two intergroup variables (i.e., condition: *PPIBI* X *WL* and block of trimester: *first* X *second* X *third trimester*) x intragroup variable (i.e., assessment time: pre- and post-) for each dependent variable. Effect sizes for improvement and ITT will also be estimated. All analyses will be conducted using IBM SPSS statistics for Windows, version 24.

At the end of the trial, the analytic methodology for this RCT will be reviewed before analyzing the data, in order to select the most appropriate analytic procedure.

**Table 2**  
Study measures and time of assessment

Measures	Aim	Time of assessment
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Sociodemographic data	Age, education, occupation, country of residency, marital status	BL
Contact	Email address	BL, post-T, FU
Information about the pregnancy	Current week of pregnancy, previous children, planned/unplanned pregnancy, future relationship with the baby, relationship with the baby's father	BL
Mental health	Currently under psychological treatment, diagnosis, use of drugs	BL, post-T, FU
Medical problems	Presence of medical problems	BL, post-T, FU
WEMWBS	Mental well-being	BL, post-T, and FU
PHQ-9	Depression severity	BL, post-T, and FU
PRAS	Pregnancy-related anxiety	BL, post-T, and FU
SWLS	Satisfaction with life	BL, post-T, and FU
MSPSS	Perceived social support	BL, post-T, and FU
SPT	Future expectations	BL, post-T, and FU
SPANE	Positive and negative affect	BL, post-T, and FU
PWBS-29	Psychological well-being	BL, post-T, and FU
SCS-SF	Self-compassion	BL, post-T, and FU
Exercise preferences and satisfaction with the intervention	Exercise preferences and satisfaction with the intervention	post-T

*BL* Baseline, *post-T* post-treatment, *FU* 5-week follow-up; *WEMWBS* Warwick-Edinburgh Mental Well-Being Scale; *PHQ-9* Patient Health Questionnaire-9; *PRAS* Pregnancy Related Anxiety Scale; *SWLS* Satisfaction With Life Scale; *MSPSS* Multidimensional Scale of Perceived Social Support; *SPT* Subjective Probability Test; *SPANE* Scale of Positive and Negative Experience; *PWBS-29* Psychological Well-Being Scale-29; *SCS-SF* Self-Compassion Scale – Short Form

### 3. Discussion

Pregnancy is a challenging time that can impact women's and children's well-being and development. Although psychological research on pregnancy has mainly focused on detecting and treating disorders related to the perinatal period, attention has recently shifted to a more salutogenic perspective. Indeed, an increasing number of studies have investigated positive aspects and protective factors of well-being during the prenatal period. Their results show the relevance and beneficial effects of cultivating maternal prenatal positive affect, positive life events, optimism, social support, and mindfulness on women's and infants' well-being. Therefore, it is a priority to develop programs that promote and enhance women's prenatal well-being.

This study describes a novel, web-based, Positive Psychology program for pregnant women. The objective of this study is to provide data from a RCT to assess the effectiveness of this protocol in pregnant women, compared to a waiting list control group. The program *Embarazo y Bienestar* presents different strengths: First, the intervention contents have a solid theoretical base. PPIs have shown to be effective in maximizing well-being in general and in depressed populations by increasing positive emotions, engagement, and meaning [86, 87]. Second, the web-based format offers different important advantages, as it reaches many people in a cost-effective manner, offering anonymity and allowing women to access the contents at the most convenient time and place for them. Furthermore, the self-paced nature of the intervention has the advantage of empowering women, increasing their perception of being responsible for their own well-being and the health of the baby.

This study also presents some limitations. First, assessments (i.e. baseline, post-intervention, follow-up) will be conducted online. Some evidence suggests that psychometric properties can change when the assessment is performed on the web [88]. Second, the extent to which participants will be involved in each activity will be assessed using self-report measures. Thus, we will not have certain control over the veracity of the frequency of the practices. Another limitation is the high dropout rate we expect (around 30%) [53, 64]. For this reason, this rate has been taken into consideration in the sample size calculation.

In summary, we have developed a protocol to evaluate whether an innovative, web-based, Positive Psychology program can support and enhance pregnant women's well-being. *Embarazo y Bienestar* is one of the few trials that focuses on fostering well-being and prevention, rather than on treating disorders related to pregnancy. This program is intended to be an effective tool to support women's well-being during a life transition like pregnancy. We expect the present study to contribute to bridging the research gap on promoting women's well-being during the prenatal period, and provide a starting point for developing simple and cost-effective interventions.

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### **Availability of data and material**

It is not possible to share data because the study is in progress. We are now at the stage of data recruitment.

### **Authors' contributions**

GC drafted the manuscript with important contributions from RMB. GC, in collaboration with ME, RH, GM, AC, EE and RMB, designed the study and participated in each of its phases. All authors participated in the review and revision of the manuscript and have approved the final manuscript to be published.

### **Competing interests**

The authors declare that they have no competing interests.

### **Consent for publication**

“Not applicable” in this section.

### **Ethics approval and consent to participate**

The study follows the guidelines of the Declaration of Helsinki and existing guidelines in Spain and the European Union for the privacy protection. This trial received approval from the Ethics Committee of the Universitat de Valencia (Valencia, Spain) (23 April 2015) and from the Ethics Committee of the Health Department of Arnau de Villanova Hospital (Valencia, Spain 21 December 2016). The consent form is required from all participants. The trial was registered at ClinicalTrial.gov as NCT03158649.



## 4. References

1. Ashford MT, Olander EK, Ayers S. Computer-or web-based interventions for perinatal mental health: A systematic review. *J Affect Disord.* 2016;197:134-146.
2. Osborne LM, Monk C. Perinatal depression the fourth inflammatory morbidity of pregnancy?: theory and literature review. *Psychoneuroendocrino.* 2013;38(10):1929-1952.
3. Borri C, Mauri M, Oppo A, Banti S, Rambelli C, Ramacciotti D, et al. Axis I psychopathology and functional impairment at the third month of pregnancy: Results from the Perinatal Depression-Research and Screening Unit (PND-ReScU) study. *J Clin Psychiatry.* 2008;69(10):1617-1624.
4. Giardinelli L, Innocenti A, Benni L, Stefanini MC, Lino G, Lunardi C, et al. Depression and anxiety in perinatal period: prevalence and risk factors in an Italian sample. *Arch Womens Ment Health.* 2012;15(1):21-30.
5. Goodman JH, Guarino A, Chenausky K, Klein L, Prager J, Petersen R, et al. CALM Pregnancy: results of a pilot study of mindfulness-based cognitive therapy for perinatal anxiety. *Arch Womens Ment Health.* 2014;17(5):373-387.
6. Sutter-Dallay AL, Giaconne-Marcésche V, Glatigny-Dallay E, Verdoux H. Women with anxiety disorders during pregnancy are at increased risk of intense postnatal depressive symptoms: a prospective survey of the MATQUID cohort. *Eur Psychiat.* 2004;19(8):459-463.
7. Adewuya AO, Ola BA, Aloba OO, Mapayi BM. Anxiety disorders among Nigerian women in late pregnancy: a controlled study. *Arch Womens Ment Health.* 2006;9(6):325-328.
8. Andersson L, Sundström-Poromaa I, Wulff M, Åström M, Bixo M. Depression and anxiety during pregnancy and six months postpartum: a follow-up study. *Acta Obstet Gynecol Scand.* 2006;85(8):937-944.

9. Heron J, O'Connor TG, Evans J, Golding J, Glover V, ALSPAC Study Team. The course of anxiety and depression through pregnancy and the postpartum in a community sample. *J Affect Disord.* 2004;80(1):65-73.
10. Lee AM, Lam SK, Lau SMSM, Chong CSY, Chui HW, Fong DYT. Prevalence, course, and risk factors for antenatal anxiety and depression. *Obstet Gynecol.* 2007;110(5):1102-1112.
11. Dunkel Schetter C. Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annu Rev Psychol.* 2011;62:531-558.
12. O'Leary K. The effect of positive psychological interventions on psychological and physical well-being during pregnancy. *DClinPsych Thesis, University College Cork.* 2015.
13. Robertson E, Grace S, Wallington T, Stewart DE. Antenatal risk factors for postpartum depression: a synthesis of recent literature. *Gen Hosp Psychiatry.* 2004;26(4):289-295.
14. Alvik A, Heyerdahl S, Haldorsen T, Lindemann R. Alcohol use before and during pregnancy: a population-based study. *Acta Obstet Gynecol Scand.* 2006;85(11):1292-1298.
15. Goodwin RD, Keyes K, Simuro N. Mental disorders and nicotine dependence among pregnant women in the United States. *Obstet Gynecol.* 2007;109(4):875-883.
16. Swallow BL, Lindow SW, Masson EA, Hay DM. Psychological health in early pregnancy: relationship with nausea and vomiting. *J Obstet Gynaecol.* 2004;24(1):28-32.
17. Andersson L, Sundström-Poromaa I, Wulff M, Åström M, Bixo M. Implications of antenatal depression and anxiety for obstetric outcome. *Obstet Gynecol.* 2004;104(3):467-476.
18. Fisk NM, Glover V. Association between maternal anxiety in pregnancy and increased uterine artery resistance index: cohort based study. *Bmj.* 1999;318(7177):153-157.

19. Entringer S, Buss C, Shirtcliff EA, Cammack AL, Yim IS, Chicz-DeMet A, et al. Attenuation of maternal psychophysiological stress responses and the maternal cortisol awakening response over the course of human pregnancy. *Stress*. 2010;13(3):258-268.
20. Goodman SH, Brogan D, Lynch ME, Fielding B. Social and emotional competence in children of depressed mothers. *Child Dev*. 1993;64(2):516-531.
21. Huizink AC, Robles de Medina PG, Mulder EJ, Visser GH, Buitelaar JK. Stress during pregnancy is associated with developmental outcome in infancy. *J Child Psychol Psyc*. 2003;44(6):810-818.
22. Roberts AD, Moore CF, DeJesus OT, Barnhart TE, Larson JA, Mukherjee J, et al. Prenatal stress, moderate fetal alcohol, and dopamine system function in rhesus monkeys. *Neurotoxicol Teratol*. 2004;26(2):169-178.
23. Bonari L, Bennett H, Einarson A, Koren G. Risks of untreated depression during pregnancy. *Can Fam Physician*. 2004;50(1):37-39.
24. Haga SM, Drozd F, Brendryen H, Slinning K. Mamma mia: a feasibility study of a Web-based intervention to reduce the risk of postpartum depression and enhance subjective well-being. *JMIR Res Prot*. 2013;2(2):e29.
25. World health Organization. WHO recommendations on antenatal care for a positive pregnancy experience. Geneva; 2016.
26. Bos SC, Macedo A, Marques M, Pereira AT, Maia BR, Soares MJ, et al. Is positive affect in pregnancy protective of postpartum depression?. *Rev Bras Psiquiat*. 2013;35(1):5-12.
27. Voellmin A, Entringer S, Moog N, Wadhwa PD, Buss C. Maternal positive affect over the course of pregnancy is associated with the length of gestation and reduced risk of preterm delivery. *J Psychosom Res*. 2013;75(4):336-340.
28. McManus MA, Khalessi AA, Lin J, Ashraf J, Reich SM. Positive feelings during pregnancy, early feeding practices, and infant health. *Pediatr Int*. 2017;59(5):593–599.

29. Pluess M, Wurmser H, Buske-Kirschbaum A, Papousek M, Pirke KM, Hellhammer D, et al. Positive life events predict salivary cortisol in pregnant women. *Psychoneuroendocrino*. 2012;37(8):1336-1340.
30. Bostock S, Hamer M, Wawrzyniak AJ, Mitchell ES, Steptoe A. Positive emotional style and subjective, cardiovascular and cortisol responses to acute laboratory stress. *Psychoneuroendocrino*. 2011;36(8):1175-1183.
31. Polk DE, Cohen S, Doyle WJ, Skoner DP, Kirschbaum C. State and trait affect as predictors of salivary cortisol in healthy adults. *Psychoneuroendocrino*. 2005;30(3):261-272.
32. Steptoe A, Wardle J, Marmot M. Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes. *Proc Natl Acad Sci USA*. 2005;102(18):6508-6512.
33. Grote NK, Bledsoe SE. Predicting postpartum depressive symptoms in new mothers: The role of optimism and stress frequency during pregnancy. *Health Soc Work*. 2007;32(2):107-118.
34. Lobel M, Yali AM, Zhu W, DeVincent C, Meyer B. Beneficial associations between optimistic disposition and emotional distress in high-risk pregnancy. *Psychol Health*. 2002;17(1):77-95.
35. Carissoli C, Villani D, Riva G . An Emerging Model of Pregnancy Care: The Introduction of New Technologies. In: Villani D, Cipresso P, Gaggioli A, Riva G, editors. *Integrating Technology in Positive Psychology Practice*. IGI Global; 2016. p 164-194.
36. Oakley A, Hickey D, Rajan L, Rigby AS. Social support in pregnancy: does it have long-term effects?. *J Reprod Infant Psychol*. 1996;14(1):7-22.
37. Dunkel-Schetter C, Sagrestano LM, Feldman P, Killingsworth C. Social support and pregnancy. In: Pierce GR, Sarason BR, Sarason IG, editors. *Handbook of social support and the family*. Springer US; 1996. p. 375-412.

38. Giurgescu C, Penckofer S, Maurer MC, Bryant FB. Impact of uncertainty, social support, and prenatal coping on the psychological well-being of high-risk pregnant women. *Nurs Res.* 2006;55(5):356-365.
39. Dejin-Karlsson E, Hanson BS, Östergren PO, Lindgren A, Sjöberg NO, Marsal K. Association of a lack of psychosocial resources and the risk of giving birth to small for gestational age infants: a stress hypothesis. *BJOG.* 2000;107(1):89-100.
40. Pryor JE, Thompson JMD, Robinson E, Clark PM, Becroft DMO, Pattison NS, et al. Stress and lack of social support as risk factors for small-for-gestational-age birth. *Acta Paediatr.* 2003;92(1):62-64.
41. Collins NL, Dunkel-Schetter C, Lobel M, Scrimshaw SC. Social support in pregnancy: psychosocial correlates of birth outcomes and postpartum depression. *J Pers Soc Psychol.* 1993;65(6):1243.
42. Feldman PJ, Dunkel-Schetter C, Sandman CA, Wadhwa PD. Maternal social support predicts birth weight and fetal growth in human pregnancy. *Psychosom Med.* 2000;62(5):715-725.
43. Hedegaard M, Henriksen TB, Secher NJ, Hatch MC, Sabroe S. Do Stressful Life Events Affect Duration of Gestation and Risk of Preterm Delivery?. *Epidemiology.* 1996;7(4):339-345.
44. Matvienko-Sikar K, Lee L, Murphy G, Murphy L. The effects of mindfulness interventions on prenatal well-being: a systematic review. *Psychol Health.* 2016;31(12):1415-1434.
45. Lee Duckworth A, Steen TA, Seligman ME. Positive psychology in clinical practice. *Annu Rev Clin Psychol.* 2005;1:629-651.
46. Fredrickson BL. What good are positive emotions?. *Rev Gen Psychol.* 1998;2(3):300.
47. Fredrickson BL. *Positivity.* Harmony Books; 2009.
48. Seligman ME, Rashid T, Parks AC. Positive psychotherapy. *Am Psychol.* 2006;61(8):774.

49. Sin NL, Lyubomirsky S. Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *J Clin Psychol.* 2009;65(5):467-487.
50. Tugade MM, Fredrickson BL. Resilient individuals use positive emotions to bounce back from negative emotional experiences. *J Pers Soc Psychol.* 2004;86(2):320.
51. Seligman ME, Steen TA, Park N, Peterson C. Positive psychology progress: empirical validation of interventions. *Am Psychol.* 2005;60(5):410.
52. Matvienko-Sikar K, Dockray S. Effects of a novel positive psychological intervention on prenatal stress and well-being: A pilot randomised controlled trial. *Women Birth.* 2017;30(2):e111-e118.
53. Andrews G, Cuijpers P, Craske MG, McEvoy P, Titov N. Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: a meta-analysis. *PLoS One.* 2010;5(10):e13196.
54. Cuijpers P, Donker T, van Straten A, Li J, Andersson G. Is guided self-help as effective as face-to-face psychotherapy for depression and anxiety disorders? A systematic review and meta-analysis of comparative outcome studies. *Psychol Med.* 2010;40(12):1943-1957.
55. Lagan BM, Sinclair M, George Kernohan W. Internet use in pregnancy informs women's decision making: a web-based survey. *Birth.* 2010;37(2):106-115.
56. Lee EW, Denison FC, Hor K, Reynolds RM. Web-based interventions for prevention and treatment of perinatal mood disorders: a systematic review. *BMC Pregnancy Childbirth.* 2016;16(1):38.
57. Bolier L, Abello KM. Online positive psychological interventions: State of the art and future directions. In: Parks AC, Schueller SM, editors. *The Wiley Blackwell handbook of positive psychological interventions.* Chichester: John Wiley & Sons, Ltd; 2014. p. 286-309.

58. Moher D, Schulz KF, Altman DG. The CONSORT statement: revised recommendations for improving the quality of reports of parallel group randomized trials. *J Am Podiatr Med Assoc.* 2001;91(8):437–42.
59. Moher D, Hopewell S, Schulz KF, Montori V, Gøtzsche PC, Devereaux PJ, et al. CONSORT 2010 explanation and elaboration: updated guidelines for reporting parallel group randomised trials. *J Clin Epidemiol.* 2010;63(8):e1–37.
60. Eysenbach G. CONSORT-EHEALTH: improving and standardizing evaluation reports of web-based and mobile health interventions. *J Med Internet Res.* 2011;13(4):e126.
61. Chan A-W, Tetzlaff JM, Altman DG, Laupacis A, Gøtzsche PC, Krleža-Jerić K, et al. SPIRIT 2013 statement: defining standard protocol items for clinical trials. *Ann Intern Med.* 2013; 158(3):200.
62. Chan A-W, Tetzlaff JM, Gøtzsche PC, Altman DG, Mann H, Berlin JA, et al. SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. *BMJ.* 2013; 346:e7586.
63. Cohen J. *Statistical power analysis for the behavioral sciences.* Hillsdale: 2nd ed. L. Erlbaum Associates; 1988.
64. Van Balleegooijen W, Cuijpers P, van Straten A, Karyotaki E, Andersson G, Smit JH, et al. Adherence to internet-based and face-to-face cognitive Behavioural therapy for depression: a meta-analysis. *PLoS One.* 2014;9(7):e100674.
65. Faul F, Erdfelder E, Lang A-G, Buchner A. *G\*power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences.* *Behav Res Methods.* 2007;39(2):175–91.
66. Williams W., Penman D. *Mindfulness: a practical guide to finding peace in a frantic world.* Hachette UK; 2011.
67. Peterson C. *A primer in positive psychology.* Oxford University Press; 2006.
68. Schueller SM, Parks AC. The science of self-help. *Eur Psychol.* 2014;19:145-155.

69. Layous K, Nelson SK, Lyubomirsky S. What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *JHS*. 2013;14(2):635-654.
70. Tennant R, Hiller L, Fishwick R, Platt S, Joseph S, Weich S. The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. *Health Qual Life Outcomes*. 2007;5(1):63.
71. López MA, Gabilondo A, Codony M, García-Forero C, Vilagut G, Castellví P, et al. Adaptation into Spanish of the Warwick–Edinburgh Mental Well-being Scale (WEMWBS) and preliminary validation in a student sample. *Qual Life Res*. 2013;22(5):1099-1104.
72. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiat Ann*. 2002;32(9):509-515.
73. Huang FY, Chung H, Kroenke K, Delucchi KL, Spitz RL. Using the patient health questionnaire-9 to measure depression among racially and ethnically diverse primary care patients. *J Gen Intern Med*. 2006;21(6):547-552.
74. Familiar I, Ortiz-Panozo E, Hall B, Vieitez I, Romieu I, Lopez-Ridaura R, Lajous M. Factor structure of the Spanish version of the Patient Health Questionnaire-9 in Mexican women. *Int J Methods Psychiatr Res*. 2015;24(1):74-82.
75. Rini CK, Dunkel-Schetter C, Wadhwa PD, Sandman CA. Psychological adaptation and birth outcomes: the role of personal resources, stress, and sociocultural context in pregnancy. *Health Psychol*. 1999;18(4):333.
76. Diener ED, Emmons RA, Larsen RJ, Griffin S. The satisfaction with life scale. *J Pers Assess*. 1985;49(1):71-75.
77. Vázquez C, Duque A, Hervás, G. Satisfaction with life scale in a representative sample of Spanish adults: validation and normative data. *Span J Psychol*. 2013;16(82):1-15.



78. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *J Pers Assess.* 1988;52(1):30-41.
79. Diener E, Wirtz D, Tov W, Kim-Prieto C, Choi DW, Oishi S, Biswas-Diener R. New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Soc Indic Res.* 2010;97(2):143-156.
80. MacLeod AK, Byrne A, Valentine JD. Affect, emotional disorder, and future-directed thinking. *Cogn Emot.* 1996;10(1): 69-86.
81. Ryff CD. Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *J Pers Soc Psychol.* 1989;57(6):1069.
82. Díaz D, Rodríguez-Carvajal R, Blanco A, Moreno-Jiménez B, Gallardo I, Valle C, Van Dierendonck D. Adaptación española de las escalas de bienestar psicológico de Ryff. *Psicothema.* 2006;18(3):572-577.
83. Raes F, Pommier E, Neff KD, Van Gucht D. Construction and factorial validation of a short form of the self-compassion scale. *Clin Psychol Psychother.* 2011;18(3):250-255.
84. Neff KD. The development and validation of a scale to measure self-compassion. *Self Identity.* 2003;2(3):223-250.
85. Garcia-Campayo J, Navarro-Gil M, Andrés E, Montero-Marin J, López-Artal L, Demarzo MMP. Validation of the Spanish versions of the long (26 items) and short (12 items) forms of the Self-Compassion Scale (SCS). *Health Qual Life Outcomes.* 2014;12(1):4.
86. Bolier L, Haverman M, Westerhof GJ, Riper H, Smit F, Bohlmeijer E. Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC public health.* 2013;13(1):119.
87. Lyubomirsky S, Layous K. How do simple positive activities increase well-being?. *Curr Dir Psychol Sci.* 2013;22(1):57-62.
88. Buchanan T, Johnson JA, Goldberg LR. Implementing a five-factor personality inventory for use on the internet. *Eur J Psychol Assess.* 2005;21(2):115-127.

**Chapter**



Effect of a web-based positive psychology intervention on prenatal well-being: a case series study

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## Abstract

**Background** Detrimental effects of women's negative feelings during pregnancy have been extensively examined and documented, but research on the influence of positive feelings and protective factors on their prenatal mental health is scarce. Evidence from the positive psychology field has shown that practicing some brief positive exercises, called positive psychology interventions, can maximize well-being by increasing positive emotions, engagement, and meaning. **Aim** The aim of this study is to examine the effect of a positive psychology web-based intervention on indices of women's prenatal well-being. **Methods** Specifically, a case series design was adopted, and data from six women are presented. Participants were involved in a 5-week online positive psychology intervention that includes a set of positive psychology interventions specifically adapted for pregnant women. Measures of women's mental well-being, depression, pregnancy-related anxiety, life satisfaction, and social support were measured at pre- and post-intervention. Compliance with the intervention and exercise preferences were assessed at post-test. Single-item related well-being measures were assessed weekly. **Findings and discussion** The findings of this case series study indicate potential effects of the intervention on supporting mental well-being and decreasing depressive symptomatology in these pregnant women. Furthermore, this study provides some suggestions for developing future online-based positive interventions addressed to pregnant women. However, these findings are preliminary, and future studies are needed in order to assess the effects of the intervention in a wider population of pregnant women.

# 1. Introduction

Pregnancy is a time of change and demands, which can impact both maternal and infant well-being. The nature, prevalence, and detrimental repercussions of negative feelings (e.g., stress, depression, anxiety) during pregnancy have been extensively examined and documented. Pregnant women are more vulnerable to developing some psychological problems such as depression<sup>1</sup>, or anxiety disorders<sup>2</sup>. Furthermore, it has been estimated that 25% of women experience prenatal stress<sup>3</sup>. Acute and chronic stressors for these women can be, for instance, worries about the baby's health and childbirth, concerns about physical changes, job-related stressors, and lack of perceived social support<sup>4</sup>. Low women's prenatal well-being is also associated with preterm childbirth, low baby weight, and even difficulties in the neurocognitive development of the fetus and emotional regulation abilities during infancy and childhood<sup>5,6</sup>. Therefore, because pregnancy is no longer considered an un-problematic period, it is essential to support and enhance mental well-being in pregnant women. This study contributes to a novel positive approach to pregnancy care, focused on the potential benefits of positive aspects (e.g. women's positive affect, positive life events) and protective factors (e.g., women's optimism, perceived social support) that can impact the course of pregnancy.

## 1.1. Positive prenatal well-being

Recent studies suggest that positive maternal mood can buffer the effects of negative feelings and promote maternal and infant well-being<sup>4,7-10</sup>. In one study of 60 pregnant women, experiencing positive life events during the prenatal period significantly predicted lower morning cortisol in late pregnancy<sup>9</sup>. Because the fetal programming hypothesis assumes that

increased maternal cortisol during pregnancy can have a negative effect on fetal development, these findings indicate that prenatal positive life experiences can attenuate - or even totally buffer - the negative effects of adverse influences on pregnant women and the developing fetus<sup>9</sup>. A recent study investigated whether women's positive affect in pregnancy could be a protective factor against postpartum depression<sup>11</sup>. Results showed that positive affect (i.e. frequency of experienced positive emotions) played a protective role, whereas negative affect was a predictor of postpartum depression. Maternal positive affect was also found to be associated with length of gestation and lowered risk of preterm birth<sup>10</sup>. McManus and colleagues<sup>8</sup> conducted the first study to examine the association between positive feelings and feeding practices. The results showed that positive maternal feelings during pregnancy were associated with better feeding practices, and that these feeding habits were associated with fewer common childhood diseases. The primary focus of psychological research on pregnancy has been on the role of social support<sup>3</sup>. Women's perceived social support can buffer the negative effects of stress and depression<sup>12</sup>. Pregnant women who reported higher levels of social support also reported low indices of distress and uncertainty, a greater sense of control over pregnancy-related changes, and improved self-image<sup>13</sup>. Women's perceived social support has also been associated with more optimal fetal movement, decreased risk of preterm birth, a better childbirth process (i.e., reduced labor length and birth complications, more spontaneous onset of labor, and natural childbirth), and higher birth weight<sup>14,15</sup>. A growing number of studies has assessed the effect of mindfulness interventions on women's prenatal well-being. Findings from a recent systematic review indicate potential benefits of mindfulness interventions on women's well-being, especially for decreasing levels of negative

affect, depression, and anxiety during pregnancy<sup>16</sup>. Nevertheless, due to the variety of research designs, gestational characteristics, timing of evaluations, and outcome measurements, improved methodological quality is necessary to accurately examine the effects of mindfulness interventions on women's prenatal well-being<sup>16</sup>. Despite these promising findings, research on the influence of positive feelings and protective factors on women's prenatal mental health is still scarce.

Evidence from the field of positive psychology has shown that practicing some brief positive exercises, called positive psychology interventions (PPIs)<sup>17</sup>, such as counting one's blessings<sup>18,19</sup>, writing gratitude journals<sup>19</sup>, or writing about one's best possible self<sup>20</sup>, can maximize individual well-being in general and depressed populations by increasing positive emotions, engagement, and meaning<sup>18,21</sup>. To the authors' knowledge, only one pilot study reported the effects of a gratitude and mindfulness intervention on women's prenatal stress, cortisol levels, and well-being indices, indicating potential direct effects of the intervention on reported stress in comparison to a treatment-as-usual control condition<sup>7</sup>.

## 1.2. Web-based intervention for prenatal mental health

In the past decade, web-based delivered interventions have been used to enhance the access to and effectiveness of traditional treatments (e.g., face-to-face treatments). Online interventions offer several potential advantages. They can overcome existing barriers, such as cost, service availability, waiting time, and transportation, and greater anonymity may encourage individuals to seek help and/or reveal more sensitive health information. Several meta-analyses have shown that web- or computer-based programs can be as effective as traditional face-to-face programs, and significantly more effective than control conditions, for

a variety of mental health disorders (e.g., depression, anxiety, and adjustment disorders) and across different populations<sup>22</sup>. Indeed, a recent systematic review provides preliminary evidence that web-based interventions can be a promising and advisable form of intervention during the prenatal period<sup>23</sup>. Women can access the web contents of an intervention at no or minimal cost, and at the most convenient time and place for them. These advantages can be particularly suitable for pregnant women, taking into account the demanding schedule of coping with pregnancy and a new baby<sup>23</sup>. Furthermore, the anonymity offered by web-based interventions might help pregnant women to overcome the stigma of seeking and accessing help<sup>23</sup>. Preliminary evidence suggests that online positive psychology interventions (OPPIs) can effectively enhance well-being and reduce depressive symptoms<sup>24</sup>, but to the authors' knowledge, the effectiveness of OPPIs for pregnant women has not yet been investigated.

The aim of this study is to examine the effect of a novel positive psychology web-based intervention on indices of women's prenatal well-being. Specifically, a case series design was adopted, and data from six women are presented.

## 2. Method

### 2.1. Participants

Pregnant women (in any week of pregnancy) who decided to keep the baby, Spanish or German speaking, and with regular Internet access, were invited to participate in the study. Six pregnant women were included in this study (see Table 1).

**Table 1.**  
Characteristics of the participants

	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>
<b>Age</b>	28	32	41	30	19	18
<b>Country of residency</b>	Austria	Spain	Spain	Spain	Germany	Germany
<b>Week of pregnancy</b>	29 <sup>th</sup>	27 <sup>th</sup>	12 <sup>th</sup>	9 <sup>th</sup>	29 <sup>th</sup>	20 <sup>th</sup>
<b>Previous children</b>	No	Yes	No	No	No	No
<b>Status</b>	In a relationship	Married	Married	Married	Separated	Separated
<b>Psychological problems</b>	No	No	No	No	No	No
<b>Physical problems</b>	No	No	No	Yes (food intolerance, migraines, irritable bowel syndrome)	No	No
<b>Education level</b>	High	High	High	High	High	High
<b>Occupation</b>	Unemployed	Unemployed	Employed	Employed	Student	Student
<b>Planned pregnancy</b>	Yes	Yes	Yes	Yes	No	No

P, participant

## 2.2. Measures

Participants provided information about age, country of residence, current week of pregnancy, previous children, relationship status, presence of psychological and/or physical problems, education level, occupation, and whether the pregnancy was planned or not. The following questionnaires were administered at pre- and post-intervention.

The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS<sup>25</sup>) is a 14-item self-report instrument that assesses subjective well-being and psychological functioning. For each item, respondents are asked to describe their experience over a two-week reference period on a 5-



point frequency scale, ranging from 1 = “none of the time” to 5 = “all of the time”. For the original WEMWBS, Cronbach's alpha was 0.89 for the student sample and 0.91 for the population sample<sup>25</sup>.

The Patient Health Questionnaire-9 (PHQ-9<sup>26</sup>) is a 9-item instrument, based on the DSM-IV diagnostic criteria, that measures depression severity. The 9 items are scored on a 4-point scale, ranging from 0 = “not at all” to 3 = “nearly every day”. Cut-off points of 5, 10, 15, and 20 represent the thresholds for mild, moderate, moderately severe, and severe depression, respectively. Previous studies have shown that the scale has good internal consistency ( $\alpha = 0.89$ ), and its validity and reliability as a diagnostic measure, as well as its utility in assessing depression severity, have been well established<sup>26,27</sup>.

The Pregnancy Related Anxiety Scale (PRAS<sup>28</sup>) is a 10-item self-report scale that evaluates the frequency or extent to which pregnant women are worried or concerned about their health, their baby’s health, labor and childbirth, and caring for a newborn. Responses are given on a 4-point scale ranging from 1 = “never or not at all” to 4 = “a lot of the time or very much”. The authors report acceptable internal reliability of the scale in both English (Cronbach's  $\alpha = 0.78$ ) and Spanish (Cronbach's  $\alpha = 0.80$ ) versions<sup>28</sup>.

The Satisfaction With Life Scale (SWLS<sup>29</sup>) is 5-item self-report measure of global life satisfaction. Respondents are asked to indicate the extent to which they agree with each item on a 7-point scale ranging from 1 = “strongly disagree” to 7 = “strongly agree”. The original SWLS has high internal consistency ( $\alpha = 0.87$ ) and high test-retest reliability ( $r = 0.82$ )<sup>29</sup>.

The Multidimensional Scale of Perceived Social Support (MSPSS<sup>30</sup>) is a 12-item scale that assesses the adequacy of perceived social support from three different sources: family, friends, and significant others. Respondents are asked to report the extent of their agreement with each item on a 7-point scale ranging from 1 = “very strongly disagree” to 7 = “very strongly agree”. The reliability of the total original scale is 0.88. The three subscales also show good internal consistency. For the significant other, family, and friends subscales, the values are  $\alpha = 0.91$ ,  $\alpha = 0.87$ , and  $\alpha = 0.85$ , respectively<sup>30</sup>.

An exercise preferences questionnaire was specifically developed for this research. It is composed of four questions designed to measure the participant’s opinion about each positive exercise proposed by the program (i.e., “*How many times did you actually practice the exercise during the past week?*”; on a 7-point scale ranging from 1 = “not at all” to 7 = “extremely”: “*How much did you enjoy the exercise?*”, “*How much did you benefit from the exercise?*”, “*How difficult was the exercise for you?*”). Participants’ preferences for the positive activities were assessed with four items (i.e., “*Which intervention exercise is your favorite?*”; “*Which intervention exercise do you like least?*”; “*Which exercise was the most difficult to practice?*”; “*Which exercise was the easiest to practice?*”). A single item was also included in order to assess the participant’s general opinion about Positive Pregnancy (i.e. on a 5-point scale: “*Would you recommend this intervention program? Why?*”).

A compliance with intervention measure was developed by the research team. Participants were asked to indicate the frequency with which they engaged in each of the daily exercises (e.g., “*How many times did you actually do the body scan exercise during the past week?*”).

### 2.2.1. Other measures

Weekly measures related to women's well-being. This instrument was specifically developed for this research. The six items assess different factors related to women's well-being (i.e., self-confidence, self-acceptance, satisfaction with life, connectedness, perceived social support, and optimism). Every week, participants were asked to indicate the extent to which they agreed with each item on a 7-point scale ranging from 1 = "very strongly disagree" to 7 = "very strongly agree".

### 2.3. Intervention Program

"Positive Pregnancy" (in Spanish: "Embarazo y Bienestar", in German: "In blühenden Umständen") is a 5-week, self-applied, web-based program designed to enhance the well-being of pregnant women. The program was developed by LabPsiTec (Laboratory of psychology and technology, University of Valencia) in collaboration with the University of Twente (Netherlands). It is composed of four modules. Each module includes a brief psycho-education unit focused on a positive psychology dimension (i.e., mindfulness and self-acceptance; savoring; connectedness and social support; optimism and life satisfaction) and a positive psychology exercise, with a duration of approximately 20 minutes. The set of PPIs (i.e., body scan exercise, three good things in life exercise, savoring the moment exercise, connectedness exercise, best possible self exercise, baby steps exercise) has been used in previous studies with different populations<sup>17-21</sup>. In the present study, the exercises have been specifically adapted to the topic of pregnancy. Table 2 summarizes the contents of each module. Different interactive elements, such as videos, sounds, and images, are provided in order to increase engagement.

**Table 2**

## Intervention program structure

Week	Name of module	Dimension of module	Description of exercise
1	“Mindfulness and Self-acceptance”	Mindfulness and self-acceptance	Body scan exercise <sup>31</sup> Participants are asked to listen to an audio recording that guides them to pay attention to various areas of their body and their breathing, gently observing these body parts and allowing other thoughts to recede
2	“Savoring”	Savoring	Three good things in life exercise <sup>19</sup> Participants identify three good things that went well each day and why  Savoring the moment exercise <sup>19</sup> Participants take a picture of something that is beautiful or meaningful and write a short description about what they appreciate and value in it
3	“Connectedness ”	Connectedness and social support	Connectedness exercise Participants identify and draw on a graphic about their most important relationships and find an activity to do together
4	“Optimism. Part 1”	Optimism and life satisfaction	Best possible self exercise <sup>20</sup> Participants visualize and write their ideal future life in as much detail as possible
5	“Optimism. Part 2”	Optimism and life satisfaction	Baby steps exercise <sup>20</sup> Participants write a list of goals and initial steps toward achieving their best possible self

## 2.4. Procedure

The study was advertised online via social networks (e.g., Facebook, Twitter). Interested women were directed to the research website (in Spanish: <http://pospre.wixsite.com/ebinsc>, in German: <http://pospre.wixsite.com/iuanmel>), where they found further information about the study and what participation entailed. Pregnant women could request participation through the website and by signing the informed consent form. After the registration, the clinical team contacted each participant by e-mail to perform the online pre-assessment on the web platform Survey Monkey

(<http://surveymonkey.com>). At the end of the evaluation, they obtained access to the first module of the program. Participants were involved in the 5-week training program. Every week, participants were contacted by e-mail and asked to perform a short assessment, at the end of which they found the hyperlink to access the following module. At the end of the last module, participants received a hyperlink by e-mail to complete the post-assessment. The training was delivered using a distance approach (i.e., web platform and e-mails). There was no face-to-face contact with the participants at any time.

## 2.5. Ethical approval

The study protocol was approved by the ethical committee of the University of Valencia.

## 3. Results

In keeping with the case-series design, data from the six women were examined individually. Patterns and trends are outlined below.

### 3.1. Mental well-being

On average, women's mental well-being levels increased from pre- to post-intervention. Specifically, participants 3, 5, and 6 reported lower mental well-being scores at pre-assessment compared to the levels reported by other studies with the general population<sup>32</sup> ( $M = 59.9$ ;  $SD = 7.8$ ; range: 14-72) (see Table 3). Mental well-being scores for participants 1, 2, and 4 decreased slightly, whereas mental well-being scores for participants 3, 5 and 6 increased from baseline to end-of-program.

### 3.2. Depression

At baseline, participants' depression scores ranged from minimum to mild. In all cases, there was a decrease in participants' depressive symptoms from baseline to post-test. Depressive symptomatology of participants 1, 2, and 6 decreased at post-intervention, even though their initial scores were in the range corresponding to "none" depression<sup>26</sup>. Depression severity scores of participants 3 and 5 decreased at post-assessment, but they remained in the "mild" range. Specifically, the level of depression of participant 4 decreased from the "mild" to "none" depression range at post-assessment.

### 3.3. Pregnancy-related anxiety

Levels of pregnancy-related anxiety at baseline were similar to those reported in previous studies<sup>33</sup>. On average, women's pregnancy-related anxiety decreased from pre- to post-intervention. At post-intervention, changes were observed in 2 of the 6 participants, who reported a decrease in pregnancy anxiety. Only participant 2 reported a slight increase in her pregnancy anxiety scores at post-test.

### 3.4. Satisfaction with life and perceived social support

Overall, women's levels of satisfaction with life increased from pre- to post-intervention. The satisfaction with life score of participant 2 was high and maintained at post-assessment. SWLS score of participant 5 slightly increased, but they remained within the average level. Scores of participants 3 and 6 increased, from a high score to very high score, whereas participant 1's scores increased from high to very high score. Only participant 4's satisfaction with life score decreased from high to average. On average, women reported less

perceived social support at post-assessment, compared to pre-intervention. Specifically, all participants, with the exception of participant 5, reported high levels of social support that remained stable across the 5-week intervention. However, participant 5 reported a decrease from moderate to low perceived social support at post-test.

### 3.5. Compliance with the intervention and weekly measures related to women's well-being

On average, women reported practicing the body scan and the baby steps exercise more frequently, compared to the three good things in life, savoring the moment, connectedness, and the best possible self. Overall, participants reported a preference for – in order – the baby step exercise, savoring the moment, and the best possible self, followed by the body scan, connectedness, and three good things in life (see Table 4). Regarding exercises' perceived benefits, women reported having benefitted more from – in order- the baby steps exercise, connectedness, three good things in life, savoring the moment , body scan, and the best possible self. On average, the most difficult exercises were those in module 2 (i.e. three good things in life and savoring the moment), followed by the body scan, baby steps, best possible self, and connectedness (see Table 4). Regarding the weekly single items, on average, self-confidence, perceived social support, connectedness, and optimism decreased from pre- to post-intervention. By contrast, satisfaction with life and self-acceptance levels increased from pre- to post-assessment (see Table 5). Specifically, participant 1 reported having practiced all the exercises at least once a week. She reported high scores at pre-intervention that remained consistently high during the five-week intervention. Participant 2 also reported having practiced all the exercises in the program. Her pre-test measures of well-being were

high; they fluctuated during the five weeks, but at the end of the intervention they were still high. Participant 3 reported having practiced only the body scan, connectedness, and the baby steps exercises. Specifically, participant 3 did not perform the exercises that she did not like, which were perceived as more difficult and having fewer benefits. Her self-acceptance score remained low at post-test, whereas her scores on satisfaction with life, connectedness, and optimism decreased from pre-test to post-intervention. Only the self-acceptance score increased, whereas the social support score remained high at post-test. Participant 4 did not perform the body scan exercise because she found it difficult, she did not like it, and she did not perceive benefits from it. She liked both the best possible self and baby steps exercises, but she did not perceive any benefit from performing them. Her self-confidence, self-acceptance, connectedness, and optimism scores decreased at post-test, although her life satisfaction and social support scores remained high at post-intervention. Participant 5 reported having practiced all the exercises at least twice a week. Her level of self-confidence decreased, whereas satisfaction with life increased at post-test. Her self-acceptance, perceived social support, connectedness, and optimism scores did not vary from pre-test to post-intervention. Participant 6 also reported having practiced the exercises at least twice a week. Her self-confidence, satisfaction with life, self-acceptance, and connectedness scores increased at post-test, whereas her social support and optimism scores remained consistently high during the intervention (see Table 5).



**Table 3**

Pre-post scores of the participants on indices of mental well-being

Dependent variables	P1		P2		P3		P4		P5		P6		Total (N=6) M(SD)	
	Pre	Pos	Pre	Pos	Pre	Pos	Pre	Pos	Pre	Pos	Pre	Pos	Pre	Post
Mental well-being (WEMWBS <sup>25</sup> )	62	60	53	52	43	50	52	45	34	44	43	53	47.8 (9.8)	50.7 (5.9)
Depression (PHQ-9 <sup>26</sup> )	4	1	4	3	9	7	9	3	7	6	3	0	6 (2.7)	3.3 (2.7)
Pregnancy related anxiety (PRAS <sup>28</sup> )	20	19	16	23	19	18	23	23	18	12	22	17	19.7 (2.6)	18.7 (4.1)
Satisfaction with life (SWLS <sup>29</sup> )	29	30	30	30	20	28	27	20	22	23	20	25	24.7 (4.5)	27 (2.8)
Perceived social support (MSPSS <sup>30</sup> )	7	7	6.9	6.5	5.3	5.8	6.7	6.1	4.1	2.3	6.3	6.6	6.1 (1.1)	5.7 (1.7)

P, participant; Pre, pre-assessment; Pos, post-assessment; WEMWBS, Warwick Edinburgh Mental Well-Being Scale (raw scores range: 14-70, high scores indicate higher level of mental well-being); PHQ-9, Patient Health Questionnaire-9 (raw scores ranges: 1-4 none, 5-9 mild, 10-14 moderate, 15-19 moderately severe, and 20-27 severe depression); PRAS, Pregnancy Related Anxiety Scale (raw scores range: 10-40, high scores indicate higher level of pregnancy related anxiety); SWLS, Satisfaction With Life Scale (raw scores ranges: 5-9 extremely dissatisfied, 10-14 dissatisfied, 15-19 slightly below average, 20-24 average score, 25-29 high score, 30-35 very highly satisfied); MSPSS, Multidimensional Scale of Perceived Social Support (raw scores ranges: 1-2.9 low support, 3-5 moderate support, 5.1-7 high support)

**Table 4**

Compliance with and evaluation of the intervention exercises

Exercise	Variable	P1	P2	P3	P4	P5	P6	Total (N =6)
								<i>M(SD)</i>
Body scan exercise	Frequency	5	3	1	0	2	4	2.5(1.9)
	Appreciation	6	5	4	2	4	2	3.8(1.6)
	Perceived benefit	5	5	4	1	4	1	3.3(1.9)
	Perceived difficulty	4	1	5	5	4	2	3.5(1.6)
Three good things in life exercise	Frequency	1	2	0	1	3	4	1.8(1.4)
	Appreciation	2	5	1	5	4	5	3.7(1.8)
	Perceived benefit	2	5	1	5	4	5	3.7(1.8)
	Perceived difficulty	6	6	5	5	1	1	4(2.4)
Savoring the moment exercise	Frequency	1	2	0	1	3	2	1.5(1)
	Appreciation	2	5	3	5	5	4	4(1.3)
	Perceived benefit	2	5	2	5	4	2	3.3(1.5)
	Perceived difficulty	6	5	5	5	1	2	4(2.4)
Connectedness exercise	Frequency	3	2	1	0	3	2	1.8(1.2)
	Appreciation	6	5	5	1	3	3	3.8(1.8)
	Perceived benefit	7	5	5	1	3	2	3.8(1.5)
	Perceived difficulty	5	5	2	1	3	2	3(1.7)
Best possible self exercise	Frequency	3	1	0	0	4	3	1.8(1.7)
	Appreciation	5	4	2	6	4	3	4(1.4)
	Perceived benefit	6	4	2	1	3	2	3(1.8)
	Perceived difficulty	5	4	4	2	3	1	3.2(1.5)
Baby steps exercise	Frequency	3	2	1	0	3	4	2.2(1.5)
	Appreciation	5	6	4	4	3	4	4.3(1)
	Perceived benefit	5	4	5	1	3	3	4.3(1)
	Perceived difficulty	6	4	4	2	3	1	3.3(1.8)

P, participant; Frequency, How many times did you actually do the exercise?; Appreciation, how much did you like the exercise? (range: 1 = "Not at all" to 7 = "Extremely"); Perceived benefit, how much did you benefit from the exercise? (range: 1 = "Not at all" to 7 = "Extremely"); Perceived difficulty, How difficult was the exercise? (range: 1 = "Not at all" to 7 = "Extremely")

**Table 5**  
Weekly measures related to well-being

Single-item well-being dimension	Time	P1	P2	P3	P4	P5	P6	Total (N=6) <i>M(SD)</i>
Self-confidence (range: 1 – 7)	T0	6	6	2	6	7	4	5.2(1.8)
	T1	6	6	3	6	3	5	4.8(1.5)
	T2	6	4	2	6	3	5	4.3(1.6)
	T3	6	5	3	6	3	5	4.7(1.4)
	T4	6	4	4	5	5	5	4.8(0.8)
	T5	6	6	2	3	3	6	4.3(1.8)
Satisfaction with life (range: 1 – 7)	T0	6	6	5	6	3	5	5.2(1.2)
	T1	6	6	5	6	5	6	5.7(0.5)
	T2	6	6	5	6	3	6	5.3(1.2)
	T3	6	6	5	5	3	5	5(1.1)
	T4	6	4	5	6	3	5	4.8(1.2)
	T5	6	6	4	6	7	6	5.8(1)
Self-acceptance (range: 1 – 7)	T0	7	6	4	6	6	3	5.3(1.5)
	T1	7	6	3	7	5	6	5.7(1.5)
	T2	6	6	6	6	7	5	6(0.6)
	T3	7	5	5	6	6	6	5.8(0.8)
	T4	7	4	5	6	6	6	5.7(1)
	T5	7	6	5	5	6	5	5.7(0.8)
Perceived social support (range: 1 – 7)	T0	7	7	6	6	4	7	6.2(1.2)
	T1	7	6	6	7	4	7	6.2(1.2)
	T2	7	6	6	6	5	7	6.2(0.8)
	T3	7	6	6	7	3	7	6(1.5)
	T4	7	4	6	6	3	7	5.5(1.6)
	T5	7	6	6	6	4	7	6(1.1)
Connectedness (range: 1 – 7)	T0	7	6	6	7	4	6	6(1.1)
	T1	6	6	5	6	4	6	5.5(0.8)

	T2	7	6	5	6	5	6	5.8(0.8)
	T3	7	6	6	5	4	6	5.7(1)
	T4	7	4	6	6	3	6	5.3(1.5)
	T5	6	6	5	6	4	7	5.7(1)
Optimism (range: 1 – 7)	T0	7	7	5	7	4	6	6(1.3)
	T1	7	6	6	6	4	6	5.8(1)
	T2	6	6	5	6	6	6	5.8(0.4)
	T3	6	6	4	6	3	6	5.2(1.3)
	T4	6	4	5	6	3	6	5(1.3)
	T5	6	6	4	6	4	6	5.3(1)

P, participant, T0, pre-intervention; T1, post-module 1; T2, post-module2; T3, post-module 3; T4, post-module 4a; T5, post-intervention

## 4. Discussion

This paper provides the first examination of the effects of a positive psychology web-based intervention on women’s prenatal well-being. Six women completed the trial, and these primary results are promising.

### 4.1. Women’s mental well-being and depression

The level of well-being was maintained at post-intervention, except for participant 4, whose well-being decreased. Nevertheless, participant 4’s level of depression decreased, and her levels of pregnancy anxiety did not increase at post-test. Regarding depression severity, all participants reported lower scores at the end of the program. These findings provide initial promising evidence about the possible positive effects of the program on reducing women’s depressive symptoms during pregnancy.

## 4.2. Pregnancy related anxiety

In general, pregnancy-related anxiety decreased, except for participants 2 and 4. Several studies indicate that pregnancy anxiety can vary during the pregnancy<sup>33,34</sup>. It tends to be highest in the first trimester, drops during the second one, and then increases during the final trimester<sup>33,34</sup>.

## 4.3. Satisfaction with life and perceived social support

Satisfaction with life remained almost stable in three cases. Participant 4's SWLS score decrease coincides with lower mental well-being at post intervention, suggesting that this participant obtained the least benefit from the program, compared to the other participants. All participants reported high perceived social support at both baseline and post-intervention.

## 4.4. Weekly measures of well-being and intervention use

Regarding the weekly measures of women's well-being, the scores decreased in the two women (i.e., P3 and P4) who did not perform all the program exercises, and in participant 5. We can hypothesize that low compliance with the intervention could influence the decline in well-being shown by participants 3 and 4. This hypothesis must be verified in a future controlled study. The decrease in participant 5's self-confidence, satisfaction with life, social support, and connectedness scores could be caused by the experience of a negative event.

## 4.5. Limitations

This study has some limitations that should be highlighted. First, findings are preliminary and cannot be generalizable to a wider population of pregnant women. Second, pregnant women were in different moments in their pregnancies, which could have affected

the results somehow. In this regard, women (i.e., P1, P2, and P5) beyond their first trimester of pregnancy obtained the greatest benefits from the program. Future research should examine the potential moderator role of the gestation trimester. Other moderators, such as age, status, and level of education, should also be analyzed<sup>33,34</sup>.

#### 4.6 Future directions

Future studies should include a control condition (e.g., waiting-list condition) and a follow-up evaluation in order to investigate whether the effects of the intervention can be maintained over time. The limitations of this study would be solved by implementing the program in a large-scale study with an experimental controlled design. Future interventions should also allow the intervention to be personalized, so that participants can choose from a set of positive activities. The personalization of the intervention could increase compliance and, therefore, produce a stronger positive impact on women's well-being during pregnancy.

### 5. Conclusion

Despite these limitations, to the best of our knowledge, this is the first study to show the preliminary results of a web-based positive psychology intervention for pregnant women. Our preliminary results tend to show that this intervention can support women's well-being and decrease depression during pregnancy. Moreover, this study also provides some indications that can be taken into consideration in the design of future online-based positive interventions. This study contributes to a novel line of studies that investigate the potential benefits of positive aspects (e.g. positive emotions, positive life events) and protective factors (e.g., optimism, perceived social support) on the course of the pregnancy. Nevertheless, these

findings are preliminary, and future controlled studies are needed in order to assess the effects of the intervention in a wider population of pregnant women.

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## 6. References

1. Zuckerman B, Bauchner H, Parker S, Cabral H. Maternal Depressive symptoms during pregnancy, and newborn irritability. *J Dev Behav Pediatr.* 1990; 11(4):190-194.
2. Buist A, Gotman N, Yonkers KA. Generalized anxiety disorder: course and risk factors in pregnancy. *J Affect Disorders.* 2011; 131(1): 277-283.
3. Dunkel-Schetter C. Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annu Rev Psychol.* 2011; 62: 531-558.
4. O'Leary K. The effect of positive psychological interventions on psychological and physical well-being during pregnancy. *DClinPsych Thesis, Cork (Ireland): University College Cork;* 2015.
5. Entringer S, Buss C, Shirtcliff EA, Cammack AL, Yim IS, Chicz-DeMet A, et al. Attenuation of maternal psychophysiological stress responses and the maternal cortisol awakening response over the course of human pregnancy. *Stress.* 2010; 13(3): 258-268.
6. Huizink AC, Robles de Medina PG, Mulder EJ, Visser GH, Buitelaar JK. Stress during pregnancy is associated with developmental outcome in infancy. *J Child Psychol Psyc.* 2003; 44(6): 810-818.
7. Matvienko-Sikar K, Dockray S. Effects of a novel positive psychological intervention on prenatal stress and well-being: A pilot randomized controlled trial. *Women Birth.* 2016.
8. McManus MA, Khalessi AA, Lin J, Ashraf J, Reich SM. Positive feelings during pregnancy, early feeding practices, and infant health. *Pediatr Int.* 2016.



9. Pluess M, Wurmser H, Buske-Kirschbaum A, Papousek M, Pirke KM, Hellhammer D, et al. Positive life events predict salivary cortisol in pregnant women. *Psychoneuroendocrinology*. 2012; 37(8): 1336-1340.
10. Voellmin A, Entringer S, Moog N, Wadhwa PD, Buss C. Maternal positive affect over the course of pregnancy is associated with the length of gestation and reduced risk of preterm delivery. *J Psychosom Res*. 2013; 75(4): 336-340.
11. Bos SC, Macedo A, Marques M, Pereira AT, Maia BR, Soares MJ, et al. Is positive affect in pregnancy protective of postpartum depression?. *Rev Bras Psiquiat*. 2013; 35(1): 5-12.
12. Collins NL, Dunkel Schetter C, Lobel M, Scrimshaw SC. Social support in pregnancy: psychosocial correlates of birth outcomes and postpartum depression. *J Pers Soc Psychol*. 1993; 65(6): 1243.
13. Giurgescu C, Penckofer S, Maurer MC, Bryant FB. Impact of uncertainty, social support, and prenatal coping on the psychological well-being of high-risk pregnant women. *Nurs Res*. 2006; 55(5): 356-365.
14. Dejin-Karlsson E, Hanson BS, Östergren PO, Lindgren A, Sjöberg NO, Marsal K. Association of a lack of psychosocial resources and the risk of giving birth to small for gestational age infants: a stress hypothesis. *BJOG*. 2000; 107(1): 89-100.
15. Feldman PJ, Dunkel Schetter C, Sandman CA, Wadhwa PD. Maternal social support predicts birth weight and fetal growth in human pregnancy. *Psychosom Med*. 2000; 62(5): 715-725.

16. Matvienko-Sikar K, Lee L, Murphy G, Murphy L. The effects of mindfulness interventions on prenatal well-being: a systematic review. *Psychol Health*. 2016; 31(12): 1415-1434.
17. Seligman, ME, Steen TA, Park N, Peterson C. Positive psychology progress: empirical validation of interventions. *Am Psychol*. 2005; 60(5): 410.
18. Lyubomirsky S, Layous K. How do simple positive activities increase well-being?. *Curr Dir Psychol Sci*. 2013; 22(1): 57-62.
19. Schueller SM, Parks AC. The Science of Self-Help. *Eur Psychol*. 2014; 19(2): 145-155.
20. Layous K, Nelson SK, Lyubomirsky S. What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *JHS*. 2013; 14(2): 635-654.
21. Bolier L, Haverman M, Westerhof GJ, Riper H, Smit F, Bohlmeijer E. Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health*. 2013; 13(1): 1.
22. Andrews G, Cuijpers P, Craske MG, McEvoy P, Titov N. Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: a meta-analysis. *PloS One*. 2010; 5(10): e13196.
23. Ashford MT, Olander EK, Ayers S. Computer-or web-based interventions for perinatal mental health: A systematic review. *J Affec Disorders*. 2016; 197: 134-146.
24. Bolier L, Abello KM. Online positive psychological interventions: State of the art and future directions. In Parks AC, Schueller SM editors. *The Wiley Blackwell handbook of positive psychological interventions*. Chichester, UK: John Wiley & Sons, Ltd; 2014. p. 286-309.

25. Tennant R, Hiller L, Fishwick R, Platt S, Joseph S, Weich S. The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. *Health Qual Life Outcomes*. 2007; 5(1): 63.
26. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiat Ann*. 2002; 32(9): 509-515.
27. Huang FY, Chung H, Kroenke K, Delucchi KL, Spitz RL. Using the patient health questionnaire-9 to measure depression among racially and ethnically diverse primary care patients. *J Gen Intern Med*. 2006; 21(6): 547-552.
28. Rini CK, Dunkel-Schetter C, Wadhwa PD, Sandman CA. Psychological adaptation and birth outcomes: the role of personal resources, stress, and sociocultural context in pregnancy. *Health Psychol*. 1999; 18(4): 333.
29. Diener ED, Emmons RA, Larsen RJ, Griffin S. The satisfaction with life scale. *J Pers Assess*. 1985; 49(1): 71-75.
30. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *J Pers Assess*. 1988; 52(1): 30-41.
31. Williams M, Penman D. *Mindfulness: a practical guide to finding peace in a frantic world*. UK: Hachette; 2011.
32. Castellví P, Forero CG, Codony M, Vilagut G, Brugulat P, Medina A, et al. The Spanish version of the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) is valid for use in the general population. *Qual Life Res*. 2014; 23(3): 857-868.

33. Schetter CD, Tanner L. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Curr Opin Psychiatry*. 2012; 25(2): 141.
34. Guardino CM, Schetter CD. Understanding pregnancy anxiety: concepts, correlates, and consequences. *Zero Three*. 2014; 34(4): 12-21.

# Chapter



## Assessing future expectations and the two-dimensional model of affect in an Italian population

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## Abstract

Future-directed thinking has been described as part of two underlying systems that integrate dimensions of affect, motivational systems, orientation to the future, and future expectations, which are initiated at the cognitive, affective, biological, behavioral, and motivational levels. The main aim of the present study is to test the two underlying frameworks model and explore future expectations in a general Italian-speaking population (N=345). Therefore, the second aim of the present paper is to confirm the factorial structure of the Subjective Probability Task (SPT; MacLeod et al., 1996), a questionnaire designed to assess specific positive and negative orientations towards the future. Results showed that the SPT has good psychometric properties and it is a reliable instrument to assess future-directed thinking. Moreover, our findings confirmed the role of future expectancies as cognitive correlates of depression and anxiety. Differently from previous studies (Clark and Watson, 1991; MacLeod et al., 1996), our results did not confirm that depression was characterized by low positive affect. We believe this paper contributes to the understanding of future expectancies and their relation with anxiety and depression, and will help to expand the availability of an instrument to assess future directed thinking.

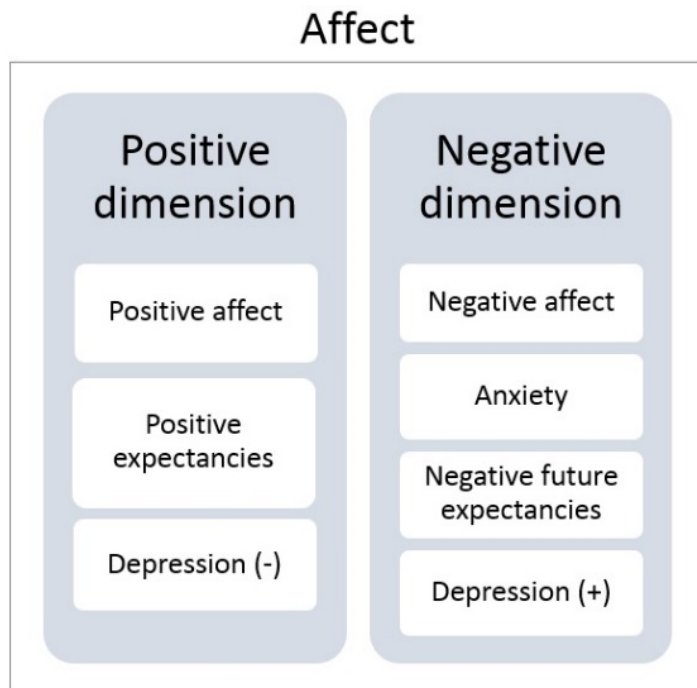
# 1. Introduction

Thinking about the future is a central component of human cognition. It involves the ability to project the self forward in time in order to pre-experience an event (Atance and O’Neill, 2001). Many studies have demonstrated the relationship between future-related thinking and well-being. For instance, previous research has shown that patterns of positive future-directed thinking, such as hope and optimism, are linked to reported higher quality of life and life satisfaction (Scheier et al., 1989), less distress (e.g. Brissette et al., 2002), more adaptive behaviors, and overall higher wellbeing (Carver et al., 2010). By contrast, patterns of negative future-directed thinking, as in the case of hopelessness and pessimism, are associated with maladaptive behaviors, such as alcohol (Ohannessian et al., 1994) and substance abuse (Park et al., 1997), less persistence facing life’s challenges, more avoidance coping, and poor health (Carver et al., 2010; Snyder et al., 1991). Moreover, reduced anticipation of future positive events is a defining characteristic of depression, whereas anxiety is characterized by an increase in the number of perceived negative future events (Balsamo et al., 2013; Bjärehed et al., 2010; Rief et al., 2015). Besides, expectancies have been considered a core feature of mental disorders and for that reason a focal objective of treatment (Rief et al., 2015).

In their study, MacLeod et al. (1996) tested a new model of affect. They explored if the positive and negative future expectancies could be included in the tripartite model of Clark and Watson (1991). The tripartite model of anxiety and depression proposed by Clark and Watson (1991) theorizes three main factors: negative affect (NA), positive affect (PA), and arousal. According to this model, both anxiety and depression are characterized by a higher NA

component; however, only depression consisting of low PA and anxiety is uniquely characterized by hyperarousal (Clark and Watson, 1991; Miloyan et al., 2014). With an exploratory factor analysis (EFA), MacLeod et al. (1996) tested a model composed by two factors: the first one characterized by anxiety, depression, NA, and expectancies for future negative events; the second factor dominated by depression (negative loading), PA (positive loading), and expectancies for future positive events. Therefore, MacLeod et al., (1996) described future-directed thinking as part of two underlying systems that integrate dimensions of affect, motivational systems, orientation to the future, and future expectations, which are initiated at the cognitive, affective, biological, behavioral, and motivational levels.

**Figure 1.** Two underlying systems that integrate dimensions of affect, motivational systems, orientation to the future, and future expectations (MacLeod et al., 1996)





Regarding affect, PA and NA have been described as two orthogonal dimensions (Clark and Watson, 1991; MacLeod et al., 1996). PA refers to pleasurable engagement and reflects the extent to which one feels enthusiastic, active and alert. NA instead refers to unpleasant engagement and reflects the extent to which one feels angry, disgusted or afraid. Both PA and NA have also been used to conceptualize anxiety and depression. Anxiety and depression are characterized by a higher NA component, whether only depression is distinguished of low PA, and anxiety is singularly characterized by hyperarousal (Clark and Watson, 1991; Miloyan et al., 2014). Referring to the motivational level, previous studies (e.g. Fowles, 1988) have shown the distinction between a punishment-driven, aversive motivational system and a reward-driven, appetitive motivational system. Specifically, McNaughton (1982) referred to the former as the behavioral inhibition system, which is linked to aversive outcomes (i.e. punishment or frustrated non-reward) and inhibits ongoing behavior when an aversive outcome is perceived as likely. By contrast, the appetitive motivational system has been called the behavioral activation system or behavioral approach system. The behavioral approach system mediates responses to signs of desirable outcomes (i.e. relieving nonpunishment or reward) and initiates approach behavior when such outcomes are perceived as probable (e.g. Fowles, 1988; Gray, 1987). Regarding future-oriented cognitive processes, they have been associated with emotional disturbances (Beck et al., 1987). Anxiety and depression are similarly associated with an increased tendency to anticipate the occurrence of negative events, and an increased tendency to believe that future events will yield negative outcomes (MacLeod et al., 1996; Miranda and Mennin, 2007). For instance, hopelessness has been described as the typical orientation to the future found in depression (Beck et al., 1988;

MacLeod et al., 1996), whereas worry and negative bias for future personal (i.e., related to the self), but not for impersonal (i.e., other-oriented), events has been described as a characteristic of anxiety (Barlow, 1988; Butler and Mathews, 1987; MacLeod et al., 1996; Molina and Borkovec, 1994). Moreover, mood-disturbed individuals have been found to overestimate the probability of negative events (e.g. Andersen et al., 1992) and sometimes underestimate the probability of positive events (e.g. Pyszczynski et al., 1987).

To assess future-directed thinking, MacLeod et al. (1996) developed the Subjective Probability Task (SPT), a questionnaire designed to measure the tendency toward specific positive and negative future expectancies (e.g. Meevissen et al., 2011; Peters et al., 2010). Different variations and adaptations of the SPT have been used in research (e.g. Boselie et al., 2014; Hanssen et al., 2013; Stöber, 2000). The original authors developed a revised version by increasing the number of positive items (from 10 to 14) and reducing the number of negative items (from 20 to 16). Nevertheless, this change did not produce significant improvements. The original version of the SPT has been validated in English-speaking samples mostly composed by students (MacLeod et al., 1996; Meevissen et al., 2011; Peters et al., 2010).

The main aim of this study is to test the model with two underlying cognitive-affective frameworks (e.g. Clark et al., 1994; Fowles, 1988; Gray, 1987; MacLeod et al., 1996; McNaughton, 1982), in an Italian-speaking general population. To achieve this objective, we translate and assess the factorial structure and psychometric properties of the Italian SPT, a measure of future expectations, and we test the correlations between this measure and the other components of the two underlying systems (i.e. depression, anxiety, and positive and negative affect). We hypothesize that the Italian version of the SPT will present a two-factor

structure and good internal consistency, like the previous version (MacLeod et al., 1996). The second objective is to test with a confirmatory factor analysis (CFA) the structure of the two-factor model, which includes future-related thinking, affect, anxiety, and depression. Based on previous outcomes (MacLeod et al., 1996), we hypothesize that analyses will reveal a two-factor structure with one factor dominated by anxiety, depression, NA, and expectancies for future negative events, and the second factor dominated by depression (negative loading), and a positive loading of PA, and expectancies for future positive events.

## 2. Methods

### 2.1. Participants

The sample was composed of 345 participants who voluntarily took part in the present study. The sample was composed of 34.8% (n=120) men and 65.2% (n=225) women. The participant average age was 33.5 years (SD=12.20.; range: 18-80 years old). Specifically, 63.9% of subjects were between 18 to 30 years old, 11.4% between 31-40, 13.2% between 41 -50, 10.5% between 51-60, and 1% more than 60 years old. All participants were native Italian speakers. Regarding education, 2.6% (n=9) had completed middle school, 20.3% (n=70) had finished high school, and 77.1% (n=266) reported a university level of education. Of 250 participants who filled-out the BDI-II, 21 (8.4%) reported a moderate level of depression, and 9 (3.6%) moderate–severe depression. Mean score on the BDI was  $9.61 \pm 7.70$  (range: 1-39). Of 256 subjects who completed the STAI-Y trait, 102 (39.84%) scored more than 40. Mean score on the STAI-Y trait was  $43.65 \pm 9.26$  (range: 26-72).

## 2.2 Italian Translation of the SPT

Permission to translate and validate the SPT was granted by the authors of the instrument (MacLeod et al., 1996). First, a native Italian speaker who was aware of the purpose of the SPT translated the items from English to Italian. Second, an Italian-English bilingual speaker who was not familiar with the SPT performed a back-translation from Italian to English. The two English versions were compared and any discrepancies were detected. Therefore, the Italian version of the SPT was judged to be an accurate translation of the English version.

## 2.3 Measures

*Positive and Negative affect.* Affect was assessed with a widely used scale, the Positive and Negative Affect Scale (PANAS; Watson et al., 1988), which consists of two subscales, one measuring PA and the other measuring NA. Each subscale contains 10 items, scored on a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). The Italian validated version of the PANAS was used in this study (Terraciano et al., 2003). The internal consistency coefficients found for the PANAS subscales in the present study were  $\alpha=0.91$  for NA and  $\alpha=0.90$  for PA.

*Depression.* Depression was assessed with the Beck Depression Inventory-II (BDI-II; Beck et al., 1996). This self-report instrument is a 21-item scale. Each item is rated on a 4-point scale (0–3). Analyzing the psychometric properties and the factor structure of the BDI-II in both analogue and clinical populations, Beck et al. (1996) found that it has good internal consistency ( $\alpha$ 's of 0.92 and 0.93, respectively) and 1-week test–retest reliability ( $r=0.93$ ). It has been found

to be a valid indicator of depression with good diagnostic discrimination (Dozois et al., 1998). The Italian version of the BDI-II has been validated by Ghisi and colleagues (2006), which shown a satisfying internal validity (from  $\alpha=0.76$  to  $\alpha=0.87$ ) (Balsamo and Saggino, 2007). The internal consistency coefficient for the Italian version of the BDI-II in the present study was  $\alpha=0.89$ .

*Anxiety.* Anxiety was assessed using one of the most popular measures: the Spielberger State-Trait Anxiety Inventory- Form Y (STAI-Y; Spielberger, 1973, 2010). It consists of a brief self-report questionnaire designed to measure and differentiate between trait (a stable personality trait) and state (a temporary and fluctuating condition) anxiety. The STAI-Y consists of two subscales with 20 items each. It is a reliable and sensitive measure of anxiety ( $\alpha=0.90$  for trait scale,  $\alpha=0.93$  for state scale) (Bados et al., 2010; Barnes et al., 2002; Gros et al., 2007; Spielberger, 1970). In this study, the validated Italian version of the STAI-Y trait was used (Pedrabissi and Santinello, 1989), which have shown a good internal validity ( $\alpha$  between 0.85 and 0.90) (Balsamo et al., 2013). The internal consistency coefficients found for the Italian version of the STAY-Y trait in the present study was  $\alpha= 0.89$ .

*Future expectancies.* Future-directed expectancies have been assessed through the Subjective Probability Task (SPT; MacLeod et al., 1996), composed of 30 items rated on a 7-point Likert scale. The participant has to estimate the probability of each item happening to him/her in the future, from 1 (“not at all likely to occur”) to 7 (“extremely likely to occur”). The SPT has two subscales: one with 20 items referring to negative expectancies, and the other with 10 items referring to positive expectancies. An independent subtotal for each subscale has to be calculated. The negative expectancies subtotal score ranges from a minimum of 20 to a

maximum of 140, while the positive expectancies subtotal score ranges from a minimum of 10 to a maximum of 70. The authors of the original version of the SPT reported that the scale has good internal consistency ( $\alpha=0.90$  for the negative subscale and  $\alpha=0.86$  for the positive subscale). The two subscales also showed good discriminant validity (MacLeod et al., 1996). The internal consistency coefficients found for the Italian version of the SPT subscales in the present study were 0.92 and 0.85 for negative and positive expectancies, respectively.

## 2.4 Procedure

Participants were recruited through e-mail, social networks, and word of mouth. The survey was carried out using the Survey Monkey web platform. Demographic data (i.e. gender, age, education level, nationality, and country of residence) were collected. The translated version of the SPT and the Italian validated versions of the STAY-Y trait, BDI-II, and PANAS were administered, in that order. It was possible to answer to the survey in approximately 30 minutes.

## 2.5 Data Analysis

Internal consistency of the Italian SPT subscales was assessed using Cronbach's  $\alpha$  coefficient. This coefficient ranges from 0 to 1, with higher values corresponding to better reliability. The analysis assesses the correlation of each item with the subscale, as well as the change in the Cronbach's  $\alpha$  coefficient if an item was excluded. Criterion validity of the Italian SPT was examined by calculating the correlation of each subscale with measures of affect, depression, and anxiety. The discriminant validity of the SPT subscales was tested by calculating item-total correlations for the positive and negative items. Construct validity of the

model composed of two affect dimensions (one factor dominated by anxiety, depression, NA and expectancies for future negative events, and the second factor dominated by depression [negative loading], PA [positive loading], and expectancies for future positive events) was estimated with two confirmatory factor analyses (CFA), using the EQS program, version 6.1. First, we tested a model composed by one factor dominated by anxiety, depression, NA and expectancies for future negative events, and the second factor dominated by PA and expectancies for future positive events. Then, we tested another model with one factor dominated by anxiety, NA and expectancies for future negative events, and the second factor dominated by depression (negative loading), PA (positive loading), and expectancies for future positive events.

### 3. Results

Table 1 shows the means and standard deviations of all the measures included in the study. T tests were conducted and no significant differences related to age level were found.

#### 3.1 Confirmatory Factor Analysis of the SPT

Initially, the factorability of the SPT items was examined. The assessment of the distribution of data showed that our data were not characterized by a normal distribution (Skewness range: -0.489 – 2.487; Kurtosis range: -0.923 – 7.772). A CFA with the Robust Maximum Likelihood estimation method was used to test the Italian version of the SPT. First, a one-factor model (Model 1) was fit to the data to serve as a baseline and identify salient sources of error. This model did not fit the data well (see Table 2). Second, a model containing two correlated first-order factors of the SPT was tested. This latter model agrees with the

original version of the questionnaire (MacLeod et al., 1996) (see Table 2). The fit indexes indicated that the two-factor structure of the Italian version of the SPT was a better representation than the one-factor model. As Table 3 shows, all factor loadings were above 0.40.

### 3.2 Reliability: Internal Consistency

The internal consistency coefficients of the two subscales of the SPT were excellent (for negative expectancies  $\alpha=0.92$ , and for positive expectancies  $\alpha=0.85$ ). These results are similar to those reported by other authors (MacLeod et al., 1996; Meevissen et al., 2011; Peters et al., 2010).

### 3.3 Correlation Analyses

Correlation coefficients are presented in Table 4. All correlations were significant at  $p<0.01$ . Measures of negative affect, anxiety, and depression correlated positively with the negative expectancies subscale and negatively with the positive expectancies subscale, while positive affect correlated negatively with the negative expectancies subscale and positively with the positive expectancies subscale. The two SPT subscales were negatively correlated ( $\rho=-0.20$ ).



**Table 1.** Descriptive statistics for all the measures described above in the entire sample (n=345)

	<i>M</i>	<i>SD</i>
<b>SPT-NE</b>	54.12	18.28
<b>SPT-PE</b>	46.62	9.29
<b>PANAS-N</b>	20.30	7.93
<b>PANAS-P</b>	31.20	7.59
<b>STAY-Y (s)</b>	47.72	12.18
<b>STAY-Y (t)</b>	43.61	10.32
<b>BDI-II</b>	9.57	7.70

*Note.* M= mean; SD= standard deviation. SPT–NE=Subjective Probability Task–Negative Expectancies; SPT–PE=Subjective Probability Task–Positive Expectancies; PANAS–N=Positive and Negative Affect Schedule–Negative Affect; PANAS–P=Positive and Negative Affect Schedule–Positive Affect; STAY-Y (s)=State-Trait Anxiety Inventory- Form Y (state); STAY-Y (t)=State-Trait Anxiety Inventory- Form Y (trait); BDI-II=Beck Depression Inventory-II.

**Table 2.** Confirmatory Factor Analysis of the Italian version of the Subjective Probability Task (n=345)

	<i>CFI</i>	<i>RMSEA</i>	<i>90% CI RMSEA</i>	<i>sbX<sup>2</sup></i>	<i>df</i>	<i>p</i>
<b>Model 1</b>	0.818	0.122	(0.116, 0.127)	1944.8543	405	< 0.001
<b>Model 2</b>	0.942	0.069	(0.063, 0.075)	896.0034	404	< 0.001

*Note.* *CFI*>0.90; *RMSE* <0.08

**Table 3.** Factor loadings of the items for the Italian Subjective Probability Task (N = 345)

	<b>Factor</b>	
	<b>1</b>	<b>2</b>
	<b>(NE)</b>	<b>(PE)</b>
Item 1	0.502	
Item 2		0.536
Item 3	0.432	
Item 4	0.602	
Item 5	0.473	
Item 6		0.709
Item 7		0.700
Item 8	0.565	
Item 9		0.673
Item 10	0.595	
Item 11	0.602	
Item 12	0.541	
Item 13	0.737	
Item 14		0.540
Item 15	0.647	
Item 16		0.606
Item 17		0.493
Item 18	0.710	
Item 19		0.548
Item 20	0.754	
Item 21	0.628	
Item 22	0.700	
Item 23	0.459	

Item 24	0.559
Item 25	0.634
Item 26	0.559
Item 27	0.687
Item 28	0.727
Item 29	0.485
Item 30	0.599

Note. NE=negative expectancies; PE=positive expectancies; loadings factors >0.40

**Table 4.** Correlations between the Italian Subjective Probability Task and measures of affect, anxiety, and depression (n = 345)

	SPT-NE	SPT-PE	PANAS-N	PANAS-P	STAY-Y (t)	BDI-II
<b>SPT-NE</b>	–					
<b>SPT-PE</b>	-0.16	–				
<b>PANAS-N</b>	0.54	-0.32	–			
<b>PANAS-P</b>	-0.28	0.63	-0.33	–		
<b>STAY-Y (t)</b>	0.55	-0.44	0.71	-0.50	–	
<b>BDI-II</b>	0.49	-0.37	0.67	-0.51	0.68	–

Note. Correlations are significant at  $p < 0.01$ . SPT-NE=Subjective Probability Task–Negative Expectancies; SPT-PE=Subjective Probability Task–Positive Expectancies; PANAS-N=Positive and Negative Affect Schedule–Negative Affect; PANAS-P=Positive and Negative Affect Schedule–Positive Affect; STAY-Y (t)=State-Trait Anxiety Inventory-Form Y (trait); BDI-II=Beck Depression Inventory-II.

### 3.4 Confirmatory Factor Analysis of the Two Affective Systems

The factorability of the model (MacLeod et al., 1996) composed of two affect dimensions (one factor dominated by anxiety, depression, NA and expectancies for future negative events, and the second factor dominated by depression-negative loading, PA and expectancies for future positive events) was estimated by confirmatory factor analysis (CFA).

The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy showed that the factor model was appropriate (0.800). Additionally, Bartlett's test of sphericity was significant ( $\chi^2(15)=776.821$ ;  $p<.08$  (see Table 5). As Table 6 shows, all factor loadings were excellent and above .65. In Model 2, we tested the model sustained by Clark and Watson and by the EFA results of MacLeod et al., according to which depression loads in the positive affect dimension. This model does not present an adequate fit (CFI and GFI<.08) (see Table 5).

**Table 5.** Confirmatory Factor Analysis of the two cognitive-affective dimension models (n=345)

	<i>CFI</i>	<i>GFI</i>	<i>RMR</i>	<i>RMSEA</i>	<i>90% CI RMSEA</i>	<i>sbX<sup>2</sup></i>	<i>df</i>	<i>p</i>
<b>Model 1</b>	0.960	0.954	0.042	0.107	(0.068, 0.148)	30.2367	8	< 0.001
<b>Model 2</b>	0.876	0.857	0.093	0.192	(0.154, 0.230)	79.7507	8	< 0.001

*Note.* *CFI*>0.90; *RMSEA*<0.08

**Table 6.** Factor loadings of the CFA of measures in the two affective system model

	<b>Factor</b>	
	<b>1 (NA)</b>	<b>2 (PA)</b>
<b>SPT-PE</b>		<b>0.767</b>
<b>SPT-NE</b>	<b>0.652</b>	
<b>PANAS-P</b>		<b>0.896</b>
<b>PANAS-N</b>	<b>0.835</b>	
<b>BDI-II</b>	<b>0.834</b>	
<b>STAY-Y (t)</b>	<b>0.877</b>	

*Note.* Factor loadings of 0.30 or above are shown in bold. SPT-PE = Subjective Probability Task-Positive Expectancies; SPT-NE=Subjective Probability Task-Negative Expectancies; PANAS-P=Positive and Negative Affect Schedule-Positive Affect; PANAS-N=Positive and Negative Affect Schedule-Negative Affect; BDI-II=Beck Depression Inventory-II; STAY-Y (t)=State-Trait Anxiety Inventory- Form Y (trait).

## 4. Discussion

The main aim of this study was to test the model with two underlying cognitive-affective frameworks, theorized and demonstrated by different authors (e.g. Clark et al., 1994; Fowles, 1988; Gray, 1987; MacLeod et al., 1996; McNaughton, 1982), in an Italian-speaking general population. In order to achieve this objective, we translated and assessed the factorial structure and psychometric properties of the Italian SPT, a measure of future expectations. In addition, we tested the correlations between this measure and the other components of the two underlying systems (i.e. depression, anxiety, and positive and negative affect).

We hypothesized that the Italian version of the SPT would present the same factor structure, psychometric characteristics, and good internal consistency as the previous version (MacLeod et al., 1996). Our findings showed that the Italian version of the SPT has good internal consistency, all items loaded in the same factor structure as the original version, and the two subscales were negatively correlated, as reported in previous versions of the questionnaire.

Moreover, the CFA showed that the factors were accurate representations of the two original subscales of the SPT: negative expectancies- NE (F1), and positive expectancies –PE (F2). Our findings also confirmed the negative correlations between the two subscales reported in the original version.

Our second hypothesis, confirm a two-factor structure with one factor dominated by anxiety, depression, NA, and expectancies for future negative events, and the second factor dominated by depression (negative loading), and a positive loading of PA, and expectancies

for future positive events, has been partially confirmed. The CFA with measures of depression, anxiety, and positive and negative affect partially confirmed the model proposed by the authors (Clark and Watson, 1991; MacLeod et al., 1996) for the two cognitive-affective-motivational systems. Our results confirmed the features of the negative factor proposed by MacLeod et al. (1996), whether the positive factor has not been confirmed by our results. In the original study conducted by Macleod et al. (1996) with a student sample, both anxiety and depression have been associated with the negative affect system, while only depression has been associated with the positive affect system. This is in line with the tripartite model proposed by Clark and Watson (1991) that posits that anxiety and depression share a common component of negative affect, but can be differentiated by low positive affect associated with depression and high physiological hyperarousal associated with anxiety (Anderson and Hope, 2006). Although this theoretical background suggests that depression is also characterized by reduced activation of the motivational system that mediates PA, approach behavior, hope, and expectancies of positive outcomes, our findings did not confirm this perspective. Evaluations of the tripartite model have had varying results, possibly due to methodological and sampling differences (Anderson and Hope, 2008). We can hypothesize that the different result could be attributed to other factors. First, anxiety and depression are difficult to discriminate in community samples with available measures but are more easily differentiated as symptomatology reaches diagnosable levels (Cummings, Caporino, and Kendall, 2014). Second, our sample was taken from the general population with low scores on depression and high positive affect. Furthermore, another significant difference is the type of analyses conducted. We performed a CFA instead of an EFA. Exploratory factor analysis is not designed

to test hypotheses or theories; it is used to explore a data set. On the contrary, confirmatory factor analysis allow researchers to test hypotheses via inferential techniques, and can provide more informative analytic options (Costello and Osborne, 2005). Lastly, the scale used to measure depression in the original study differed from the one used in the present study. In one of their two studies, Macleod et al. (1996) evaluated depression and anxiety with a self-report scale specifically designed for the study, and in the second study they included the Hospital Anxiety and Depression scale (HADS; Zigmond and Snaith, 1983). Therefore, future studies should clarify whether depression is characterized by both an increase in negative expectancies for the future and a decrease in positive expectancies, or only by the latter, using different scales to measure depression. Regarding the high root mean square error of approximation (RMSEA=0.107) reported by the CFA of the two-affect dimension model, it could be explained by the sample size. In fact, as Chen and colleagues (2008) suggested, the widely adopted cutoff value of 0.05 for this index rejects too many valid models in small sample sizes ( $n \leq 100$ ), while performing better in larger sample sizes (although it tends to over-accept at  $n \geq 800$ ). Nevertheless, future studies should be carried out to verify our findings.

These findings about the role of future expectancies could represent a target for psychological interventions aimed to prevent depression and anxiety symptomatology. In fact, recent studies involving exercises that promote positive future thinking (e.g. best possible self; Peters et al., 2010; MacLeod et al., 2008) show that these pathway thinking can effectively increase positive affect and reduce depression, negative affect, and dysfunctional attitudes (Renner et al., 2014). Therefore, the SPT questionnaire represents a valid instrument that can assess the effectiveness of psychological interventions aimed to establish the casual

relationship between optimism and various cognitive behavioral and affective correlates (Meevissen et al., 2011).

This study presents some limitations. First, it involved only the general population, whereas it would be interesting to use a clinical sample as well. Second, the present study is characterized by the lack of a test-retest reliability analysis for the Italian version of the SPT. In order to overcome this limitation, additional studies are needed to determine whether the Italian version of the SPT is a reliable instrument over time. Third, it would be interesting to analyze the role of other variables, such as worry and hopelessness, in the two underlying systems identified by the original authors, in a general and/or clinical Italian population.

There are different and, sometimes, contradictory approaches in the literature about models of affect (e.g. Denollet and De Vries, 2006). Therefore, further studies are recommended in order to investigate more about this thematic. The present study generated new findings that can feed the debate on the characterization of a model of affect. Moreover, since psychology has become an international science (Alonso-Arbiol and van de Vijver, 2010; Ziegler and Bensch, 2013), it is necessary to guarantee the comparability of the method of assessment used in order to be able to compare findings of researches in different languages (Ziegler and Bensch, 2013). Therefore, the present validation of the SPT in an Italian-speaking population will help to expand the availability of this instrument beyond the English- and Spanish-speaking world, creating new opportunities to conduct research with the Italian population.



## 5. References

Alonso-Arbiol, I., van de Vijver, F.J.R., 2010. A historical analysis of the European Journal of Psychological Assessment. *Eur. J. Psychol. Assess.* 26, 238–247. American Psychiatric Association, 2000. *Diagnostic and statistical Manual of Mental Disorders (revised 4th Ed.)*. Author, Washington, DC.

Andersen, S.M., Spielman, L.A., Bargh, J.A., 1992. Future-event schemas and certainty about the future: automaticity in depressives' future-event predictions. *J. Pers. Soc. Psychol.* 63 (5), 711-723.

Anderson, E.R., Hope, D.A., 2009. A review of the tripartite model for understanding the link between anxiety and depression in youth. *Clin. Psychol. Rev.* 28 (2), 275-287.

Atance, C.M., O'Neill, D.K., 2001. Episodic future thinking. *Trends Cogn. Sci.* 5 (12), 533-539. Bados, A., Gomez-Benito, J., Balaguer, G., 2010. The state-trait anxiety inventory, trait version: does it really measure anxiety? *J. Pers. Assess.* 92 (6), 560-567.

Balsamo, M., Romanelli, R., Innamorati, M., Ciccarese, G., Carlucci, L., Saggino, A., 2013. The state-trait anxiety inventory: shadows and lights on its construct validity. *J. Psychopathol. Behav.* 35 (4), 475-486.

Balsamo, M., Saggino, A., 2007. Test per l'assessment della depressione nel contesto italiano: un'analisi critica. *Italian Journal of Cognitive and Behavioural Psychotherapy* 13 (2), 167. Barlow, D.H., 2000. *Anxiety and its disorders*. Guilford Press, New York.

Barnes, L.L., Harp, D., Jung, W.S., 2002. Reliability generalization of scores on the Spielberger state-trait anxiety inventory. *Educ. Psychol. Meas.* 62 (4), 603-618.

Beck, A.T., Brown, G., Steer, R.A., Eidelson, J.I., Riskind, J.H., 1987. Differentiating anxiety and depression: A test of the cognitive content-specificity hypothesis. *J. Abnorm. Psychol.* 96, 179– 183.

Beck, A.T., Riskind, J.H., Brown, G., Steer, R.A., 1988. Levels of hopelessness in DSM-III disorders: A partial test of content specificity in depression. *Cognitive. Ther. Res.* 12 (5), 459-469.

Beck, A.T., Steer, R.A., Brown, G.K., 1996. Beck depression inventory-II. San Antonio. Bjärehed, J., Sarkohi, A., Andersson, G., 2010. Less positive or more negative? Future-directed thinking in mild to moderate depression. *Cogn. Behav. Ther.* 39 (1), 37-45.

Boselie, J.J., Vancleef, L.M., Smeets, T., Peters, M.L., 2014. Increasing optimism abolishes pain-induced impairments in executive task performance. *Pain* 155 (2), 334-340.

Brisette, I., Scheier, M.F., Carver, C.S., 2002. The role of optimism in social network development, coping, and psychological adjustment during a life transition. *J. Pers. Soc. Psychol.* 82 (1), 102.

Butler, G., Mathews, A., 1987. Anticipatory anxiety and risk perception. *Cognitive. Ther. Res.* 11, 551–565.

Carver, C.S., Scheier, M.F., Segerstrom, S.C., 2010. Optimism. *Clin. Psychol. Rev.* 30 (7), 879-889.

Chen, F., Curran, P.J., Bollen, K.A., Kirby, J., Paxton, P., 2008. An empirical evaluation of the use of fixed cutoff points in RMSEA test statistic in structural equation models. *Sociol. Methods. Res.* 36 (4), 462-494.

Clark, D.A., Steer, R.A., Beck, A.T., 1994. Common and specific dimensions of self-reported anxiety and depression: implications for the cognitive and tripartite models. *J. Abnorm. Psychol.* 103 (4), 645.

Clark, L.A., Watson, D., 1991. Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *J. Abnorm. Psychol.* 100 (3), 316.

Cummings, C.M., Caporino, N.E., Kendall, P.C., 2014. Comorbidity of anxiety and depression in children and adolescents: 20 years after. *Psychol. Bull.* 140 (3), 816.

Denollet, J., De Vries, J., 2006. Positive and negative affect within the realm of depression, stress and fatigue: The two-factor distress model of the Global Mood Scale (GMS). *J. Affect. Disorders.* 91 (2), 171-180.

Fowles, D.C., 1988. Psychophysiology and psychopathology: A motivational approach. *Psychophysiology* 25 (4), 373-391.

Ghisi, M., Flebus, G.B., Montano, A., Sanavio, E., Sica, C., 2006. Beck Depression Inventory-II. Manuale italiano. Organizzazioni Speciali, Firenze. Gray, J.A., 1987. The psychology of fear and stress (2nd. ed.). Cambridge University Press.

Gros, D.F., Antony, M.M., Simms, L.J., McCabe, R.E., 2008. Psychometric properties of the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA): comparison to the State-Trait Anxiety Inventory (STAI). *Psychol. Assessment*. 19 (4), 369-381.

Hanssen, M.M., Peters, M.L., Vlaeyen, J.W., Meevissen, Y.M., Vancleef, L.M., 2013. Optimism lowers pain: Evidence of the causal status and underlying mechanisms. *Pain* 154 (1), 53-58.

Kagan, L.J., MacLeod, A.K., Pote, H.L., 2004. Accessibility of causal explanations for future positive and negative events in adolescents with anxiety and depression. *Clin. Psychol. Psychot.* 11 (3), 177-186.

MacLeod, A.K., Byrne, A., Valentine, J.D., 1996. Affect, emotional disorder, and future-directed thinking. *Cogn. Emot.* 10 (1), 69-86.

MacLeod, A.K., Coates, E., Hetherington, J., 2008. Increasing well-being through teaching goal-setting and planning skills: results of a brief intervention. *JHS* 9 (2), 185-196.

McNaughton, N., 1982. Gray's Neuropsychology of anxiety: An enquiry into the functions of septohippocampal theories. *Behav. Brain. Sci.* 5 (03), 492.

Meevissen, Y., Peters, M.L., Alberts, H.J., 2011. Becoming more optimistic by imaging a best possible self: Effects of a two week intervention. *J. Behav. Ther. Exp. Psychiatry* 42 (3), 371-378.

Miloyan, B., Pachana, N.A., Suddendorf, T., 2014. The future is here: a review of foresight systems in anxiety and depression. *Cogn. Emot.* 28 (5), 795-810.

Miranda, R., Mennin, D.S., 2007. Depression, generalized anxiety disorder, and certainty in pessimistic predictions about the future. *Cognit. Ther. Res.* 31 (1), 71–82.

Molina, S., Borkovec, T.D., 1994. The Penn State Worry Questionnaire: Psychometric properties and associated characteristics. In Davey, G., Tallis, F. (Eds.), *Worrying: Perspectives on Theory, Assessment, and Treatment* (pp. 265-283), John Wiley & Sons. Oxford, England.

Ohannessian, C.M., Hesselbrock, V.M., Tennen, H., Affleck, G., 1994. Hassles and uplifts and generalized outcome expectancies as moderators on the relation between a family history of alcoholism and drinking behaviors. *J. Stud. Alcohol. Drugs.* 55 (6), 754.

Osborne, J.W., Costello, A.B., 2009. Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *PPMR* 12 (2), 131-146.

Park, C.L., Moore, P.J., Turner, R.A., Adler, N.E., 1997. The roles of constructive thinking and optimism in psychological and behavioral adjustment during pregnancy. *J. Pers. Soc. Psychol.* 73 (3), 584.

Pedrabissi, L., Santinello, M., 1989. *Inventario per l'ansia di «Stato» e di «Tratto»: nuova versione italiana dello STAI Forma Y: Manuale.* Organizzazioni Speciali, Firenze.

Peters, M.L., Flink, I.K., Boersma, K., Linton, S.J., 2010. Manipulating optimism: Can imagining a best possible self be used to increase positive future expectancies? *J. Posit. Psychol.* 5 (3), 204-211.

Pyszczynski, T., Holt, K., Greenberg, J., 1987. Depression, self-focused attention, and expectancies for positive and negative future life events for self and others. *J. Pers. Soc. Psychol.* 52 (5), 994.

Renner, F., Schwarz, P., Peters, M.L., Huibers, M.J., 2014. Effects of a best-possible-self mental imagery exercise on mood and dysfunctional attitudes. *Psychiat. Res.* 215 (1), 105-110.

Rief, W., Glombiewski, J.A., Gollwitzer, M., Schubö, A., Schwarting, R., Thorwart, A., 2015. Expectancies as core features of mental disorders. *Curr. Opin. Psychiatry.* 28 (5), 378-385.

Scheier, M.F., Matthews, K.A., Owens, J.F., Magovern, G.J., Lefebvre, R.C., Abbott, R.A., Carver, C.S., 1989. Dispositional optimism and recovery from coronary artery bypass surgery: the beneficial effects on physical and psychological well-being. *J. Pers. Soc. Psychol.* 57 (6), 1024.

Snyder, C.R., Irving, L.M., Anderson, J.R., 1991. Hope and health. *Handbook of social and clinical psychology: The health perspective*, 162, 285-305.

Spielberger, C.D., Gorsuch, R.L., Lushene, R.E., 1970. *Manual for the State-Trait Anxiety Inventory*. Consulting Psychologists Press, Palo Alto, CA.

Spielberger, C.D., 1973. *STAIC preliminary manual*. Consulting Psychologists Press, Palo Alto, CA.

Spielberger, C.D., 2010. *Test anxiety inventory*. John Wiley & Sons, Inc.

Stöber, J., 2000. Prospective cognitions in anxiety and depression: Replication and methodological extension. *Cogn. Emot.* 14 (5), 725-729.

Terraciano, A., McCrae, R.R., Costa Jr., P.T., 2003. Factorial and construct validity of the Italian Positive and Negative Affect Schedule (PANAS). *Eur. J. Psychol. Assess.* 19 (2), 131.

Watson, D., Clark, L.A., Tellegen, A., 1988. Development and validation of brief measures of positive and negative affect: the PANAS scales. *J. Pers. Soc. Psychol.* 54 (6), 1063.

Ziegler, M., Bensch, D., 2013. Lost in translation: Thoughts regarding the translation of existing psychological measures into other languages. *Eur. J. Psychol. Assess.* 29 (2), 81-83.

Zigmond, A.S., Snaith, R.P., 1983. The hospital anxiety and depression scale. *Acta. Psychiat. Scand.* 67 (6), 361-370.

# Chapter



## Assessing Positive and Negative Experiences: validation of a new measure of well-being in an Italian Population

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## Riassunto

Lo scopo del presente studio è quello di esplorare le proprietà psicometriche di uno strumento di misurazione dell'affetto, la Scala di Esperienze Positive e Negative (SPANE) [1], all'interno di una popolazione Italiana. Gli esiti dell'analisi fattoriale confermativa comprovano l'attesa struttura a due fattori, sentimenti positivi e negativi. Le correlazioni con altre dimensioni (i.e. ansia, depressione, affetto, aspettative future) confermano i risultati ottenuti con le precedenti versioni della scala: affetto negativo, ansia, depressione e aspettative future negative correlano positivamente con la subscale di esperienze negative e negativamente con la subscale di esperienze positive dello SPANE. In conclusione, i risultati del nostro studio dimostrano che la versione Italiana dello SPANE presenta caratteristiche psicometriche simili a quelle mostrate dalla versione originale e da successive validazioni dello strumento in altre lingue. La scala presenta inoltre affidabilità e validità fattoriale. Lo SPANE è un indice utile dal punto di vista clinico che può fornire informazioni rilevanti circa l'esperienza emotiva e il benessere della persona. Nonostante ulteriori studi siano necessari per confermare le caratteristiche psicometriche della scala, la presente validazione della versione Italiana dello SPANE può contribuire ad ampliare la ricerca nell'ambito del benessere in una popolazione Italiana.

## Abstract

The aim of this study is to explore the psychometric properties of an affect scale, the Scale of Positive and Negative Experience (SPANE) [1], in an Italian-speaking population. The results of this study demonstrate that the Italian version of the SPANE has psychometric properties

similar to those shown by the original and previous versions, and it presents satisfactory reliability and factorial validity. The results of the Confirmatory Factor Analysis support the expected two-factor structure, positive and negative feeling, which characterized the previous versions. As expected, measures of negative affect, anxiety, negative future expectancies, and depression correlated positively with the negative experiences SPANE subscale, and negatively with the positive experiences SPANE subscale. Results of this study demonstrate that the Italian version of the SPANE has psychometric proprieties similar to those shown by the original and previous versions, and it presents satisfactory reliability and factorial validity. The use of this instrument provides clinically useful information about a person's overall emotional experience and it's an indicator of well-being. Although further studies are required to confirm the psychometric characteristics of the scale, the SPANE Italian version is expected to improve theoretical and empirical research on the well-being of the Italian population.

# 1. Introduction

## 1.1. Two-Factor Model of Affect

Affect is a central theme in the field of psychology, and many studies have been conducted on this topic. For instance, well-being studies shown that emotional experience, together with life satisfaction, is a central component of subjective well-being, which includes experiencing high life satisfaction, positive emotions and low negative emotions [2]. Watson and Tellegen [3] summarized the evidence and presented a two-factor model composed of two highly distinctive orthogonal dimensions called Positive Affect (PA) and Negative Affect (NA). Although some investigators still endorse a model characterized by unrotated dimensions, referred to as pleasantness-unpleasantness and arousal [4], the varimax-rotated factors proposed by Watson and Tellegen are the most widely used in studies on affect.

Following this model, emotional experience has been defined as being dominated by these two broad and independent dimensions. PA is a general dimension that reflects the extent to which a person feels excited, enthusiastic, alert, and active [5, 6]. High PA corresponds to a state characterized by full concentration, high energy, and pleasurable engagement. By contrast, low PA is distinguished by lethargy and sadness. NA, on the other hand, reflects subjective distress and unpleasant engagement. The NA factor includes a wide range of aversive mood states, such as guilt, anger, disgust, contempt, fear, scorn, and depression [5, 6], whereas low negative affect corresponds to a state of calmness and serenity [5]. Negative and positive affect can represent either a state (i.e. transient fluctuations in mood) or trait (i.e. stable individual differences in general affective level) dimension.

Specifically, these traits, referred to as negative affectivity (or trait NA) and positive affectivity (or trait PA) [7], denote tendencies to experience the associated state mood factor. Thus, trait NA is linked to the dominant personality factor of anxiety/neuroticism, whereas trait PA is related to extroversion [8, 9]. Individuals who report high negative affectivity are more likely to experience significant levels of dissatisfaction and distress, they are introspective, and they tend to focus on the negative side of life. By contrast, individuals with low negative affectivity are more likely to be secure, self-satisfied, and content [9]. High trait PA is associated with happiness, a full and interesting life, and energy [7–10]. Moreover, numerous studies have indicated that anxiety and depression both involve NA, whereas only low PA is related to depression [11–14].

## 1.2. Affect scales

Given the two-factor structure of affect, numerous scales have been developed to assess pleasant and unpleasant emotions in a variety of research areas [5, 15, 16], but the most widely used scale is the Positive and Negative Affect Schedule (PANAS) [5]. This tool consists of two subscales, one measuring PA and one measuring NA. This scale presents some limitations. First, PANAS was designed to measure a specific conception of emotional well-being and ill-being; thus, it includes some items that are not usually considered feelings (e.g., “strong”, “alert”, “active”, and “determined”). Second, PANAS omits some core emotional feelings that are considered important to well-being (i.e. “pride”, “envy”, “jealousy”, “contentment”, “joy”, “happiness”, and “love”). Third, this scale omits other feelings that are widely believed to be core emotional feelings in some individuals and certain situations and does not consider the difference in the desirability of feelings in different contexts or cultures

[17, 18]. Lastly, some feelings, such as anxiety, are represented by a number of similar adjectives (i.e. “jittery,” “nervous,” “scared,” and “afraid”). Therefore, the inclusion of various synonyms for a single feeling means that the scale is heavily weighted toward one specific type of feeling.

### *1.2.1. Scale of Positive and Negative Experience*

To overcome these limitations, the new Scale of Positive and Negative Experience (SPANE) developed by Diener and his colleagues [1] has been used to assess a broad range of pleasant and unpleasant feelings by asking people to report their feelings, in terms of their duration, after recalling their activities and experiences during the previous 4 weeks. This approach is coherent with Diener and colleagues’ [19] conceptualization that overall judgements of subjective well-being, as for instance satisfaction with life, are based more on the frequency of an experience than on its intensity. Furthermore, the authors suggested that the amount of time having experienced a feeling might be more comparable among the respondents than the intensity of their feelings [1]. Moreover, the reference time, “4 weeks”, is short enough in order to permit to the person to recall actual feelings and experiences instead of refer to general self-concepts. In the same way, this scale is based on a time period that allows avoiding to refer just to a short-lived mood.

SPANE assesses the full range of positive and negative experiences, including specific feelings that may be defined by one’s culture. It includes items that reflect all types of feelings. The emotions used permit to investigate the major emotions theorized by the many of the affect theories. In the same time, using terms as “pleasant” or “unpleasant”, “positive” or “negative” allow to investigate also other negative or positive feelings making it possible to

assess the full range of possible desirable and undesirable experiences. Moreover, using the SPANE is possible also to gather all levels of arousal for both negative (e.g. sad, angry, afraid) and positive (e.g. joy, happy, contented) feelings. It also assesses feelings such as interest, flow, boredom, pain, engagement, and physical pleasure, which are not considered in most of the other scales [1]. The scale is composed of 12 items, 6 related to positive experiences and 6 related to negative experiences. The scores of negative and positive feelings can be combined to create a balance score (i.e. SPANE-B). Regarding both the positive and negative items, 3 are more specific (e.g. joyful, afraid), and 3 are more general (e.g. good, bad).

The original version of the SPANE showed good psychometric properties (Cronbach  $\alpha$  between .81 and .89), and performed well in terms of convergent validity and reliability with others measures related to well-being, emotions, life satisfaction, and happiness. The negative and positive subscales correlated significantly with each other ( $r = -.60$ ) [1]. Validations in Portuguese and Japanese showed similar results [20–22].

The aim of this study is to assess the psychometric proprieties of the SPANE in an Italian-speaking population. First, using the Italian translation already provided by the original authors, we examined the component factors and internal consistency of the Italian version of the scale. Second, we assessed the factorial validity with confirmatory factor analysis (CFA). Finally, we explored the convergent validity of the scale by evaluating its correlations with other measures linked to the affect dimension. We hypothesize that the Italian version of the SPANE will present the same factor structure and good internal consistency as the previous English, Portuguese, and Japanese versions [1, 20–22]. We expect that the negative SPANE subscale will correlate positively with anxiety, negative future expectancies, depression and

the negative PANAS subscale, and negatively with the positive SPANE and PANAS subscales and positive expectancies. Moreover, we expect that the positive SPANE subscale will correlate positively with the positive PANAS subscale and positive future expectancies, and negatively with depression, anxiety, negative future thinking and the negative SPANE and PANAS subscales.

## 2. Method

Participants were recruited through online public social networks and our research group's Facebook page. Then, participants asked other persons (relatives, friends, partners, and acquaintances) to take part to the study by completing questionnaires on the Survey Monkey platform. The combined sample consisted of 345 participants, who voluntarily agreed to be involved in the study. The sample was composed of 34.8% (n=120) men and 65.2% (n=225) women, with an average age of 33.5 years (SD= 12.20.; range: 18-80 years old). All participants were native Italian speakers. Regarding education, 2.6% (n=9) had completed middle school, 20.3% (n=70) had completed a high-school level, and 77.1% (n=266) reported a university level of instruction. Demographics are similar to what would be expected according to SPANE original validation (67.9 % women, all the sample were university students) [1] and the Italian validation of the PANAS (62.9 % women, mean age 27.9, with an average to high level of education) [23]. On 250 subjects who completed the BDI-II, 21 (8.4%) reported a moderate level of depression, and 9 (3.6%) moderate–severe depression. Mean score on the BDI was  $9.61 \pm 7.70$  (range: 1-39). On 256 subjects who completed the STAI-Y, 102 (39.84%) participants scored more than 40 at the STAI-Y (t), and 131 (39.84%) scored more

than 40 at the STAI-Y (s). Mean score on the STAI-Y (t) was  $43.65 \pm 9.26$  (range: 26-72), and on the STAI-Y (s) was  $42.73 \pm 12.23$  (range: 22-76).

## 2.1. Measures

The *SPANE* is a brief 12-item scale with six items devoted to positive experience and six items designed to assess negative experience. Each item is scored on a scale ranging from 1 (“very rarely or never”) to 5 (“very often or always”). The positive and negative scales are scored separately. Both the total positive (SPANE-P) and negative (SPANE-N) scores can range from 6 to 30. The two scores can be combined by subtracting the negative score from the positive score, and the resulting SPANE-B scores can range from -24 to 24. The SPANE Italian translated version already provided by the original authors was used in the present study [1]. The internal consistency coefficients found for the SPANE subscales in the present study were  $\alpha = .85$  and  $\alpha = .88$  for negative and positive affect, respectively.

The *PANAS* [3] consists of two subscales, one measuring PA and one measuring NA. Each subscale consists of 10 items, scored on a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). The PANAS subscales have been shown to be uncorrelated and have good internal consistency and test-retest reliability [3]. The Italian validated version of the PANAS was used in this study [23]. The internal consistency coefficients found for the PANAS subscales in the present study were  $\alpha = .91$  for negative affect and  $\alpha = .90$  for positive affect.

The *Beck Depression Inventory-II* (BDI-II) [24] has been used to assess depression. This self-report instrument is the second version of the widely used Beck Depression Inventory (BDI)



[25], and it consists of 21 items. Each item is rated on a 4-point scale (0–3). Analyzing the psychometric properties and the factor structure of the BDI-II in both analogue and clinical populations, Beck and colleagues [24] found that it has both good internal consistency ( $\alpha$ 's of 0.92 and 0.93, respectively) and 1-week test–retest reliability ( $r= 0.93$ ). It has been found to be a valid indicator of depression and to have good diagnostic discrimination [26]. The internal consistency coefficient for the Italian version of the BDI-II in the present study was  $\alpha= .89$ .

The *Spielberger State-Trait Anxiety Inventory- Form Y* (STAI-Y) [27] has been used to evaluate anxiety. It consists of a brief self-report questionnaire designed to measure and differentiate between trait (a stable personality trait) and state (a temporary and fluctuating condition) anxiety. The STAI-Y consists of two subscales containing 20 items each. The first subscale assesses state anxiety by asking the individual to report how he/she feels, from 1 (“*not at all*”) to 4 (“*very much so*”), at a particular point in time (e.g., satisfied, frightened). The second subscale assesses trait anxiety by asking to people to report how they generally feel (e.g., inadequate, rested) from 1 (“*almost never*”) to 4 (“*almost always*”). It is a reliable and sensitive measure of anxiety ( $\alpha= .90$  for trait scale,  $\alpha= .93$  for state scale). Moreover, test-retest coefficients ranged from .73 to .86 and .16 to .62 for scores on the trait and state scales, respectively [27, 28]. In this study, the Italian validated version of the STAI-Y [29] was used. The internal consistency coefficients for the Italian version of the STAY-Y subscales in the present study were  $\alpha= .94$  and  $\alpha= .91$  for the state and trait scales, respectively.

The *Subjective Probability Task* (SPT) [14] has been used to assess future expectancies. It is composed of 30 items rated on a 7-point Likert scale. The participant has to estimate the probability of each item happening to him/her in the future, from 1 (“*not at all likely to occur*”)

to 7 (“extremely likely to occur”). The SPT consists of two subscales: one containing 20 items referring to negative expectancies (NE), and the other with 10 items referring to positive expectancies (PE). An independent subtotal for each subscale has to be calculated. The authors of the original version of the SPT reported that the scale has good internal consistency ( $\alpha = .90$  for the negative items and  $\alpha = .86$  for the positive items). The two subscales also show good discriminant validity [14]. In this study, the Italian validated version of the SPT was used (Corno et al. submitted). The internal consistency coefficients for the Italian version of the SPT subscales in the present study were .91 and .86 for negative and positive expectancies, respectively.

## 2.2. Procedure

Participants were recruited through e-mail, social network, and word of mouth, and they were directed to a dedicated online survey. The survey was carried out using the SurveyMonkey web platform (<https://www.surveymonkey.com>). Before the survey was administered, participants were informed that the study was voluntary and confidential, and they signed a consent form stating their willingness to participate. First, demographic data (i.e. gender, age, education level, nationality, and country of residence) were collected. The translated version of the SPANE and the Italian validated version of the STAY-Y, BDI-II, and PANAS were administered, in that order. Ethical approval was obtained, as part of a wider study, from the University of Valencia, Spain, Research Ethics Committee.

## 2.3. Data analysis

Construct validity of the Italian SPANE was estimated using confirmatory factor analysis (CFA) conducted with the EQS program, version 6.1, respectively. Cases with missing data were eliminated from final analysis ( $n=49$ ). The kurtosis and Skewness of the items were analyzed with SPSS software, version 20 (SPSS Inc., Chicago, Illinois), to verify their normal distribution. Internal consistency of the Italian SPANE subscales was assessed using Cronbach's  $\alpha$  coefficient. This coefficient ranges from 0 to 1; higher values correspond to better reliability. The analysis assesses the correlation of each item with the subscale, as well as the change in the Cronbach's  $\alpha$  coefficient if an item is excluded. Criterion validity of the Italian SPANE was examined by calculating the correlations of each subscale with measures of affect, depression, future expectancies, and anxiety. The discriminant validity of the SPANE subscales was tested by calculating item-total correlations for the positive and negative items.

Independent Samples T-Tests were conducted for all the measures used in the study, in order to examine gender differences.

## 3. Results

Table 1 shows the means and standard deviations of all the measures included in the study.

### 3.1. Confirmatory Factor Analysis of the SPANE

The factorability of the SPANE items was examined. The assessment of the distribution of data showed that our data were characterized by a normal distribution (Skewness range:  $-.518 - .764$ ; Kurtosis range:  $-.659 - .532$ ). A CFA with the Robust Maximum Likelihood

estimation method was used to test the Italian version of the SPANE. First, a one-factor model (Model 1) was fit to the data to serve as a baseline and identify salient sources of error. This model did not fit the data well (see Table 2). Second, a model (Model 2) containing two correlated first-order factors for the SPANE was tested. This latter model agrees with the original version of the questionnaire [1] (see Table 2). The fit indexes indicated that the two-factor structure of the Italian version of the SPANE was a better representation than the one-factor model. As Figure 1 shows, all factor loadings were above .40.

### 3.2. Reliability: Internal Consistency

The internal consistency coefficients for the two subscales of the SPANE were excellent (for negative experiences  $\alpha = .85$ , and for positive experiences  $\alpha = .88$ ). Internal consistency (Cronbach's  $\alpha$ ) for SPANE B was .91.

### 3.3. Correlation Analyses

Correlation coefficients are presented in Table 3. All correlations were significant at  $p < .001$ . As expected, measures of negative affect, anxiety, negative expectancies, and depression correlated positively with the negative experiences SPANE subscale, and negatively with the positive experiences SPANE subscale and the SPANE-B. Positive affect and positive expectancies correlated negatively with the negative experiences SPANE subscale, and positively with the positive experiences SPANE subscale and the SPANE-B. Moreover, the negative correlation reported in the original study ( $r = -.60$ ) [1] between the two factors was confirmed by our findings, which show a lower correlation between the two SPANE subscales ( $r = -.50$ ).

**Table 1** Descriptive statistics for all the measures assessed in the present study

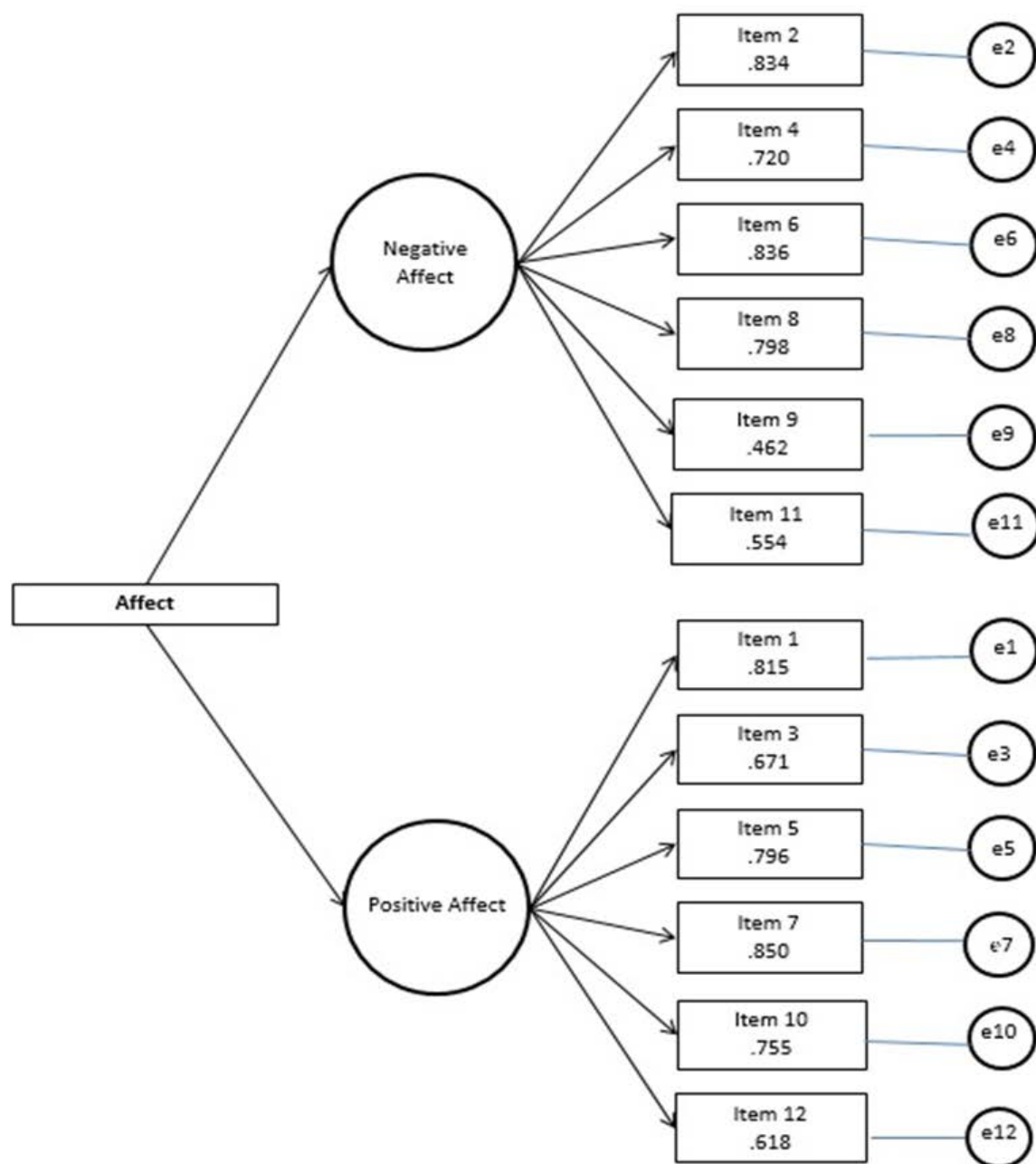
	MEN	WOMEN	t	d
SPANE-N	12.99 (SD 4.84)	15.56 (SD 4.67)	-4.38**	-.72
SPANE-P	20.50 (SD 4.51)	20.10 (SD 4.36)	.73	.07
SPANE-B	7.51 (SD 8.21)	4.53 (SD 8.17)	2.93*	.36
PANAS-N	16.86 (SD 6.54)	21.78 (SD 8.07)	-4.48**	-.64
PANAS-P	29.72 (SD 6.97)	27.22 (SD 6.83)	2.60	.36
STAI-Y (s)	39.03 (SD 10.05)	44.32 (SD 12.75)	-3.23*	-.44
STAI-Y (t)	39.82 (SD 7.62)	45.30 (SD 9.42)	-4.51**	-.61
BDI-II	6.52 (SD 6.14)	10.93 (SD 7.96)	-4.2**	-.59
SPT-PE	44.71 (SD 10.39)	44.38 (SD 9.52)	.264	.034
SPT-NE	52.26 (SD 17.51)	55.17 (SD 18.53)	-1.22	-.16

*Note.* M = mean; SD = standard deviation; \*\* $p < .001$ ; \*  $p < .05$ . Cohen (1988) defines  $d = 0.2$  as a “small” effect size,  $d = 0.5$  as “medium,” and  $d = 0.8$  as “large; SPANE-N = Scale of Positive and Negative Experiences - Negative Experiences; SPANE-P = Scale of Positive and Negative Experiences - Positive Experiences; SPANE-B = Scale of Positive and Negative Experiences - Balanced; PANAS-N= Positive and Negative Affect Schedule - Negative Affect; PANAS-P= Positive and Negative Affect Schedule - Positive Affect; STAI-Y (s)= State-Trait Anxiety Inventory- Form Y (state); STAI-Y (t)= State-Trait Anxiety Inventory-Form Y (trait); BDI-II= Beck Depression Inventory-II; SPT-PE= Subjective Probability Task - Positive Expectancies; SPT-NE= Subjective Probability Task - Negative Expectancies.

**Table 2** Confirmatory Factor Analysis (CFA) of the Italian version of the SPANE (N=345)

	CFI	RMSEA	90%CI	sbX <sup>2</sup>	df	p
		RMSEA				
<b>Model 1</b>	.852	.114	(.099, .129)	227.5597	54	$p < 0.001$
<b>Model 2</b>	.981	.042	(.017, .062)	75.7687	53	$P < 0.001$

Fig. 1 Factor loadings of the items for the Italian version of the SPANE (N=345)



Note. Factor loadings' level of significance: > .40

**Table 3** Correlations between the SPANE and measures of affect, anxiety, depression, and future expectancies (N=345)

	SPAN E-P	SPANE -N	SPANE -B	PANAS -P	PANAS -N	STAI-Y (s)	STAI-Y (t)	BDI- II	SPT- PE	SPT- NE
SPANE-P	-									
SPANE-N	-.50**	-								
SPANE-B	.86**	-.88**	-							
PANAS-P	.48**	-.34**	.49**	-						
PANAS-N	-.37**	.66**	-.62**	-.34**	-					
STAI-Y (s)	-.49**	.58**	-.66**	-.57**	.76**	-				
STAI-Y (t)	-.44**	.61**	-.63**	-.50**	.73**	.76**	-			
BDI-II	-.44**	.58**	-.61**	-.52**	.70**	.71**	.71**	-		
SPT-PE	.52**	-.26**	.46**	.68**	-.32**	-.50**	.45**	-.36**	-	
SPT-NE	-.19**	.44**	-.39**	-.26**	.57**	.50**	.57**	.52**	-.14**	-

*Note.* Correlations were significant at  $p < .001$ ; SPANE-P= Scale of Positive and Negative Experiences – Positive Experiences; SPANE-N= Scale of Positive and Negative Experiences – Negative Experiences; SPANE-B= Scale of Positive and Negative Experiences – Balanced; PANAS-P= Positive and Negative Affect Schedule – Positive Affect; PANAS-N= Positive and Negative Affect Schedule – Negative Affect; STAI-Y (s)= State-Trait Anxiety Inventory- Form Y (state); STAI-Y (t)= State-Trait Anxiety Inventory- Form Y (trait); BDI-II= Beck Depression Inventory-II; SPT-PE= Subjective Probability Task – Positive Expectancies; SPT-NE= Subjective Probability Task – Negative Expectancies.

## 4. Discussion

The aim of the present study was to assess the psychometric proprieties of an affect scale, the Scale of Positive and Negative Experience (SPANE) [1], in an Italian-speaking population. Results of this study shown that the Italian version of the SPANE is a reliable instrument that can provide useful information about a person's emotional experiences and it can be appointee as an indicator of well-being. The results of this study demonstrate that the Italian version of the SPANE has psychometric proprieties similar to those shown by the original [1] and previous versions, and it presents satisfactory reliability and factorial validity. The results of the CFA support the expected two-factor structure, positive and negative feeling, which characterized the original English version [1], the Japanese version [21, 22], and the Portuguese [20] version. All Cronbach's alpha coefficients for the SPANE subscales indicate excellent internal consistency (positive feelings:  $\alpha = .88$ , negative feelings:  $\alpha = .85$ , SPANE balanced:  $\alpha = .92$ ). Correlation results confirmed our hypothesis. As expected, the negative SPANE subscale correlates positively with anxiety, negative future expectancies, depression, and the negative PANAS subscale, and negatively with positive expectancies and the positive SPANE and PANAS subscales. Furthermore, and consistent with the nature of the measured construct, the positive SPANE subscale correlates positively with the positive PANAS subscale and with positive future expectancies, and negatively with depression, anxiety, negative future thinking and the negative SPANE and PANAS subscales. In addition, regarding the correlation between the positive and negative SPANE subscales in the present study ( $r = -.50$ ), it is lower than the one found for the original ( $r = -.60$ ) version, but higher than those reported for the Portuguese and Japanese versions (respectively,  $r = -.47$  and  $r = -.28$ ) [20–22].



SPANE has advantages over other affect measures. First, it is short (12 items) and easy to administer. Second, because the SPANE is composed of and assesses general feelings (e.g. “positive”, “negative”), it can be applied across many cultures. Furthermore, the scale can also reflect feelings such as physical pleasure, engagement, pain, interest, and boredom, which are not taken into consideration in most measures of feelings. Third, based on Diener and colleagues’ [19] conceptualization about the importance of frequency (and not intensity) in the assessment of happiness, the SPANE elicits answers based on the frequency of an emotion and not its intensity, unlike other measures.

Some limitations of the study should be considered. First, test-retest analyses were not conducted and therefore was not possible to conclude about the stability of the scale in this population. Further studies need to establish the temporal stability in Italian populations. Second, we used a web-delivered administration procedure. It is unclear if this might have influenced our findings, however online questionnaires have successfully been used in psychology research with equivalent psychometric properties [30, 31] .

In conclusion, the SPANE Italian version proved to be a reliable and valid measure of affect and it is expected to improve theoretical and empirical research on the well-being of the Italian population. Nevertheless, it could be note that the psychometric findings might differ for different subgroups. It could be interesting, for instance, to investigate the proprieties of the SPANE Italian version among a clinical population. The averages of the scores reported by the participants for the BDI-II and STAI-Y, are in fact in line with the means of normative data [32]. Therefore, further studies are necessary to come to a final appraisal of the scale. Finally, it could be interesting and useful to examine correlations between the scores

on the Italian version of the SPANE and scores on other measures of well-being, such as those used in the original study about satisfaction with life (SLS) [33], flourishing (FS) [1], happiness (SHS) [34], Fordyce's single item measure of happiness, optimism (LOT-R) [35], and loneliness (UCLA Loneliness Scale) [36]. Overall, the Italian SPANE is ready for further use in research and practice. This study adds a new tool to the repertoire of measures that can be used by researchers interested in affect and well-being with the Italian population.

## 5. References

- [1] Diener E, Wirtz D, Tov W, et al. New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Soc Indic Res* 2009; 97: 143–156.
- [2] Diener E, Lucas R, Oishi S. Subjective well-being: The science of happiness and life satisfaction. In: Snyder C, Lopez S (eds) *Handbook of positive psychology*. New York: Oxford University Press, 2002.
- [3] Watson D, Tellegen A. Toward a consensual structure of mood. *Psychol Bull* 1985; 98(2): 219.
- [4] Russell JA. A circumplex model of affect. *J Pers Soc Psychol* 1980; 39: 1161–1178.
- [5] Watson D, Clark L a, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. *J Pers Soc Psychol* 1988; 54: 1063–70.
- [6] Watson D, Pennebaker JW. Health complaints, stress, and distress: Exploring the central role of negative affectivity. *Psychol Rev* 1989; 96: 234–254.
- [7] Tellegen A. *Brief manual for the Differential Personality Questionnaire*. University of Minnesota: Unpublished manuscript, 1982.
- [8] Tellegen A. Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In: Tuma A, Maser J (eds). *Anxiety and the anxiety disorders*. Hillsdale, NJ: Erlbaumhttp, 1985.
- [9] Watson D, Clark L. Negative affectivity: the disposition to experience aversive emotional states. *Psychol Bull* 1984; 96(3): 465.

- [10] Costa P, McCrae R. Influence of extraversion and neuroticism on subjective well-being: happy and unhappy people. *J Pers Soc Psychol* 1980; 38(4): 68.
- [11] Clark L, Watson D. Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *J Abnorm Psychol* 1991; 100(3): 316.
- [12] Clark D, Steer R, Beck A. Common and specific dimensions of self-reported anxiety and depression: implications for the cognitive and tripartite models. *J Abnorm Psychol* 1994; 103 (4): 645.
- [13] Jolly J, Dyck M. Integration of positive and negative affectivity and cognitive content-specificity: improved discrimination of anxious and depressive symptoms. *J Abnorm Psychol* 1994; 103 (3): 544.
- [14] MacLeod A, Byrne A, Valentine J. Affect, emotional disorder, and future-directed thinking. *Cogn Emot* 1996; 10(1): 69–86.
- [15] Bradburn N. The structure of psychological well-being. 1969.
- [16] Schimmack U, Diener E, Oishi S. Life-satisfaction is a momentary judgment and a stable personality characteristic: The use of chronically accessible and stable sources. *J Pers* 2002; 70: 345–384.
- [17] Oishi S, Schimmack U, Colcombe S. The contextual and systematic nature of life satisfaction judgments. *J Exp Soc Psychol* 2003; 39(3): 232–247.
- [18] Tsai J, Knutson B, Fung H. Cultural variation in affect valuation. *J Pers Soc Psychol* 2006; 90: 288–307.

- [19] Diener E, Sandvik E, Pavot W. Happiness is the frequency, not the intensity, of positive versus negative affect. In: Strack F, Argyle M, Schwarz N (eds) *Subjective well-being: An interdisciplinary perspective*. New York: Pergamon, 1991.
- [20] Silva A, Caetano A. Validation of the flourishing scale and scale of positive and negative experience in Portugal. *Soc Indic Res* 2013; 110(2): 469–478.
- [21] Sumi K. Reliability and validity of Japanese versions of the Flourishing Scale and the Scale of Positive and Negative Experience. *Soci Indic Res* 2014; 118(2): 601–615.
- [22] Sumi K. Temporal Stability of the Japanese Versions of the Flourishing Scale and the Scale of Positive and Negative Experience. *J Psychol Psychother* 2014; 4(140): 2161–2487.
- [23] Terraciano A. Factorial and construct validity of the Italian Positive and Negative Affect Schedule (PANAS). *Eur J Psychol Assess* 2003; 19(2): 131.
- [24] Beck A, Steer R, Brown G. *Beck depression inventory-II*. San Antonio, 1996.
- [25] Beck A, Ward C, Mendelson Met al. An Inventory for Measuring Depression. *Arch Gen Psychiatry* 1961; 4(6): 561.
- [26] Dozois DJ a., Dobson KS, Ahnberg JL. A psychometric evaluation of the Beck Depression Inventory-II. *Psychol Assess* 1998; 10: 83–89.
- [27] Spielberger CD. State-Trait Anxiety Inventory. *Anxiety* 2009; 19.
- [28] Spielberger C. *Test anxiety inventory*. John Wiley & Sons, Inc., 2010.
- [29] Pedrabissi L, Santinello M. *Inventario per l'ansia di «Stato» e di «Tratto»: nuova versione*

*italiana dello STAI Forma Y: Manuale*. Firenze: Organizzazioni Speciali, 1989.

- [30] Carlbring P, Brunt S, Bohman S. Internet vs. paper and pencil administration of questionnaires commonly used in panic/agoraphobia research. *Comput Hum Behav* 2007; 23(3): 1421–1434.
- [31] Gordon J, McNew R. Developing the online survey. *Nurs Clin N Am* 2008; 43(4): 605–619.
- [32] Eysenck S. Cross-cultural comparison of personality for Italian, Sicilian and British subjects. *Boll Psicol Appl* 1985; 176: 11–16.
- [33] Diener E. *The science of well-being: The collected works of Ed Diener*. Springer Science & Business Media, 2009.
- [34] Lyubomirsky S, Lepper H. A measure of subjective happiness: Preliminary reliability and construct validation. *Soc Indic Res* 1999; 46(2): 137–155.
- [35] Fordyce M. A review of research on the happiness measures: A sixty second index of happiness and mental health. *Soc Indic Resndic Res* 1988; 20(4): 355–381.
- [36] Russell D. UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *J Pers Assess* 1996; 66(1): 20–40.

# Chapter



## Enhancing mental well-being during pregnancy: Assessing feasibility of a web-based positive psychology intervention

THIS CHAPTER HAS BEEN SUBMITTED TO *JOURNAL OF PSYCHOSOMATIC OBSTETRICS & GYNECOLOGY*: CORNO, G., MOLINARI, G., HERRERO, R., ETCHEMENDY, E., ESPINOZA, M., CARRILLO, A., Y BAÑOS, R. M. ENHANCING MENTAL WELL-BEING DURING PREGNANCY: ASSESSING FEASIBILITY OF A WEB-BASED POSITIVE PSYCHOLOGY INTERVENTION.

## Abstract

**Purpose** This study presents data on the feasibility, acceptance and possible benefits of a positive psychology web-based intervention addressed to support women's well-being during pregnancy. **Method** Participants (N = 70) were pregnant women aged from 21 to 43 years (M = 32.71, SD = 15.80). The 5-week intervention consisted of four modules of intervention. Women were invited to engage to positive activities aimed to support and foster mental well-being. Well-being indices were assessed before and after each module, as well as activities' frequency, appreciation, ease-to use and perceived benefit. Women's positive and negative affect was assessed before and after the intervention. Qualitative data about global evaluation of the intervention were also collected with an open-ended question. **Results** Overall the intervention was positively assessed by participants. Regarding adherence to the intervention, women that reported higher appreciation and perceived benefit for an exercise were more likely to complete the exercise and to do the activity over more days. Mostly all the participants reported that they would recommend the intervention. The results showed improvements regarding participants' well-being indices and positive affect, and a decreasing of negative affect from pre- to post-test. **Conclusion** Regarding the context of pregnancy, positive psychology research is still at its infancy. Although these are very preliminary data, the results presented in this study are encouraging. Future actions and investigations are discussed, specifically regarding which positive intervention might predict the best "fit" for pregnant women, in order to tailor optimal positive interventions for this population.



# 1. Introduction

The importance and impacts of prenatal maternal well-being on mother's and foetus' health has been widely documented. Nevertheless, a negative bias prevailed in the research on prenatal well-being, where the main emphasis was on low prenatal well-being (i.e., low levels of positive affect, self-esteem, and life satisfaction and high levels of depression, anxiety, and stress) and its subsequent negative effects on woman's and child's physical and psychological health [1-4]. Specifically, research and intervention have been mostly devoted to depression, which can occur during pregnancy (i.e. antenatal depression), after birth (i.e. postnatal depression), or in both periods [1,5], with 5 to 25% of estimated prevalence. This predominant focus on low prenatal well-being has resulted in the neglect of positive factors that may support, enhance, and improve well-being during the perinatal period.

Research examining how and which positive aspects of well-being can protect and support women's and consequently child's well-being are in their infancy [1,4,6]. The first results indicated that positive affect, optimism, positive life events and perceived social support, can have a positive impact on length of gestation [7], feeding practices [8], and can play a protector role against postpartum depression [9,10].

Since fostering positive aspects of well-being during pregnancy can have considerable benefits on woman's and child's health, development and evaluation of well-being supporting strategies and interventions are of major importance.

The aim of the present study was to investigate the feasibility of "Embarazo y Bienestar", a web-based positive psychology intervention aimed to support women's mental

well-being during pregnancy. Positive psychology proposes an integrated perspective to conceptualize and investigate human mental health, in which both positive and negative states would be acknowledged [11]. One aim of positive psychology is to support and foster well-being and research in this field have shown that this is possible through brief exercises called positive psychology interventions (PPIs) [12-15]. “Embarazo y Bienestar” consists of a set of PPIs specifically adapted to the pregnancy context. In the last decades, many psychological interventions have been translated in an online format [16, 17] including PPIs (i.e. online positive psychology interventions, OPPIs) [18,19]. Furthermore, regarding pregnant women, recent systematic reviews provide preliminary evidence that web-based interventions can be a promising and suitable form of intervention during the perinatal period [20,21].

In order to evaluate the feasibility of “Embarazo y Bienestar”, we pilot tested the intervention in order to observe how it is perceived and evaluated by its potential users. Therefore, the objective of this study was to examine the feasibility of “Embarazo y Bienestar”, and identify its strengths and weakness which might provide added value to the operation and future development of the intervention. We carried out a single-group descriptive pilot study in order to explore if and how this intervention would be perceived by pregnant women and if it would show any preliminary evidence of efficacy in increasing positive moods.

## 2. Method

### 2.1. Participants

Participants ( $N = 70$ ) were pregnant women aged from 21 to 43 years ( $M = 32.71$ ,  $SD = 15.80$ ). Women were required to be over 18 years old and to be up to 34 weeks pregnant at recruitment time. Participants had also to declare to decide to keep the baby and to have regular access to the Internet. The intervention was available in three languages (i.e., English, Spanish, and Italian), thus participants were also required to have adequate knowledge to understand and read one of these languages. Recruitment took place in three countries: Spain, Italy, and Canada. Recruitment presentations were performed in various locations, including medical centers and birth classes. Recruitment posters and leaflets were also made available in consultant clinics. Furthermore the study was advertised online via websites dedicated to pregnancy and maternity, and non-professional social-network (i.e., Facebook). Table 1 resumes the characteristics of the sample.

**Table 1.** Participant characteristics (N=70)

	<b>Participants</b> <i>n</i> (%)
<i>Age</i>	
21-25	2(2.9%)
26-30	17(24.2%)
31-40	49(70%)
>40	2(2.9%)
<i>Country of residency</i>	
Canada	2(2.9%)
Chile	1(1.4%)
Spain	57(81.4%)
France	1(1.4%)
Italy	6(8.5%)
Mexico	2(2.9%)
Paraguay	1(1.4%)
<i>Education</i>	
Lower secondary	1(1.4%)
Upper secondary	10(14.3%)
Tertiary	59(84.3%)
<i>Unemployment</i>	
Employed	65(92.9%)
Unemployed	4(5.7%)
Student	1(1.4%)
<i>Status</i>	
Single	3(4.3%)
In a relation	24(34.3%)
Married	42(60%)
Divorced	1(1.4%)
<i>Trimester of pregnancy</i>	
First trimester	22(31.4%)
Second trimester	24(34.3%)
Third trimester	24(34.3%)
<i>Previous children</i>	
Yes	19(27.1%)
No	51(72.9%)
<i>Planned pregnancy</i>	
Yes	63(90%)
No	7(10%)
<i>Physical problems</i>	
Yes	6(8.6%)
No	64(91.4%)
<i>Currently under psychological treatment</i>	
Yes	7(10%)
No	63(90%)

Note. First trimester: 0-12<sup>th</sup> week of pregnancy; Second trimester: 13<sup>th</sup>-25<sup>th</sup> week of pregnancy; Third trimester: 26<sup>th</sup>-40<sup>th</sup> week of pregnancy.

## 2.2. Materials

**Socio-demographic variables.** The following socio-demographic data were collected at baseline: age, education, occupation, country of residency, and marital status. In order to contact them, participants were asked to provide an email address.

**Pregnancy-related variables.** Women were asked to provide details about their pregnancy in terms of current week of pregnancy at time of pre-assessment, previous children, planned/unplanned pregnancy, and future relation with the baby.

**Health-related variables.** Women were asked to provide information about their mental and physical health, specifically: if, at the baseline time, they were under psychological treatment and if they received a diagnosis, if they use drugs, and if they have medical problems.

**Affect.** The Scale of Positive and Negative Experience (SPANE) [22] was used to measure positive (6 items) and negative (6 items) experiences. Responses are given on a 5-point scale ranging from 1 to 5. The positive and negative scales are scored separately (i.e., positive SPANE-P and negative SPANE-N). The scores of negative and positive feelings can be combined to create a balance score (i.e. SPANE-B). The original SPANE shown high internal consistencies in all the three subscales (SPANE-P:  $\alpha = 0.87$ ; SPANE-N:  $\alpha = 0.81$ ; SPANE-B:  $\alpha = .89$ ) [22]. Participants were asked to answer to this questionnaire at pre- and post-intervention.

**Weekly measures related to women's well-being.** This instrument was specifically developed for this research. Six items assessed different factors related to women's well-being (i.e., self-confidence, self-acceptance, satisfaction with life, connectedness, perceived social support,

and optimism). Every week, participants were asked to indicate the extent to which they agreed with each item on a 7-point scale.

**Exercises assessment.** An exercise preferences questionnaire was specifically developed for this research. Four questions measured the participant's opinion about each exercise proposed in terms of frequency of practice (i.e., "How many times did you actually practice the exercise during the past week?"), appreciation of the exercise (i.e. on a 7-point scale ranging from 1 = "not at all" to 7 = "extremely": "How much did you enjoy the exercise?"), perceived benefit (i.e. on a 7-point scale: "How much did you benefit from the exercise?") and perceived ease-of-practice (i.e. on a 7-point scale : "How difficult was the exercise for you?").

**Global assessment of the intervention.** A single item was also included in order to assess the participant's general opinion about Positive Pregnancy (i.e. on a 5-point scale: "Would you recommend this intervention program? Why?").

### 2.3. Intervention

"Embarazo y Bienestar" (English version: "Positive Pregnancy", Italian version: "Gravidanza & Benessere"), is a modular, 5-weeks, self-guided program designed to foster pregnant women's well-being. It consisted of four modules of intervention, one welcome module, and a final resume page. Each module includes a brief psycho-education unit focused on a positive psychology dimension and a positive psychology. Table 2 resumes the contents of each module. The PPIs proposed in "Embarazo y Bienestar", already used and investigated in previous studies [12,23-25], have been specifically adapted to the topic of pregnancy.

Different interactive elements, such as videos, sounds, and images, are provided in order to increase engagement.

**Table 2.** Intervention program description

Week	Name of module	Dimension of module	Description of exercise
1	“Mindfulness and Self-acceptance”	Mindfulness and self-acceptance	<i>Body scan exercise</i> [26] The body scan is a mindfulness practice that helps to understand the difference between thinking about a sensation and experiencing it [26]. Participants are guided to pay attention to various areas of their body and their breathing, gently observing these body parts and allowing other thoughts to recede. A video guides participants through the exercise.
2	“Savoring”	Savoring	<i>Three good things in life exercise</i> [23] Participants are asked to think about and describe three good things that went well each day and why <i>Savoring the moment exercise</i> [23] Participants are asked to take a picture of something beautiful or meaningful and write a short description about what they appreciate and value in it
3	“Connectedness ”	Connectedness and social support	<i>Connectedness exercise</i> Participants are asked to think about, identify and draw a graphic about their most important relationships and find an activity to do together
4	“Optimism. Part 1”	Optimism and life satisfaction	<i>Best possible self exercise</i> [24] Participants are instructed to visualize and write down a description of their ideal future life in as much detail as possible
5	“Optimism. Part 2”	Optimism and life satisfaction	<i>Baby steps exercise</i> [24] Participants write a list of goals and initial steps toward achieving their best possible self

## 2.4. Procedure

Pregnant women could request participation through the website of the study (i.e. in Spanish: <http://pospre.wixsite.com/ebinsc>, Italian: <http://pospre.wixsite.com/gebiscrizione>, English: <http://pospre.wixsite.com/ppmodregistration>) and by signing the informed consent form. Then, women were contacted by e-mail to perform the online pre-assessment on the

web platform Survey Monkey (<http://surveymonkey.com>). At the end of the pre-test, they obtained access to the first module of the program. Every week, participants were contacted by e-mail and asked to perform a short assessment, at the end of which they found the hyperlink to access the following module. At the end of the last week participants received a hyperlink by e-mail to complete the post-test. The intervention was completely self-applied, and it was delivered using a distance approach (i.e., web platform and e-mails).

## 3. Results

### 3.1. Attrition

A total of 70 participants enrolled in the study. Of those, 91.4% (n=64) answered to the assessment post-module 1, 62.9% (n=44) completed the evaluation post-module 2, 48.6% (n=34) women completed the evaluation post-module 3, 42.9% (n=30) completed the evaluation post-module 4, and 37.1% (n=26) of participants completed the last posttest. The full pattern of attrition and measurement competition is shown in Figure 1.

### 3.2. Affect

Descriptive statistics of PA and NA are shown in Table 3. In order to analyze the differences in term between pre-intervention and post-intervention scores, a series of repeated measure ANOVA was conducted. Regarding PA there was not a significant difference between pre- and post-intervention [ $F(1, 25) = .003, p = .96, \eta^2 = .000$ ]. Although NA values decreased from pre- to posttest, this difference was nonsignificant [ $F(1,25) = 1.24, p = .28, \eta^2 = .049$ ]. Regarding the values of the SPANE-B, there was not a significant change [ $F(1,24) = .21, p = .65, \eta^2 = .009$ ], albeit the values increased from pre- to post-intervention.



### 3.3. Well-being

Self-confidence significantly increased [ $F(1,23) = 14.57, p = .001, \eta^2 = .388$ ], specifically, Bonferroni post-hoc analyses showed that there was a significant difference between self-confidence values at pre- (i.e. T0) and post-intervention (i.e. T5) ( $p = .012$ ). Furthermore, tendencies toward significance change were found from baseline (i.e. T0) to post-module 1 (i.e. T1) ( $p = .062$ ), from baseline to post module 3 (i.e. T3) ( $p = .066$ ), and from baseline to post module 4a (i.e. T4) ( $p = .061$ ) (see Table 3). Statistically significant differences were found for both self-acceptance [ $F(1,24) = 7.55, p = .011, \eta^2 = .239$ ] and optimism [ $F(1,24) = 4.9, p = .037, \eta^2 = .170$ ], notwithstanding post hoc analyses did not shown a significant difference between the five times of assessment. Although satisfaction with life [ $F(1,24) = 1.42, p = .245, \eta^2 = .056$ ], connectedness [ $F(1,24) = 1.70, p = .205, \eta^2 = .066$ ] and perceived social support [ $F(1,24) = .29, p = .593, \eta^2 = .012$ ] increased from pre- to post-test, these changes were not statistical significant.

### 3.4. Exercises assessment

Participants reported to have practice the almost four times a week the “Three good things in life” exercise ( $M = 3.64, DS = 4.52$ ), meanwhile the other exercises were practiced approximately 3 times a week (i.e. body scan:  $M = 2.98, SD = 3.73$ ; savoring the moment:  $M = 3, SD = 5.49$ ; connectedness:  $M = 3, SD = 2.4$ ; BPS:  $M = 3.07, SD = 2.20$ ; baby steps:  $M = 2.8, SD = 3.83$ ) (see Figure 2). On a 7-points scale, women reported to have appreciated –in order - the exercises: connectedness ( $M = 4.82, SD = 2.57$ ), BPS ( $M = 4.67, SD = 2.16$ ), baby steps ( $M = 4.64, SD = 2.99$ ), three good things in life ( $M = 4.59, SD = 3.36$ ), savoring the moment ( $M = 4.57, SD = 3.69$ ), and body scan ( $M = 4.45, SD = 2.57$ ) (see Figure 3).

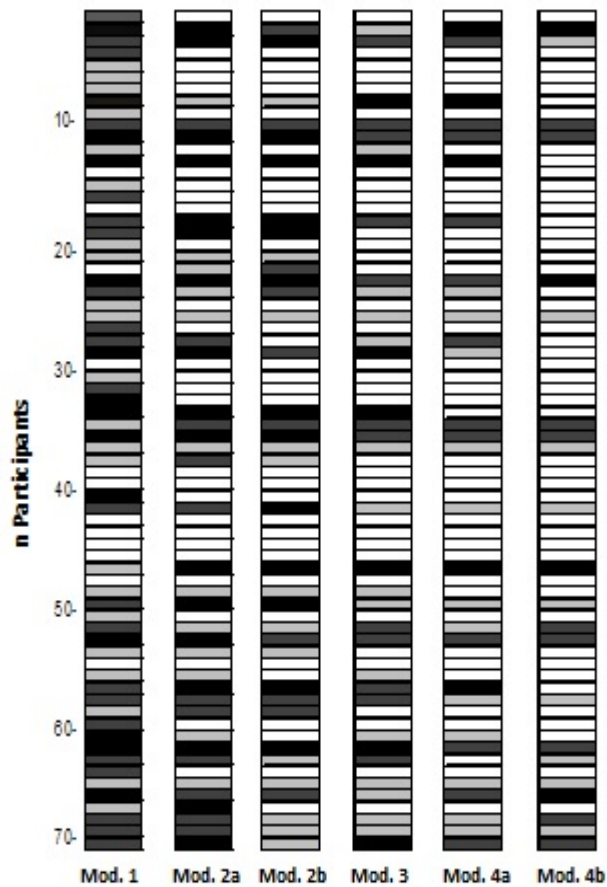
The exercises that were reported as more difficult were the connectedness ( $M = 3.5$ ,  $SD = 3.47$ ) and the baby steps exercise ( $M = 3.4$ ,  $SD = 2.92$ ), followed by the savoring the moment ( $M = 3.07$ ,  $SD = 3.79$ ) and the BPS exercise ( $M = 2.9$ ,  $SD = 2.92$ ). The easiest exercises were the body scan ( $M = 2.45$ ,  $SD = 2.38$ ), and the three good things in life exercise ( $M = 2.75$ ,  $SD = 2.61$ ) (see Figure 4). Women reported to have perceived more benefit from the practice of the connectedness ( $M = 4.82$ ,  $SD = 2.33$ ), and three good things in life exercise ( $M = 4.77$ ,  $SD = 2.78$ ). Almost the same level of perceived benefit was reported regarding the baby steps ( $M = 4.64$ ,  $SD = 2.66$ ), and BPS ( $M = 4.6$ ,  $SD = 1.97$ ). The lowest levels of perceived benefit were reported in relation to the body scan ( $M = 4$ ,  $SD = 2.8$ ) and savoring the moment ( $M = 4.43$ ,  $SD = 4.21$ ) exercise (see Figure 5).

A Pearson correlation was carried out to analyze possible relations between the frequency of practice, appreciation, ease-to-use and perceived benefit for each of the six exercises (see Table 4). First, there were positive and statistically significant correlations between frequency and appreciation of all the exercises ( $r = .376$  to  $r = .790$ ), as well as between frequency and perceived benefit ( $r = .382$  to  $r = .741$ ). Regarding the relation between frequency of practice and ease-to-use, there was a significant positive relation only for the connectedness exercise ( $r = .366$ ).

### 3.5. Global assessment of the intervention

Level of satisfaction with the intervention was positive and they would recommend to participate to the intervention ( $M = 3.87$ ,  $SD = 1.21$ ). Regarding qualitative data, participants commented that the intervention was helpful and interesting. They underlined that the program helped them to know better themselves (e.g. "I could discover some aspects of

myself that I never noticed before”; “It helps to be aware if you feel well with yourself, in order to be ready to welcome a new life!”), and to enjoy more the positive things of their lives (e.g., “It helped me to think more about the important things, and to savor them”, “It helped me to connect more with my baby, and with my beloveds”) . Regarding negative comments, three participants found the program too long and exigent (e.g. “This program is effective, but you need a lot of energy and time, or you lose motivation. As a pregnant woman who is still working full time, sometimes it was hard to sit down and take time to do those exercises.”). Furthermore, two women reported that the program was not useful because they did not perceive any change (e.g. “It is not useful because I feel like before I started the intervention”).



**Figure 1** Participant attrition for each of the six activities proposed in the training. *Note.* Mod. 1: Body scan exercise; Mod. 2a: Three good things in life; Mod. 2b: Savoring the moment exercise; Mod. 3 Connectedness exercise; Mod. 4a: BPS exercise; Mod. 4b: Baby steps exercise. Rows represent individual participants. Rectangles indicate frequency of exercise by the relevant participant (black: > than 4 times per week; grey: 3-4 times per week; light grey: 1-2 times per week; white: never).

**Table 3.** Means (SDs): Affect and well-being items pre-session to post-session

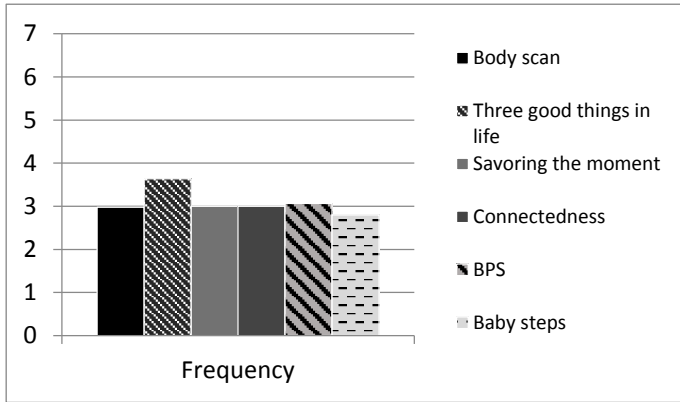
	<b>T0</b> <b>M(SD)</b>	<b>T1</b> <b>M(SD)</b>	<b>T2</b> <b>M(SD)</b>	<b>T3</b> <b>M(SD)</b>	<b>T4</b> <b>M(SD)</b>	<b>T5</b> <b>M(SD)</b>
<b>SPANE-P</b>	23.69(3.85)	-	-	-	-	23.65(4.94)
<b>SPANE-N</b>	14.04(4.46)	-	-	-	-	13.32(5.01)
<b>SPANE-B</b>	9.64(8.03)	-	-	-	-	10.24(9.50)
<b>Self-confidence</b>	5.04(1.85)	5.58(1.47)	5.50(1.47)	5.67(1.40)	5.83(1.31)	5.92(1.32)
<b>Self-acceptance</b>	5.52(1.64)	5.56(1.61)	5.92(1.5)	5.92(1.41)	5.8(1.5)	6.04(1.24)
<b>Satisfaction with life</b>	5.96(1.27)	5.96(1.1)	6.20(.76)	6(.87)	6.20(.96)	6.12(.78)
<b>Connectedness</b>	5.84(1.25)	5.76(1.33)	5.8(1.19)	5.88(1.05)	5.84(1.11)	6.08(.91)
<b>Perceived social support</b>	6.28(.98)	6.24(.97)	6.04(1.34)	6.12(.97)	6.24(1.13)	6.36(.91)
<b>Optimism</b>	6(.96)	5.88(1.17)	5.96(.84)	6.08(.95)	6.20(.76)	6.16(.80)

Note. SPANE-P: Scale of Positive and Negative Experience-Positive affect; SPANE-N: Scale of Positive and Negative Experience-Negative affect; Scale of Positive and Negative Experience-Balanced; T0: Baseline; T1: Post-module 1; T2: Post-module 2; T3: Post-module 3; T4: Post-module 4a; T5: Post-assessment.

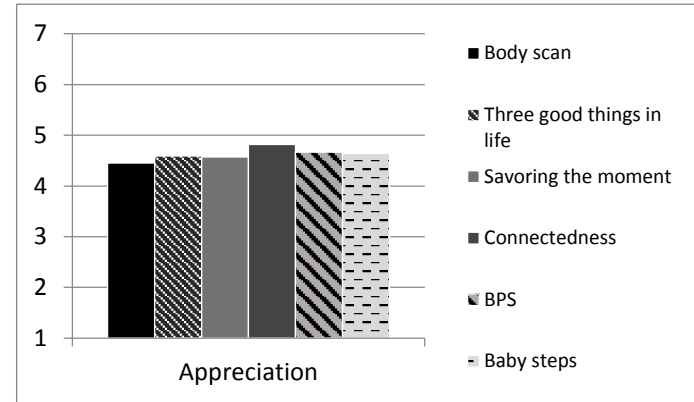
**Table 4.** Pearson correlations between exercise frequency, appreciation, easy-to-use, and perceived benefit

	<i>n</i>	<i>r</i> (frequency,appreciation)	<i>r</i> (frequency,ease-to-use)	<i>r</i> (frequency,perceived benefit)
Body scan	64	.587**	.189	.575**
Three good things in life	44	.743**	.081	.707**
Savoring the moment	44	.790**	.097	.741**
Connectedness	34	.376*	.366*	.382*
BPS	30	.390*	.098	.460*
Baby steps	25	.507**	-.087	.407*

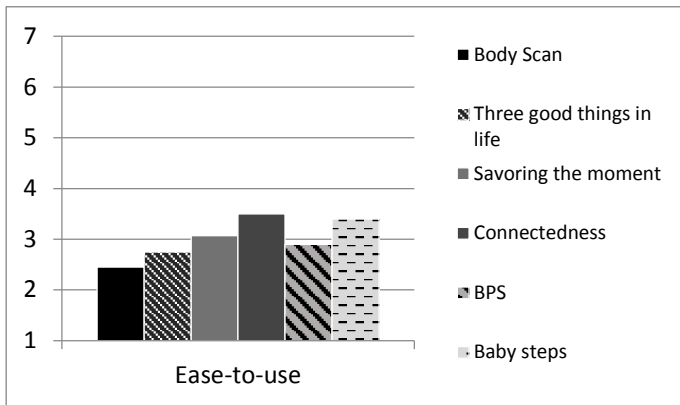
\* $p < 0.05$ ; \*\* $p < 0.01$



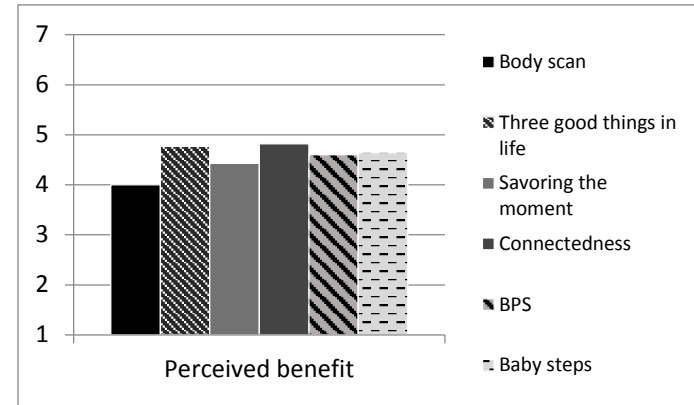
**Figure 2.** Reported frequency of practice of each exercise



**Figure 3.** Reported level of appreciation of each exercise



**Figure 4.** Reported level of ease-to-use of each exercise



**Figure 5.** Reported perceived benefit related to the practice of each exercise

## 4. Discussion

The aim of the present study was to assess the feasibility and acceptance of an online-based positive psychology intervention, “Embarazo y Bienestar”, as well as identify potential points of strengths and issues that could be improved.

Overall the intervention was positively assessed by participants. Interesting, albeit women evaluated the connectedness exercise as the most difficult, they perceived the most benefits from its practice and it was also the most appreciated. Indeed, connectedness and social support have been identified as considerable factors in the context of pregnancy. Perceived social support has shown to be associated with significantly less anxiety, prenatal and postpartum depression, as well as greater sense of control over pregnancy-related changes, improved self-image, and better health [27,28]. The two optimism-centered activities – BPS and baby steps- were also appreciated by women comparing to the mindfulness-based practice of the body scan and the two savoring activities. Optimism has been shown to play a protective role in maternal postpartum psychological well-being [10], and optimistic pregnant women shown to be more likely involved in healthy behaviors [3] and cope more adaptively than pessimistic ones [3,29].

Regarding adherence to the intervention, our results confirmed the relation found by Schueller [14] between preference for an activity and adherence to that exercise. Participants who reported higher appreciation and perceived benefit for an exercise were more likely to complete the exercise and to do the activity over more days. However, this study reported high levels of dropouts. Specifically, 32% of participants left the intervention after the first

module, whereas the percentages of attrition decreased after this first stumbling block. Online interventions can offer several advantages, and recent evidence suggested that they could be an affordable for pregnant women [20,21]. Notwithstanding, different studies showed that, despite of a great number of participants begin an online intervention, just very few even progressing past a first session [23,30]. If we compare the web format with the in-person one, it can be faster and easier to sign up for an online trial as well as it can be easier to leave it. In an in-person trial, participants can create a personal link with the researcher, and this can motivate participants to continue the trial. Furthermore, perceived social support by the family and institutions is an important factor in the context of pregnancy [3,31]. Therefore, we can posit that the complete self-applied format of “Embarazo y Bienestar” could explain the high percentage of dropouts. Thus, we can advance the hypothesis that a semi self-applied intervention, which combines in-person sessions with the online training, could be an optimal solution.

Mostly all the participants reported that they would recommend the participation to the intervention. Specifically women found the intervention useful and interesting, as they informed that it helped them to know better themselves and to enjoy more the positive things of their lives. These qualitative data were supported by quantitative outcomes. Notwithstanding we found a statistical significant increase only for self-confidence, the results shown a tendency toward improvements regarding participants’ well-being indices and PA, and a decreasing of NA from pre- to post-test. Two points of weakness were highlighted: the excessive duration, and the absence of perceived benefit from the intervention. These two factors have been investigated and identified as two possible moderators that can have an



impact on the effectiveness of PPIs (e.g., Lyubomirsky et al., 2005; Sheldon, Boehm, & Lyubomirsky, 2012).

Recently research in the field of positive psychology has been trying to answer to a question: how, why, what, when, and who benefits more from PPIs? Lyubomirsky and Layous [12] proposed a positive activity model which posits the relevance of person-activity fit for optimal positive intervention success. The model proposes four mediating variables (i.e., positive thoughts, positive emotions, positive behaviors, and need satisfaction) as well as two moderators (i.e., features of the positive activity: timing and dosage, and variety; characteristics of the person: motivation and beliefs, effort, social support, culture, age, and baseline well-being levels). For instance, in one study participants who performed five acts of kindness in one showed greater increases in well-being comparing to participants that performed kind acts throughout one week [13]. Furthermore, participant's motivation can play an important moderator role. Participants that are initially not motivated to seriously engage in the target activity, as well as participants that are too much motivated can feel disappointed about the positive practice [32,33]. We can speculate that these factors could have influenced participants' adherence to the intervention and partially explain the high levels of dropouts.

The present study has some limitations. Firstly, the size of the sample was small, thus there is a need to contrast the present findings with a larger sample of pregnant women in order to corroborate the results detected in this study. Secondly, the study did not include a control condition and a follow-up evaluation in order to investigate whether the effects of the intervention could be maintained over time. In sum there is a need to test the effectiveness

of the proposed intervention in Randomized Control Trials (RCTs). Moreover, future studies should take in considerations specific pregnancy-related factors and dissemination factors (e.g., semi self-applied intervention) that can moderate the efficacy of PPIs among pregnant women.

## 5. Conclusions

Regarding the context of pregnancy, positive psychology research is still at its infancy. Although these are very preliminary data, our results are encouraging. The information collected could be a starting point to investigate which exercise or group of exercises, which optimal conditions (e.g., duration, intervention format), as well as personal characteristics (e.g., motivation), might predict the best “fit” for pregnant women, in order to tailor optimal positive interventions for this population.

## 6. References

1. Delle Fave A, Pozzo M, Bassi M, et al. A longitudinal study on motherhood and well-being: Developmental and clinical implications. *Ter Psicol.* 2013; 1(1): 21-33.
2. DiPietro JA, Ghera MM, Costigan K, et al. Measuring the ups and downs of pregnancy stress. *J Psychosom Obstet Gynecol.* 2004; 25(3-4): 189-201.
3. Dunkel Schetter C. Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annu Rev Psychol.* 2011; 62: 531-558.
4. Matvienko-Sikar K, Dockray S. Effects of a novel positive psychological intervention on prenatal stress and well-being: A pilot randomised controlled trial. *Women Birth.* 2017; 30(2): e111-e118.
5. Leigh B, Milgrom J. Risk factors for antenatal depression, postnatal depression and parenting stress. *BMC Psychiatry.* 2008; 8(1): 24.
6. O'Leary K, Dockray S, Hammond S. Positive prenatal well-being: conceptualising and measuring mindfulness and gratitude in pregnancy. *Arch Womens Ment Health.* 2016; 19(4): 665-673.
7. Voellmin A, Entringer S, Moog N, et al. Maternal positive affect over the course of pregnancy is associated with the length of gestation and reduced risk of preterm delivery. *J Psychosom Res.* 2013; 75(4): 336-340.
8. McManus MA, Khalessi AA, Lin J, et al. Positive feelings during pregnancy, early feeding practices, and infant health. *Pediatr Int.* 2017.

9. Bos SC, Macedo A, Marques M, et al. Is positive affect in pregnancy protective of postpartum depression?. *Rev Bras Psiquiatr.* 2013; 35(1): 5-12.
10. Grote NK, Bledsoe SE. Predicting postpartum depressive symptoms in new mothers: The role of optimism and stress frequency during pregnancy. *Health Soc Work.* 2007; 32(2): 107-118.
11. Seligman ME, Csikszentmihalyi M. Special issue: Positive psychology. *Am Psychol.* 2000; 55(1): 5-14.
12. Lyubomirsky S, Layous K. How do simple positive activities increase well-being?. *Curr Dir Psychol Sci.* 2013; 22(1): 57-62.
13. Lyubomirsky S, Sheldon KM, Schkade D. Pursuing happiness: The architecture of sustainable change. *Rev Gen Psychol.* 2005; 9: 111-131.
14. Schueller SM. Preferences for positive psychology exercises. *J Posit Psychol.* 2010; 5(3): 192-203.
15. Seligman ME, Steen TA, Park N, et al. Positive psychology progress: empirical validation of interventions. *Am Psychol.* 2005; 60(5): 410.
16. Andrews G, Cuijpers P, Craske MG, et al. Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: a meta-analysis. *PloS One.* 2010; 5(10): e13196.

17. Cuijpers P, Donker T, van Straten A, et al. Is guided self-help as effective as face-to-face psychotherapy for depression and anxiety disorders? A systematic review and meta-analysis of comparative outcome studies. *Psychol Med*. 2010; 40(12): 1943-1957.
18. Bolier L, Abello KM. Online positive psychological interventions: State of the art and future directions. In: Parks AC, Schueller SM, editors. *The Wiley Blackwell handbook of positive psychological interventions*. Chichester (UK): John Wiley & Sons, Ltd; 2014. p. 286-309.
19. Mitchell J, Vella-Brodrick D, Klein B. Positive psychology and the internet: A mental health opportunity. *E J Appl Psychol*. 2010; 6(2): 30-41.
20. Ashford MT, Olander EK, Ayers S. Computer-or web-based interventions for perinatal mental health: A systematic review. *J Affect Disord*. 2016; 197: 134-146.
21. Lee EW, Denison FC, Hor K, et al. Web-based interventions for prevention and treatment of perinatal mood disorders: a systematic review. *BMC Pregnancy Childbirth*. 2016; 16(1): 38.
22. Diener E, Wirtz D, Tov W, et al. New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Soc Indic Res*. 2010; 97(2): 143-156.
23. Schueller SM, Parks AC. The science of self-help. *Eur Psychol*. 2014; 19(2): 145-155.
24. Layous K, Nelson SK, Lyubomirsky S. What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *J Happiness Stud*. 2013; 14(2): 635-654.
25. Bolier L, Haverman M, Westerhof GJ, et al. Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health*. 2013; 13(1): 119.

26. Williams M, Penman D. Mindfulness: a practical guide to finding peace in a frantic world. Hachette UK; 2011.
27. Oakley A, Hickey D, Rajan L, et al. Social support in pregnancy: does it have long-term effects?. *J Reprod Infant Psychol.* 1996; 14(1): 7-22.
28. Dunkel Schetter, C., Sagrestano, L. M., Feldman P, et al. Social support and pregnancy. In: Pierce GR, Sarason BR, Sarason IG, editors. *Handbook of social support and the family.* Springer US; 1996. p. 375-412.
29. Lobel M, Yali AM, Zhu W, et al. Beneficial associations between optimistic disposition and emotional distress in high-risk pregnancy. *Psychol Health.* 2002; 17(1): 77-95.
30. Christensen H, Griffiths K, Groves C, et al. Free range users and one hit wonders: community users of an Internet-based cognitive behaviour therapy program. *Aust N Z J Psychiatry.* 2006; 40(1): 59-62.
31. Carissoli C, Villani D, Riva G. An Emerging Model of Pregnancy Care: The Introduction of New Technologies. In: Villani D, Cipresso P, Gaggioli A, Riva G, editors. *Integrating Technology in Positive Psychology Practice.* IGI Global; 2016. p. 164-195.
32. Lyubomirsky S, Dickerhoof R, Boehm JK, et al. Becoming happier takes both a will and a proper way: an experimental longitudinal intervention to boost well-being. *Emotion.* 2011; 11(2): 391.

33. Sheldon KM, Boehm JK, Lyubomirsky S. Variety is the spice of happiness: The hedonic adaptation prevention (HAP) model. In: Boniwell I, David S, editors. Oxford handbook of happiness. Oxford: Oxford University Press; 2012. P. 901-914.

# Chapter



# General discussion



Pregnancy is a challenging time during which women have to face changes and demands that can impact both maternal and infant well-being. The scientific literature has extensively investigated the nature, prevalence, and detrimental repercussions of low maternal prenatal well-being. Recently research on antenatal care has expanded to a salutogenic perspective, which examines the potential benefits of positive aspects and protective factors that can influence the course of pregnancy, maternal perinatal well-being and childbirth. This salutogenic perspective is supported by positive psychology, which calls for the necessity to support and enhance well-being, rather than focusing only on preventing and treating problems (Delle Fave, Pozzo, Bassi, & Cetin, 2013; Seligman, & Csikszentmihalyi, 2000). The aim of this dissertation was to review the existing scientific literature about PPIs applied during the perinatal period and to investigate the potential effects and feasibility of a novel online-based positive psychology program on women's prenatal well-being. Specifically, Chapter 2 presents the results of a comprehensive narrative review of PPIs addressed to improve women's mental well-being during the perinatal period. Chapter 3 presents the study protocol of *Embarazo y Bienestar*, a novel web-based positive psychology intervention addressed to support and fosters women's mental well-being during pregnancy. Chapter 4 reports the results of a case series study about the effects of *Embarazo y Bienestar* on indices of women's prenatal well-being. Chapter 5 and 6 describes two validation studies that were conducted with the aim to translate and adapt the intervention to the Italian language. Chapter 7 presents data on the feasibility, acceptance and possible benefits of *Embarazo y Bienestar*.

In this last Chapter, an overview of the general conclusions of these studies will be provided. This will be followed by a discussion of the findings and implications for future research will be made.

## 1. Summary of the main findings

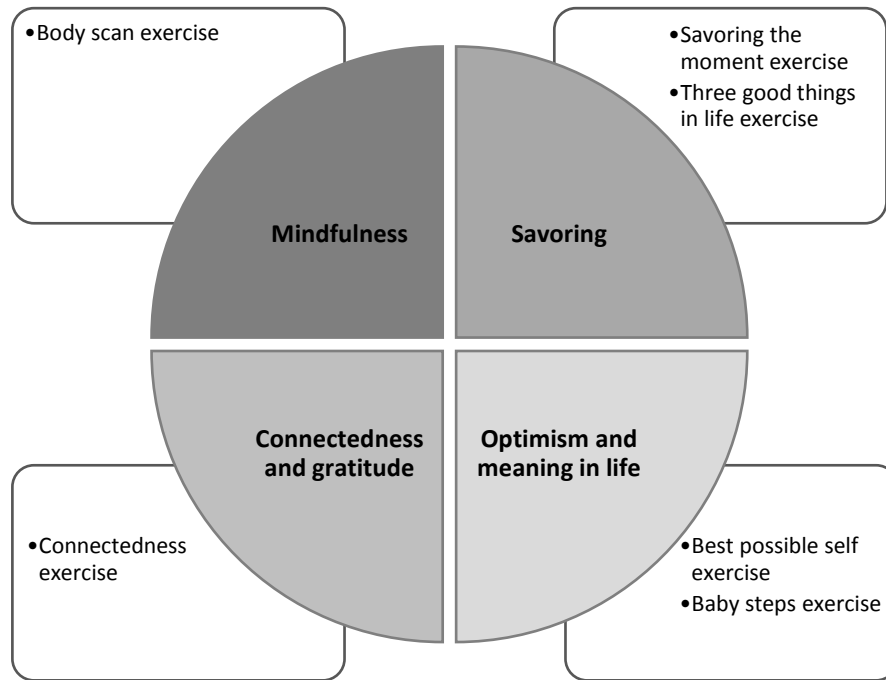
### 1.1. Reviewing PPIs for women during the perinatal period

Recent studies suggest that positive maternal mood can buffer the effects of negative feelings and promote maternal and infant well-being. Evidence from the field of positive psychology has shown that practicing some positive activities, called positive psychology interventions (PPIs), can enhance well-being and/or reduce negative symptoms (e.g., Cohn, & Fredrickson, 2010; Layous, Chancellor, Lyubomirsky, Wang, & Doraiswamy, 2011; Layous, & Lyubomirsky, 2014; Seligman, Steen, Park, & Peterson, 2005; Sin, Della Porta, & Lyubomirsky, 2011). PPIs are brief, non-stigmatizing and – mainly - self-administered exercises that promote positive thoughts, positive feelings, and/or positive behaviors, rather than aiming to fix negative – and/or pathological – thoughts, feelings, and/or behaviors (Layous, & Lyubomirsky, 2014). Through a systematic search, two intervention programs that included at least one perinatal PPI, have been identified (i.e., Mamma Mia, and a gratitude and mindfulness online intervention). Both interventions were online-based and gratitude was the PPI common to both. Preliminary results shown potential direct effects of the gratitude and mindfulness online intervention on self-reported stress and physiological stress. Feasibility data about one intervention (i.e., Mamma Mia) indicated potential positive impact of early interventions during pregnancy and postpartum.

In sum, the narrative review presented in Chapter 2 has synthesized the first promising studies in the wake of a new model of positive interventions aimed to maximize and support women's well-being during the perinatal period. Nevertheless, research in this field is still in its infancy and much more research is required to establish the effectiveness and efficacy of PPIs in the context of pregnancy.

## 1.2. Creating a web-based positive psychology program for pregnant women

Using the findings of Chapter 2 as a starting point, we proceeded to design *Embarazo y Bienestar*, a novel web-based positive psychology intervention addressed to support and fosters pregnant women's mental well-being. *Embarazo y Bienestar* is a modular, 5-weeks, self-paced program consisting of four intervention modules, one welcome module, and a final summary page. Each module includes a brief psycho-education unit focused on a positive psychology dimension and a positive psychology activity. The PPIs proposed in *Embarazo y Bienestar* have been already used and investigated in previous studies (e.g., Lyubomirsky, & Layous, 2013; Schueller, & Parks, 2014; Layous, Nelson, Lyubomirsky, 2013; Bolier, Haverman, Westerhof, Riper, Smit, & Bohlmeijer, 2013). The interventions included in *Embarazo y Bienestar* can be classified in four main categories (Figure 1): mindfulness (body scan exercise), savoring (savoring the moment and three good things in life exercises), connectedness and gratitude (connectedness exercise), and optimism and meaning in life (best possible self and baby steps exercises).



**Fig. 1** Four main categories of positive psychology and mindfulness intervention included in *Embarazo y Bienestar*

We have specifically adapted the PPIs to the context of pregnancy. Different interactive elements, such as videos, sounds, and images, were provided in order to increase engagement. Recent systematic reviews have provided preliminary evidence that web-based interventions can be a promising and appropriate form of intervention during the perinatal period (Ashford, Olander, & Ayers, 2016; Lee, Denison, Hor, & Reynolds, 2016). Indeed, PPIs have also been transferred to an online format and preliminary evidence suggests that Online Positive Psychology Interventions (OPPIs) can effectively enhance well-being and reduce depressive symptoms (Bolier, Abello, 2014; Mitchell, Vella-Brodrick, & Klein, 2010). *Embarazo y Bienestar* has been developed using the Wix web platform (<http://www.wix.com/>). Participants could access the website through a PC, tablet, or smartphone, and they could access to the web contents anywhere and at their own pace. The intervention program

designed lasts five weeks and is completely self-administered. Participants would be assessed at three points: before the intervention, after the intervention, and at 5-week follow-up. The outcome variables would include mental well-being, depression, pregnancy-related anxiety, and other relevant variables. In chapter 3 we proposed to assess the effectiveness of *Embarazo y Bienestar* through a randomized control trial with restricted randomization - in order to control the variance related to the trimester of pregnancy – and the results would be compared to a waiting list control group.

### 1.3. Preliminary assessment of Embarazo y Bienestar

We decided to test the efficacy of *Embarazo y Bienestar* among a small sample of pregnant women. Chapter 4 reports the results of a case series study conducted with 4 Spanish-speaking and 2 German-speaking pregnant women. Participants were involved in the 5-week online positive psychology intervention and their levels of mental well-being, depression, pregnancy-related anxiety, life satisfaction, and social support were measured at pre- and post-intervention. Compliance with the intervention and exercise preferences were also assessed at post-test and single-item related well-being measures were assessed weekly. The preliminary results shown potential effects of the intervention on supporting women's prenatal mental well-being and decreasing depressive symptomatology. Nevertheless, these results could not be interpreted as conclusive and future studies are needed in order to assess the feasibility and effects of the intervention in a wider population of pregnant women.

## 1.4. Translating the intervention in different languages

As we have seen before, one of the points of strength of online interventions is the possibility to reach a consistent number of potential participants without or with minimal cost. Thus, in order to test *Embarazo y Bienestar* within a larger sample, we have translated the intervention also in Italian and English language. For this reason, we conducted two studies with the aim to validate to the Italian language two questionnaires that we included in the assessment protocol of the intervention (Chapter 3). Specifically, we conducted two studies in order to assess if the Scale of Positive and Negative Experiences (SPANE; Diener et al., 2010) and the Subjective Probability Task (SPT; MacLeod, Byrne, & Valentine, 1996) were reliable and valid instruments to evaluate – respectively – positive and negative affect and future directed thinking among Italian population.

Regarding the Italian version of the SPT results presented in Chapter 5 showed that the SPT has good psychometric properties and it is a reliable instrument to assess future-directed thinking. Moreover, our findings confirmed the role of future expectancies as cognitive correlates of depression and anxiety. We believe this paper contributes to the understanding of future expectancies and their relation with anxiety and depression, and will help to expand the availability of an instrument to assess future directed thinking.

In Chapter 6 we presented the results of the Italian validation of the SPANE. The Italian version of the SPANE showed psychometric proprieties similar to those shown by the original and previous versions, and it presents satisfactory reliability and factorial validity. The results of the Confirmatory Factor Analysis support the expected two-factor structure, positive and

negative feeling, which characterized the previous versions. Furthermore, as we hypothesized, measures of negative affect, anxiety, negative future expectancies, and depression correlated positively with the negative experiences SPANE subscale, and negatively with the positive experiences SPANE subscale. In sum, albeit further studies are required to confirm the psychometric characteristics of the scale, the SPANE Italian version is expected to improve theoretical and empirical research on the well-being of the Italian population.

### 1.5. Embarazo y Bienestar: a feasible intervention?

In order to evaluate the feasibility of *Embarazo y Bienestar*, we tested the intervention in order to observe how it was perceived and evaluated by its potential users. We intended to identify the points of strengths and weakness that might provide added value to the operation and future development of the intervention. We carried out a single-group descriptive study in order to explore how this intervention would be perceived by pregnant women and if it would show any preliminary evidence of effectiveness in increasing positive moods. 70 pregnant women Spanish- and/or Italian-, and/or English-, and/or German-speaking participated to the study. Pregnant women were aged from 21 to 43 years ( $M = 32.71$ ,  $SD = 15.80$ ) and were between the 4<sup>th</sup> to the 34<sup>th</sup> week of pregnancy at pre-intervention time. Results showed that mostly all the participants reported that they would recommend the participation to the intervention. Specifically, pregnant women found the intervention useful and interesting. Regarding indices of mental well-being (i.e., self-confidence, self-acceptance, satisfaction with life, connectedness, perceived social support, and optimism), we found a statistical significant increase only for self-confidence. Nevertheless, the results showed a tendency toward improvements regarding the other well-being indices as well as for positive

affect. We found also a tendency toward decrease of negative affect from pre- to post-test. Participants highlighted two points of weakness: the excessive duration, and the absence of perceived benefit from the intervention. These two factors have been investigated and identified as two possible moderators that can have an impact on the effectiveness of PPIs (e.g., Lyubomirsky, Sheldon, & Schkade, 2005; Sheldon, Boehm, & Lyubomirsky, 2012), and we will discuss about them in the next paragraph. Even though it was assessed as the most difficult, participants' preferred activity in terms of appreciation and perceived benefit was the connectedness exercise. The aim of this exercise was to foster pregnant women's relationships, as connectedness and social support have been identified as important factors during pregnancy (Dunkel Schetter, 2011). The two optimism-centered activities were also appreciated by women comparing to the mindfulness-based practice of the body scan and the two savoring activities. Optimism has been shown to play a protective role in maternal postpartum psychological well-being and health (Dunkel Schetter, 2011; Grote, & Bledsoe, 2007). Regarding adherence to the intervention, our results confirmed the relation found in a previous study on preferences for positive psychology exercises (Schueller, 2010): women that reported higher appreciation and perceived benefit for an exercise were more likely to complete the exercise and to do the activity over more days.

## 2. General discussion

Over the last decade, randomized control trials have pointed out that PPIs can improve positive emotions and well-being. Recently, researchers have started to reflect on questions beyond the scientific validation of PPIs. We resumed them in two wide questions: 1) *What*



*PPIs work for whom?* 2) *What is the best way to disseminate PPIs?* Researchers have been trying to solve these two important interrogatives, but, as we will see in the next paragraph, much additional work is needed to fully answer these issues.

Our objective is to present the results of the studies that have begun to address these questions. Using these findings as a starting point, we will address the limits of *Embarazo y Bienestar* highlighted in Chapter 2 and 7 and we will propose future lines of research in the context of pregnancy and positive psychology interventions.

## 2.1. What PPIs work for whom?

### *2.1.1. How do PPIs work? The mediators underlying the efficacy of PPIs*

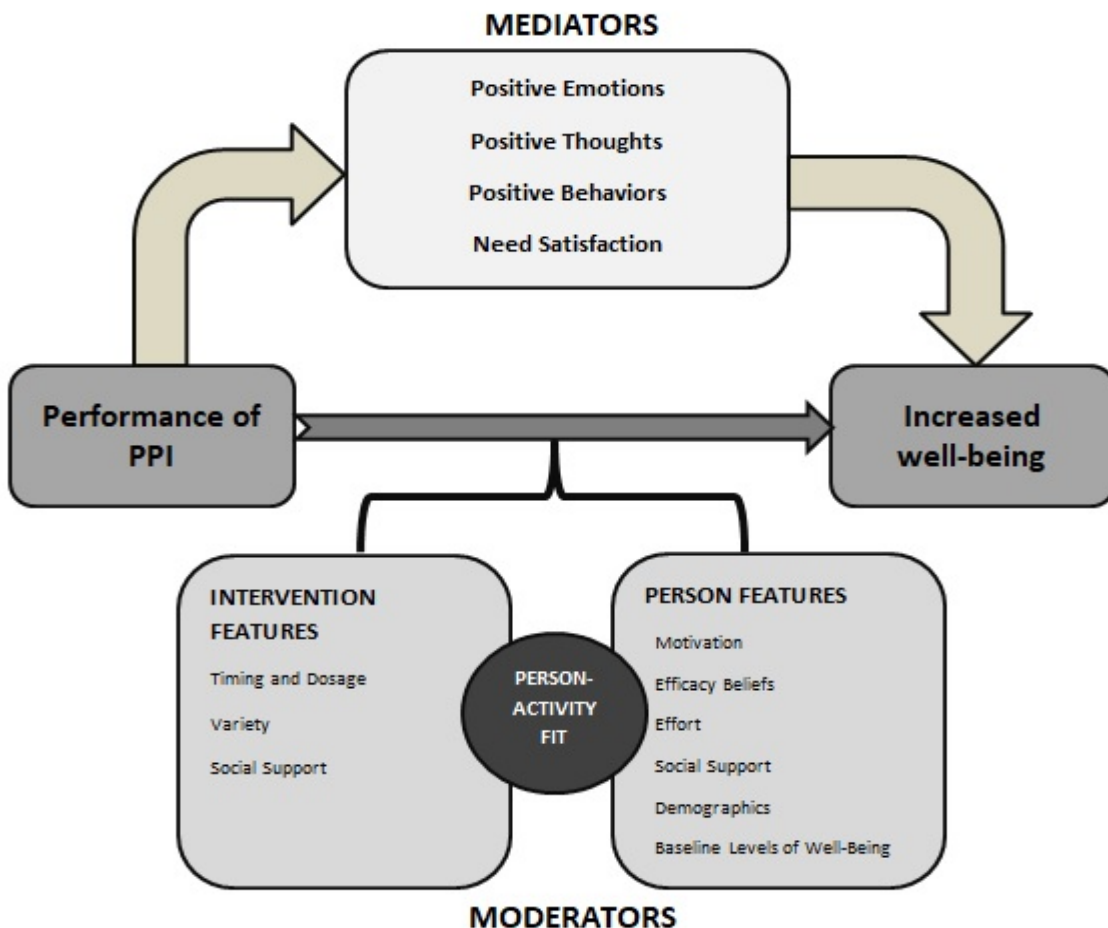
Recently, positive psychology researchers have started wondering on *how* positive interventions work rather than *whether* they work. In this regard, Lyubomirsky and Layous (2013) have started to analyze the processes and dissect the potential mechanisms that can mediate the effectiveness of PPIs in terms of increased well-being. In their positive activity model, the authors proposed that positive emotions, positive thoughts, positive behaviors and need of satisfaction could play the role of mediator factors. Specifically, the authors posited that encouraging people to engage in positive activities would lead them to have more positive emotions, behaviors, thoughts, and greater satisfaction of psychological needs, which, in turn, bring to increase well-being (bottom part Figure 2).

This mediation process has been supported by some preliminary results. For instance, a study conducted by Boehm, Lyubomirsky, and Sheldon (2011a), showed that the relation between performing a positive activity (i.e. express optimism and convey gratitude) and

increased well-being was mediated by feelings of control and connectedness. Another study found that expressing gratitude and optimism led to increases in positive affect, which ultimately led to decreases in depressive symptoms (Lyubomirsky, & Dickerhoof, 2010). Furthermore, engaging in positive activities (i.e., counting one blessings, a gratitude activity) have showed to increase positive behaviors that are not directly related with the activity itself (i.e., exercising more) (Emmons, & McCullough, 2003). Satisfaction of basic psychological needs have also shown to play a mediator role. For example, recent evidence showed that expressing gratitude and optimism, increased the need satisfying feelings of autonomy and connectedness, which in turn boosted well-being (Boehm, Lyubomirsky, & Sheldon, 2011b; Layous, & Lyubomirsky, 2014). Furthermore, a positive intervention which combined performing act of kindness and delivering autonomously supportive messages, increased participants' perceived autonomy (i.e., satisfaction of the need of autonomy), which in turn enhanced their happiness and decreased negative affect (Della Porta, Jacobs Bao, & Lyubomirsky, 2012; Layous, & Lyubomirsky, 2014).

### *2.1.2. Understanding the moderators underlying the efficacy of PPIs*

The positive activity model proposed by Lyubomirsky and Layous (2013), points out also two categories of factors that can play the role of moderators in the relation between engagement in a PPI and increased well-being. Specifically, the authors postulated that some features of the PPI (i.e. timing, dosage, and variety) and some characteristics of the person engaged in the activity (i.e., motivation, beliefs, effort, social support, culture, age, and baseline levels of well-being) can influence the efficacy of the PPI (bottom part of Figure 2).



**Fig. 2** Mediators and moderators underlying the efficacy of PPIs. Adapted from Lyubomirsky and Layous (2013)

### 2.1.2.1. Features of PPIs that can influence their efficacy

Generally, the characteristics of an activity influence its effectiveness. For instance, when pregnant women take prescription of folic acid, their doctor explains the correct dosage (e.g., 0.4 mg [400µg]) and timing (e.g., once a day during the first trimester) of this vitamin to make it optimally effective. Dosage and timing matters in PPIs too. Preliminary results showed that practicing a positive activity too much, can generate an “overdose” effect. In one study, participant who were asked to engage in a gratitude exercise (i.e. counting one’s blessings exercise) only once a week for 6 weeks reported greater increases in well-being than

participants who were asked to perform the activity three times per week (Lyubomirsky et al., 2005). Similar results were found about practicing acts of kindness: participants who performed five acts of kindness in one day showed greater gains in well-being than those who performed the activity throughout one week (Lyubomirsky et al., 2005). In sum, it seems that performing a positive activity too much (“overdose”), might make it cumbersome and therefore contrasting its positive effect and diminishing the benefits (Layous, & Lyubomirsky, 2014).

Nevertheless, in a series of studies, Parks et al. (2012) found that optimum frequency for practicing a positive activity may vary depending by the fact that engagement is voluntary or requested from a third person (e.g., an investigator). Indeed, the authors found that participants that voluntarily chose a positive activity through a mobile application, reported greater gains in well-being the more frequently they logged into the application (Parks et al., 2012).

Intervention length can also play as a moderator. Sin & Lyubomirsky (2009) hypothesized that longer intervention could lead to greater increases in well-being. Specifically, because the length of the interventions included in their meta-analysis was between 4 and 10 weeks long, the authors proposed that these PPIs were not long enough to generate a potential hedonic adaptation. On the other hand, intervention length and dosage have shown to depend also by the appreciation reported by the participant. Indeed, the results presented in Chapter 7 together with the findings of Schueller (2010), show that preference of an exercise was positively related to adherence to that exercise.

Variety has shown to play a critical role in fostering both initial and sustained benefits of any life changes linked to increased happiness and well-being (Parks et al., 2012; Schueller, & Parks, 2014; Sheldon, & Lyubomirsky, 2012). Practicing only one activity for several weeks or months, can lead to perceive that activity as boring and blundersome, and consequently, experiencing fewer and weaker positive feelings with the time.

Variety can sustain also motivation, as it requires to the person to apply her skills in new ways. Indeed, in a naturalistic study investigating people's everyday pursuit of happiness, Parks et al. (2012, Study 2) found that people perform between seven and eight different activities to improve their own happiness. Furthermore, another study showed that performing different acts of kindness, led to greater gains in well-being than to perform the same act of kindness (Sheldon et al., 2012). These findings are supported also by the results of a recent meta-analysis which showed that multicomponent positive psychology interventions (MPPIs) can be more effective than single component positive psychology interventions (Hendriks, Schotanus, & Bohlmeijer, 2017).

Receiving support when engaging in a PPI (e.g., receiving supportive messages in case of self-applied interventions) can also play a moderation role. We will discuss about this factor in the next paragraph, when we will talk about the second question: *What is the best way to disseminate PPIs?*

#### *2.1.2.2. Features of persons that may impact the benefit from practicing a PPI*

Participant's motivation is a critical factor that can influence the efficacy of a PPI. When people are high motivated, they are able to complete behaviors that require a certain amount

of effort, whereas when motivation is low, people's ability to engage in difficult behaviors drops (Fogg, 2009; Schueller & Parks, 2014). Indeed, some studies suggested that only people that are motivated to increase their own happiness can benefit from a PPI (Lyubomirsky, Dickerhoof, Boehm, & Sheldon, 2011; Schueller, & Parks, 2014). One reason that why motivated happiness-seekers are more successful than less motivated ones is that they are well-disposed to put more and continue to muster effort into the practice of a PPI (Layous, Lee,, Choi, & Lyubomirsky, 2013; Layous, & Lyubomirsky, 2014; Lyubomirsky et al., 2011).

Notwithstanding, other evidence indicated that a high level of motivation to increase one's own happiness can be deleterious. People with high expectancies in reaching the goal of happiness through the practice of a positive activity, can feel disappointed about the activity itself (Layous, & Lyubomirsky, 2014). Overvalued happiness and not realistic expectancies can generate disappointment, which is a direct threat to happiness. Therefore, being too much motivated to become happier can be a barrier to real happiness (Mauss, Tamir, Anderson, & Savino, 2011).

Research pointed out that self-selection into a PPI is an important factor that can influence both motivation and the efficacy of a PPI. People who self-select into positive interventions have shown larger increases in well-being and larger decreases in depressive symptoms than those who do not self-select (e.g., Lyubomirsky et al., 2011; Seligman et al., 2005; Sin & Lyubomirsky, 2009). Thus, in sum, PPIs require both a proper way (e.g., self-selection) and a proper will (e.g., motivation) to be followed through and completed (Lyubomirsky et al., 2011).

Participant's culture can also play a role as moderator. Albeit just few studies have considered it, culture can influence how a people perform an activity and how effective that activity may be (Layous, & Lyubomirsky, 2014; Lyubomirsky, 2017). Indeed, people conceive happiness in different ways depending by their culture. For instance, in the Western culture, personal achievement and goal pursuit are keys components of happiness, whereas Eastern culture tends to give more importance to collective harmony and relationships. Therefore, some positive interventions can fit just for people with a certain cultural background. Layous and colleagues (2013) conducted a 6-week kindness and gratitude intervention among participants from United States and South Korea. The authors found that whereas U.S. participants increased in well-being from both the activities, South Korean ones showed similar gains in well-being as did U.S. participants only when performing acts of kindness (Layous et al., 2013; Lyubomirsky, 2017). On the other hand, South Korean participants benefited significantly less from practicing gratitude than U.S. ones, and the authors suggested that this difference could be explained by the fact that South Korean are less likely to experience conflicting emotions (e.g. guilt) when they are grateful (Layous et al., 2013). Moreover, the study showed that Americans reported to put more effort in the practice of the activities than the South Koreans. This finding can be explained by the fact that in the Americans consider happiness is in their own hands and can be changed by force of personal effort or will, whereas in the Korean culture the world happiness means "fortunate or lucky blessing" (Layous et al., 2013; Oishi, Graham, Kesebir, & Galinha, 2013).

Researchers have identified age as another potential moderator factor, but only few studies have been conducted and results seem contradictory. The meta-analysis conducted by

Sin and Lyubomirsky (2009) provided evidence that older participants can benefit more from PPIs than younger ones. Specifically younger adults (i.e. 18 to 35 years old) showed to gain less from PPIs than middle adults (i.e. 36 to 50 years old). On the other hand, evidence is emerging that youth can also benefit from PPIs. Studies that tested positive activities (i.e. count their blessings, writing letters of gratitude, and performing acts of kindness) among adolescents showed larger increases in well-being levels than the ones reported after being involved in a neutral task (Froh, Sefick, & Emmons, 2008; Haworth et al., 2012, 2016). In sum, future studies should explore the range in which PPIs are more helpful and tailoring positive activities taking in consideration the development needs of people of different ages (Layous, & Lyubomirsky, 2014).

Baseline levels of well-being can also play a moderator role in the relation between engagement in a PPI and increased well-being. However, the limited number of studies have had mixed results. Seligman and colleagues (2005) as well as Layous and Lyubomirsky (2011) found that participants who reported mild depressive symptoms before to start a PPI, benefitted from practicing a positive activity. However, other studies shown that practicing a specific positive activity (i.e. writing a gratitude letter) had a backfire effect on depressed participants (Lyubomirsky, 2017; Sin et al., 2011).

Recently a study pointed out the existence of a new potential moderator that was not included in the original positive activity model: the prosocial behavior. Specifically, Nelson and colleagues (2016) investigated the effects of two prosocial (i.e. acts of kindness directed to another person and acts of kindness to benefit more broadly humanity or the world) and self-oriented behavior in a 6-week longitudinal study. Participants assigned to the self-focused



condition did not report improved psychological flourishing, positive emotions, or negative emotions, whereas those assigned to the prosocial actions, reported greater increases in psychological flourishing. In sum, these preliminary results suggest that people striving for happiness may be more successful if they choose to treat someone else instead to treat themselves (Nelson et al., 2016).

## 2.2. What is the best way to disseminate PPIs?

The second question that has been debated by researchers on positive psychology regards the problem of dissemination of PPIs. What are the best modalities for distributing PPIs into real-world settings? PPIs have been disseminated through self-help books (e.g., “The How of Happiness”, Lyubomirsky, 2008), and evidence suggest that books can be an effective way to provide positive psychology strategies, but much more research is needed to test their efficacy to increase happiness. Positive psychology strategies have been taught also during classes in several settings as in the secondary education (e.g., Seligman, Ernst, Gillham, Reivich, & Linkins, 2009), and military (e.g., Reivich, Seligman, & McBride, 2011).

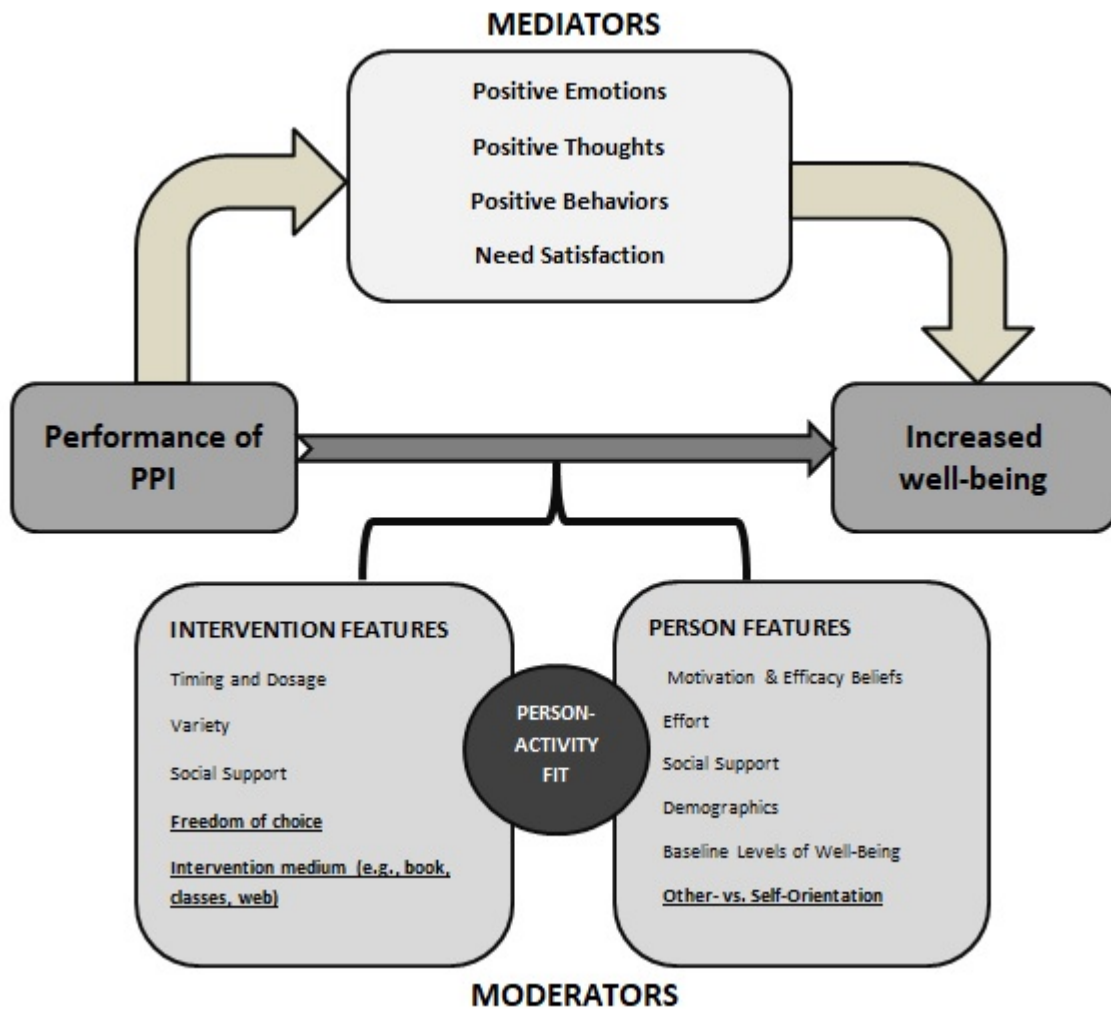
As we have seen in the Introduction, a possible way is to disseminate PPIs through the web. Although many online positive psychology interventions (OPPIs) have been designed and developed, only few have been empirically tested (e.g., Bolier, & Abello, 2014; Mitchell et al., 2010). Many factors need to be investigated regarding both the design of OPPIs and their empirical evaluation. For instance, in terms of design, much more studies are needed to understand which factors can influence user engagement, the right dosage of the activities proposed online and the extent to which the user can be free to choose the activity/ies to

perform (Parks, 2014). As we have seen before, social support can moderate the efficacy of a PPI. This is particularly true when the intervention is self-applied, as an OPPI. Evidence pointed out the challenge to make participants feel supported (perceived support) without being overbearing (e.g. receiving support in forms for instance of reminders can come across as nagging or intrusive), and maintaining their feeling of autonomy in the activity. Thus, an important question to be investigated regards how much support should be provided in an OPPI and in which format.

We have summarized this paragraph with a modified schema of the positive activity model (Figure 3). This proposed model is not exhaustive, as much more studies are needed to answer to the numerous interrogatives and doubts that remain - at the present moment- without an answer.

In conclusion, these evidences lead us to the conclusion that the greatest increases in well-being from engaging in PPIs can emerge when a specific intervention format matches the individual preferences and/or features of the person, in other words, the degree of person-activity fit (Figure 3).

In the next paragraph we will use these findings as a starting point to address the limits of *Embarazo y Bienestar* highlighted in Chapter 2 and 7 and we will propose future research implication in the context of pregnancy and positive psychology interventions.



**Fig. 3** Proposed updated positive activity model. Adapted from Lyubomirsky and Layous (2013)

### 3. Future implications

In Chapter 4 we presented the data of a case series study conducted to test the efficacy of *Embarazo y Bienestar*, a web-based positive psychology intervention for pregnant women. These preliminary findings provide promising evidence about the potential positive effects of the intervention in terms of maintained levels of mental well-being, satisfaction with life and perceived social support, and decreased depression severity and pregnancy-related anxiety. Furthermore, in Chapter 7 we presented the data of a study conducted to investigate the

feasibility of the intervention among a wider population of pregnant women. Overall, the intervention was positively assessed by participants. Participants provided data about their activities preferences and pointed out some limitations of *Embarazo y Bienestar*, as the length of the intervention.

In the next paragraphs, we will propose potential future lines of studies in order to address the limitations of *Embarazo y Bienestar* and to better understanding the mechanisms that can influence the efficacy of PPIs in the context of pregnancy.

### 3.1. What PPIs work for pregnant women?

Participants of the feasibility study (Chapter 7) expressed their preferences (in terms of appreciation, perceived benefits and difficulty) for the positive activities proposed in the interventions. The most appreciated activities were the ones related to the connectedness-gratitude (i.e., connectedness exercise), and optimism-meaning in life (i.e. best possible self and baby steps exercises) areas. The savoring-based activities were less rated as well as the mindfulness-based practice of the body scan.

Basing on these data, we can propose a series of randomized control trials (RCTs), one for each positive psychology domain presented in *Embarazo y Bienestar*. Specifically, we can advance the proposal to conduct three RCTs: a) a study that will compare the connectedness-gratitude activity with a control-neutral activity; b) a study comparing the optimism-meaning in life activities with a control-neutral activity; c) and a third study comparing the savoring-based activities with a control-neutral activity.

We propose to exclude the mindfulness-based activity for several reasons. First, although it could be said that mindfulness and positive psychology are based on some common principle (i.e., savoring principle derive from one of the most basic mindfulness activities, wherein one deliberately and systematically attends to every aspect of an experience [Kabat-Zinn, 2009]), mindfulness interventions have been assessed and investigated as independent from positive psychology (Bolier et al., 2013; Hendriks et al., 2017; Schueller, & Parks, 2014). Second, the mindfulness-based exercise (i.e., body scan exercise) proposed by *Embarazo y Bienestar* was the less appreciated by participants of the feasibility study. Furthermore, we detected the highest percentage of drop-out (32%) after the first module, which proposed the body scan practice. We believe that mindfulness interventions can be effective in the context of pregnancy, and a growing number of studies have demonstrated it (Matvienko-Sikar, Murphy, & Murphy, 2016). Nevertheless, we think that the body scan exercise may not fit some features of *Embarazo y Bienestar*, as the self-applied and online format. As we will see later, we believe that a mindfulness-based activity as the body scan, could be an optimal exercise to propose in a semi self-applied intervention for pregnant women.

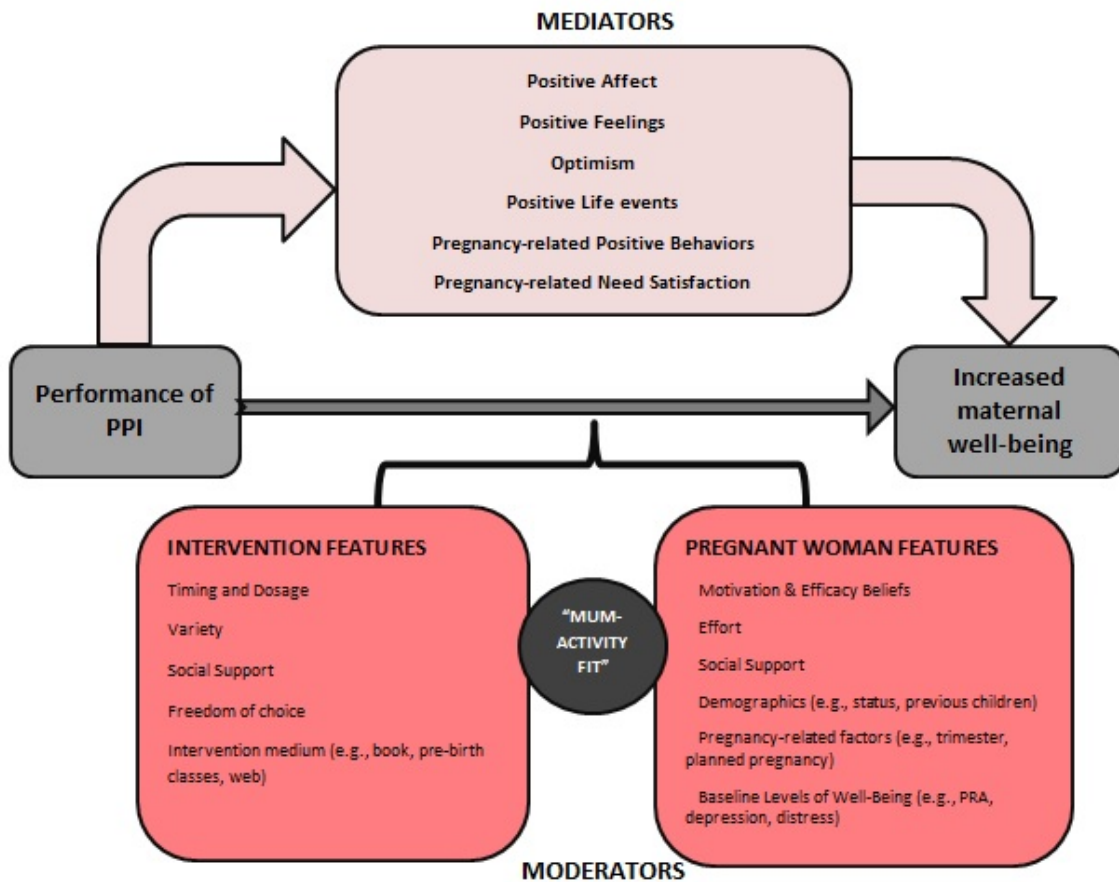
Through the series of RCTs, we propose to test the efficacy of each positive activity originally proposed in *Embarazo y Bienestar* and to investigate the potential mediators and moderators that could influence the relation between engagement in PPI and gains in women's mental well-being.

As we have seen, studies have started to provide preliminary evidence that endorse the mediators proposed by Lyubomirsky and Layous (2013) in their positive activity model.

However, to the authors knowledge, no study has investigated if and which factors could mediate the relation between engaging in PPIs and increased well-being of pregnant women.

As we have seen in Chapter 2, research on positive psychology in the context of the perinatal period is at its infancy. We can advance the hypothesis that the efficacy of PPIs in the prenatal period can be mediate by specific pregnancy-related factors. For instance, pregnant women could present psychological needs related to the specificity of the perinatal period, as the need to perceiving social support from their family and the institutions (e.g., Carissoli, Villani, & Riva, 2016; Lancaster, Gold, Flynn, Yoo, Marcus, & Davis, 2010; Stice, Ragan, & Randall, 2004). Furthermore, positive behaviors related to the pregnancy, as, for example, participating to prenatal classes, and/or practicing physical activity (e.g., yoga, pilates, fitness classes dedicated to pregnant women) and/or following a healthy diet, could mediate the efficacy of PPIs addressed to pregnant women. As we have seen before, a growing number of studies have shown that cultivating women's prenatal positive affect (Voellmin, Entringer, Moog, Wadhwa, & Buss, 2013), positive feelings (McManus, Khalessi, Lin, Ashraf, & Reich, 2017), positive life experiences (Bos et al., 2013; Bostock, Hamer, Wawrzyniak, Mitchell, & Steptoe, 2011; Pluess et al., 2012, Polk, Cohen, Doyle, Skoner, & Kirschbaum, 2005; Steptoe, Wardle, & Marmot, 2005) , and optimism (Dunkel Schetter, 2011; Grote, & Bledsoe, 2007; Lobel, Yali, Zhu, DeVincent, & Meyer, 2002) can represent a form of psychosocial support that may attenuate or even fully buffer the negative effects of adverse influences on pregnant women and the developing fetus. Therefore, we can advance the hypothesis that positive affect, feelings, life experiences and optimism could mediate the relation between be engaged in a PPI and gains in women's well-being.

In sum, future studies are needed to test if the mediation model proposed by Lyubomirsky and Layous (2013) can fit also in the context of pregnancy, and/or if different mediating factors, as the ones that we proposed (upper part of Figure 4), could be underlying the efficacy of PPIs among pregnant women.



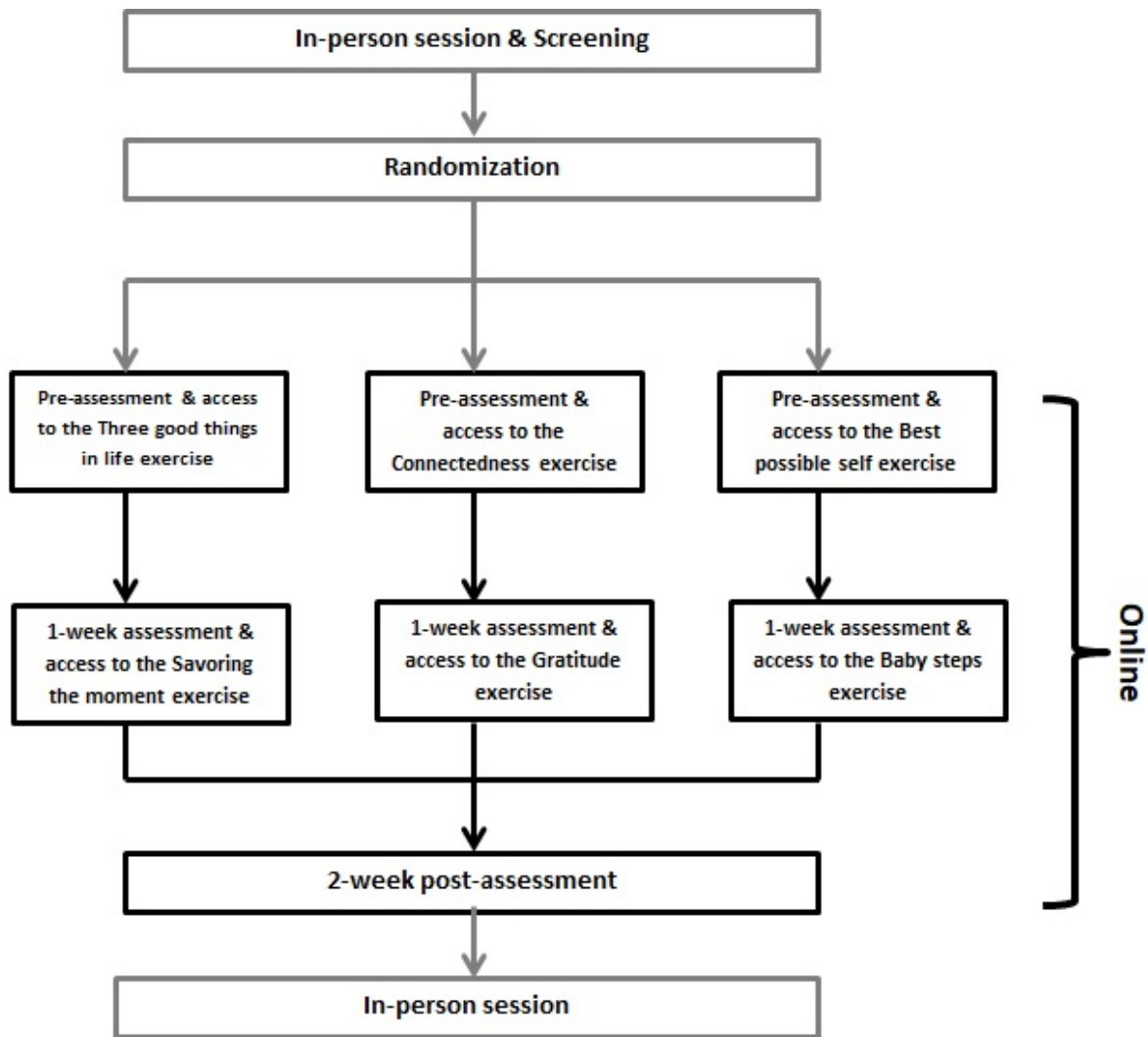
**Fig. 4** “Mum-Activity Fit”: proposed mediators and moderators underlying the efficacy of PPIs among pregnant women. Adapted from Lyubomirsky and Layous (2013)

Basing on our findings about the feasibility of *Embarazo y Bienestar*, we can postulate that some moderators related to the specificity of the PPI, can influence the efficacy of the PPIs among pregnant women.

One important point of weakness highlighted by pregnant women was the excessive duration of the intervention (i.e., 5 weeks). The length of the intervention could represent also a potential factor that can explain the high percentage of dropouts. Therefore, we think that length and dosage of the intervention could play an important role as moderators. In the series of proposed future RCTs, length and dosage of the interventions could be manipulated in order to find the optimal balance for pregnant women. For instance, future studies could propose to pregnant women to engage in a single positive activity at least once a week for a total length of two weeks. We think that this length and dosage can be affordable, without being overbearing for pregnant women. They could feel free to exercise all the times that they would like in a relatively short period. We postulate that 2 weeks could be a potential good duration of the intervention, as women can become use to the practice of the activities, without feeling bored.

In order to prevent the monotony and to boost motivation, future studies could also vary the practice of a positive activity. Indeed, as we have seen above, variety can moderate the efficacy of a PPI. Therefore, we can think about a two-week intervention in which each week participants are involved to a different positive activity related to the same domain. For instance, regarding the domain of optimism and meaning in life, a possible study would propose to participants to be engaged during the first week 1 in the best possible self exercise. Then, the second week would be dedicated to the practice of the baby steps exercise. In Figure 5 we propose the study's flowchart of the three RCTs proposed in this last Chapter.





**Fig. 5** Flowchart of the three RCTs proposed in this Chapter

Features of pregnant women could moderate the efficacy of the PPIs. Specifically, we propose to take in considerations some variables that were not specified in the positive activity model, and which are specific for pregnant women. For example, particular demographic characteristics, as relationship status and/or previous children, and pregnancy related factors, as trimester of pregnancy, and/or planned pregnancy, may influence the efficacy of the intervention. We can advance the hypothesis that these variables could influence the motivation and effort as well as the baseline levels of well-being of the

participant. For instance, in the first trimester of pregnancy, pregnant women can show more physical discomfort, due to the hormonal changes, which in turn can contribute to increase anxiety. These factors can have a negative impact on the motivation of the participant to engage in the intervention. Furthermore, women that are in particular need of support (e.g., those who report high levels of anxiety, low perceived social support, unplanned pregnancy) can be too much motivated, and have unrealistic expectancies about the intervention, and therefore feel disappointed by the intervention, as reported by two participants in Chapter 7 (e.g. *“It is not useful because I feel like before I started the intervention”*).

As we have seen above, baseline level of well-being is another important moderator. Regarding pregnant women, we can postulate that, as we have seen in the Introduction, pregnancy related anxiety as well as depression severity and distress are potential factors that can moderate the efficacy of a PPI. For instance, we can advance the hypothesis that women reporting at baseline a high level of pregnancy related anxiety, which has shown to be higher during the first and third trimester (Dunkel Schetter, 2011), can buffer the positive effects of a PPI as the ones dedicated to optimism. Furthermore, high levels of depression can counteract the potential benefits of the gratitude-based interventions, as it was reported in previous studies (Lyubomirsky, 2017; Sin et al., 2011).

In sum, we propose that futures studies should take in considerations specific pregnancy-related mediators (e.g., maternal positive affect, feelings, and life experiences, social support and optimism) and moderators (e.g., biographic data [status, previous children], pregnancy-related data [trimester of pregnancy, planned pregnancy], baseline women mental

well-being [pregnancy related anxiety, depression severity, distress]) that can play an important role in determining the efficacy of PPIs among pregnant women.

### 3.2. How to disseminate PPIs for pregnant women?

*Embarazo y Bienestar* is a totally self-applied online-based intervention. As we have seen before, online interventions can offer several advantages, and recent evidence suggested that they could be an affordable for pregnant women (Ashford et al., 2016; Lee et al., 2016).

One relevant point of weakness of online interventions is the high rate of dropouts. Different studies pointed out that a great number of people who begin a web intervention, with just very few even progressing past a first session (Christensen, Griffiths, Groves, & Korten, 2006; Schueller, & Parks, 2014). Generally, if we compare the online format with the face-to-face, it can be faster and easier to sign up for an online trial as well as it can be easier to leave it. In a face-to-face trial, participants can create a link with the researcher, and this can motivate participants to continue the trial. As we have seen, perceived social support by the family and institutions is an important factor in the context of pregnancy (e.g., Carissoli et al., 2016).

Therefore, we can posit that the complete self-applied format of *Embarazo y Bienestar* could explain the high percentage of dropouts reported in Chapter 7. Thus, we advance the hypothesis that a semi self-applied intervention could be an optimal solution. Specifically, we propose that future intervention would include a first in person meeting with the researcher (see Figure 5). This meeting can be proposed in a group format or individualized one. For instance, a first group session could be implemented during pre-birth classes. Commonly,

women start to attend to a pre-birth class during the third trimester of pregnancy. Therefore, for women in their first and second trimester, the collaboration and support of prenatal care centers is necessary in order to organize these sessions. During the first in-person session, the researcher can introduce positive psychology and explain the rationale of the PPIs proposed. In order to create an atmosphere of acceptance and calm, the researcher can guide the women to the practice of the body scan exercise, as we suggested above, and introduce the practice of the PPIs to which participants would be involved for the following two weeks. This first session could be an optimal occasion to answer to questions and doubts about the intervention (e.g., randomization, access to the web page) and motivate women to continue to practice the PPI with the support of a web platform as *Embarazo y Bienestar*. A second face-to-face session can have place at the end of the positive intervention. During this second session, the experimenter can invite the women to express their opinion about the intervention, following the logic of a focus group.

Another possible option could be that, during the first face-to-face session, the experimenter would explain the different PPIs (corresponding to the three domains: savoring, connectedness and gratitude, optimism and meaning in life) and permit to the women to subscribe to the intervention that they prefer. As we have seen before, research pointed out that self-selection into a PPI is an important factor that can influence both motivation and the efficacy of a PPI (Layous, & Lyubomirsky, 2014; Lyubomirsky et al., 2011; Parks et al., 2012; Seligman et al., 2005; Sin, & Lyubomirsky, 2009). Nevertheless, by granting the opportunity to self-select the PPI into which one's would be involved, could decrease the rigor of the research design. This is an important factor that future researches have to take into account.

In sum, we propose that future PPIs for pregnant women could have the format of semi self-applied interventions, which can combine the point of strengths of OPPIs and boost motivation and perceived social support through the in-person sessions. Future research should also take into account the degree of freedom to grant to participants in terms of self-selection of the PPI.

### 3.3. Limitations and future challenges

The future studies proposed in this Chapter have some limitations and require facing some challenges.

First, the series of three RCTs proposed would require a large sample size. Recruiting pregnant women and letting them complete the intervention could be a challenge for future researchers. They would need to be supported by pregnancy-care professionals (e.g., midwives, gynecologists) as well as have the ability to communicate to potential participants who are women who are living a stressful period of their lives.

Second, the future studies proposed in this Chapter would require different changes of the web-platform as well as the availability of a specialist (e.g., the research in charge) to organize and give the in-person sessions. This can require a certain investment of time and human resources.

Third, the degree of the autonomy granted in the self-selection of the PPI is an important point of question that future research would have to take in consideration. Indeed, if granting more autonomy to the participants can have a positive impact on the attrition with

the intervention and on motivation, in the other hand can decrease the rigor of the research design.

### 3.4. What next? Long-term future implications

Once examined each PPI individually, a potential future development could be to design and develop a web-based platform and/or a mobile App that offers to pregnant women the possibility to choose between a variety of positive activities. Why propose packages of free-choice positive activities? Mainly for two reasons. First, evidence pointed out that, in their everyday pursuit of happiness, people report practicing 7-8 activities at a time (Parks et al., 2012). Moreover, when happiness seekers are offered a variety of activities to choose from, those who engaged a wider variety of exercises reported the largest mood benefits (Parks, & Biswas-Diener, 2013). Second, granting the possibility to autonomously choose the activities to be engaged in, has shown to positively influence frequency of practicing (Parks et al., 2012). Furthermore, evidence showed that people who self-select into positive interventions have been found to report larger increases in well-being and larger decreases in depressive symptoms comparing to those who did not self-select (Sin, & Lyubomirsky, 2009).

One example of package of free-choice PPIs is the Live Happy iPhone application developed by Parks et al. (2012). This App is based on Sonja Lyubomirsky's research and proposes a package of different PPIs (e.g., kindness journal, gratitude journal, goal evaluation and tracking).

In sum, we propose that, once the conducted the three RCT to test the efficacy of the three-domain PPIs proposed for pregnant women, the following step could be to disseminate

these interventions into real-world settings. We proposed that to design and develop a web-based and/or a mobile App-based package of free-choice PPIs could be a good solution in order to made PPIs accessible and affordable for pregnant women. Notwithstanding, much additional work is needed to find the optimal way to deliver the right PPI to pregnant women.

## 4. Conclusion

Recently research on antenatal care has expanded to a salutogenic perspective, which examines the potential benefits of positive and protective factors that can influence the course of pregnancy, women's perinatal well-being and childbirth. This salutogenic perspective is supported by positive psychology, which calls for the necessity to support and foster well-being, rather than focusing only on preventing and treating problems and symptoms (Delle Fave et al., 2013; Seligman, & Csikszentmihalyi, 2000). The aim of this dissertation was to review the existing scientific literature about PPIs applied during the perinatal period and to investigate the potential effects and feasibility of a novel online-based positive psychology program on women's prenatal well-being.

Furthermore, in the present dissertation we pointed out the potential next steps to further investigate what PPI works better for pregnant women and what is the optimal way to deliver PPIs into the daily reality of pregnant women. We think that the present dissertation gives a significant contribution to the emerging field of studies on pregnancy and positive psychology, and we hope that readers would be inspired to continue to investigate in this field.

## 5. References

Ashford, M.T., Olander, E.K., & Ayers, S. (2016). Computer-or web-based interventions for perinatal mental health: A systematic review. *Journal of Affective Disorders, 197*, 134-146.

Boehm, J.K., Lyubomirsky, S., & Sheldon, K.M. (2011a). A longitudinal experimental study comparing the effectiveness of happiness-enhancing strategies in Anglo Americans and Asian Americans. *Cognition & Emotion, 25*(7), 1263-1272.

Boehm, J.K., Lyubomirsky, S., & Sheldon, K.M. (2011b). [The role of need satisfying emotions in a positive activity intervention]. Unpublished raw data.

Bolier, L., & Abello, K.M. (2014). Online positive psychological interventions: State of the art and future directions. In: A.C. Parks, & S.M. Schueller (Eds.), *The Wiley Blackwell handbook of positive psychological interventions* (pp. 286-309). Chichester: John Wiley & Sons, Ltd.

Bolier, L., Haverman, M., Westerhof, G.J., Riper, H., Smit, F., & Bohlmeijer, E. (2013). Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health, 13*(1), 119.

Bos, S.C., Macedo, A., Marques, M., Pereira, A.T., Maia, B.R., Soares, M.J., ... & Azevedo, M.H. (2013). Is positive affect in pregnancy protective of postpartum depression?. *Revista Brasileira de Psiquiatria, 35*(1), 5-12.



Bostock, S., Hamer, M., Wawrzyniak, A.J., Mitchell, E.S., & Steptoe, A. (2011). Positive emotional style and subjective, cardiovascular and cortisol responses to acute laboratory stress. *Psychoneuroendocrinology*, *36*(8), 1175-1183.

Carissoli, C., Villani, D., & Riva, G. (2016). An Emerging Model of Pregnancy Care: The Introduction of New Technologies. In: D. Villani, P. Cipresso, A. Gaggioli, & G. Riva (Eds.), *Integrating Technology in Positive Psychology Practice* (pp. 164-195). IGI Global.

Christensen, H., Griffiths, K., Groves, C., & Korten, A. (2006). Free range users and one hit wonders: community users of an Internet-based cognitive behaviour therapy program. *Australian & New Zealand Journal of Psychiatry*, *40*(1), 59-62.

Cohn, M.A., & Fredrickson, B.L. (2010). In search of durable positive psychology interventions: Predictors and consequences of long-term positive behavior change. *The Journal of Positive Psychology*, *5*(5), 355-366.

Della Porta, M.D., Jacobs Bao, K., & Lyubomirsky, S. (2012). *Does supporting autonomy facilitate the pursuit of happiness? Results from an experimental longitudinal well-being intervention*. Manuscript submitted for publication.

Delle Fave, A., Pozzo, M., Bassi, M., & Cetin, I. (2013). A longitudinal study on motherhood and well-being: Developmental and clinical implications. *Terapia Psicologica*, *1*(1), 21-33.

Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi, D.W., Oishi, S., & Biswas-Diener, R. (2010). New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Social Indicators Research*, *97*(2), 143-156

Dunkel Schetter, C. (2011). Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annual Review of Psychology, 62*, 531-558.

Emmons, R.A., & McCullough, M.E. (2003). Counting blessings versus burdens: an experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology, 84*(2), 377.

Fogg, B.J. (2009, April). A behavior model for persuasive design. In: S. Chatterjee, & P. Dev (Eds.), *Proceedings of the 4<sup>th</sup> International Conference on Persuasive Technology*, New York, NY: ACM.

Froh, J.J., Sefick, W.J., & Emmons, R.A. (2008). Counting blessings in early adolescents: An experimental study of gratitude and subjective well-being. *Journal of School Psychology, 46*(2), 213-233.

Grote, N.K., & Bledsoe, S.E. (2007). Predicting postpartum depressive symptoms in new mothers: The role of optimism and stress frequency during pregnancy. *Health & Social Work, 32*(2), 107-118.

Haworth, C.M., Nelson, S.K., Layous, K., Carter, K., Bao, K.J., Lyubomirsky, S., & Plomin, R. (2016). Stability and change in genetic and environmental influences on well-being in response to an intervention. *Plos One, 11*(5), e0155538.

Haworth, C.M., Palmer, C., Layous, K., Nelson, S.K., Bao, K.J., Lyubomirsky, S., & Plomin, R. (2012, August). The Twins Wellbeing Intervention Study (TWIST): A genetically sensitive

online intervention. Paper presented at the European Association for Behavioural and Cognitive Therapies. Geneva, Switzerland.

Hendriks, T., Schotanus, M., & Bohlmeijer, E. (2017, July). The efficacy of multi-component positive psychological interventions: a meta-analysis of randomized controlled trials. In C. Vazquez (Chair), *Clinical Positive Psychology interventions: New Frontiers and Developments*. Symposium at the 5th World Congress International Positive Psychology Association, Montreal, Canada.

Kabat-Zinn, J. (2009). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness*. New York: Delta.

Lancaster, C.A., Gold, K.J., Flynn, H.A., Yoo, H., Marcus, S.M., & Davis, M.M. (2010). Risk factors for depressive symptoms during pregnancy: a systematic review. *American Journal of Obstetrics and Gynecology*, 202(1), 5-14.

Layous, K., Chancellor, J., Lyubomirsky, S., Wang, L., & Doraiswamy, P.M. (2011). Delivering happiness: Translating positive psychology intervention research for treating major and minor depressive disorders. *The Journal of Alternative and Complementary Medicine*, 17(8), 675-683.

Layous, K., Lee, H., Choi, I., & Lyubomirsky, S. (2013). Culture matters when designing a successful happiness-increasing activity: A comparison of the United States and South Korea. *Journal of Cross-Cultural Psychology*, 44(8), 1294-1303.

Layous, K., & Lyubomirsky, S. (2014). The how, why, what, when, and who of happiness: Mechanisms underlying the success of positive activity interventions. In J. Gruber, & J.

Moscowitz (Eds.), *The light and dark side of positive emotions* (pp. 473-495). New York: Oxford University Press.

Layous, K., Nelson, S.K., & Lyubomirsky, S. (2013). What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *Journal of Happiness Studies, 14*(2), 635-654.

Lee, E.W., Denison, F.C., Hor, K., & Reynolds, R.M. (2016). Web-based interventions for prevention and treatment of perinatal mood disorders: a systematic review. *BMC Pregnancy and Childbirth, 16*(1), 38.

Lobel, M., Yali, A.M., Zhu, W., DeVincent, C., & Meyer, B. (2002). Beneficial associations between optimistic disposition and emotional distress in high-risk pregnancy. *Psychology and Health, 17*(1), 77-95.

Lyubomirsky, S. (2008). *The How of Happiness*. New York: The Penguin Press.

Lyubomirsky, S. (2017, July). Whither Happiness? When, How, and Why Positive Activities Might Undermine Versus Boost Well-Being. In, *Opening Plenary Session*. Individual presentation at the 5th World Congress International Positive Psychology Association, Montreal, Canada.

Lyubomirsky, S., & Dickerhoof, R. (2010). A construal approach to increasing happiness. In: J. Tangney, J.E. Maddux (Eds.), *Social Psychological Foundations of Clinical Psychology* (pp. 229-244). New York: Guildford Press.

Lyubomirsky, S., Dickerhoof, R., Boehm, J.K., & Sheldon, K.M. (2011). Becoming happier takes both a will and a proper way: an experimental longitudinal intervention to boost well-being. *Emotion, 11*(2), 391.

Lyubomirsky, S., & Layous, K. (2013). How do simple positive activities increase well-being?. *Current Directions in Psychological Science, 22*(1), 57-62.

Lyubomirsky, S., Sheldon, K.M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology, 9*(2), 111.

MacLeod, A.K., Byrne, A., Valentine, J.D. (1996). Affect, emotional disorder, and future-directed thinking. *Cognition & Emotion, 10*(1), 69-86.

Matvienko-Sikar, K., Lee, L., Murphy, G., & Murphy, L. (2016). The effects of mindfulness interventions on prenatal well-being: A systematic review. *Psychology & Health, 31*(12), 1415-1434.

Mauss, I.B., Tamir, M., Anderson, C.L., & Savino, N.S. (2011). Can seeking happiness make people unhappy? Paradoxical effects of valuing happiness. *Emotion, 11*(4), 807.

McManus, M.A., Khalessi, A.A., Lin, J., Ashraf, J., & Reich, S.M. (2017). Positive feelings during pregnancy, early feeding practices, and infant health. *Pediatrics International*.

Mitchell, J., Vella-Brodrick, D., & Klein, B. (2010). Positive psychology and the internet: A mental health opportunity. *E-Journal of Applied Psychology, 6*(2), 30-41.

Nelson, S.K., Layous, K., Cole, S.W., & Lyubomirsky, S. (2016). Do unto others or treat yourself? The effects of prosocial and self-focused behavior on psychological flourishing. *Emotion, 16*(6), 850.

Oishi, S., Graham, J., Kesebir, S., & Galinha, I.C. (2013). Concepts of happiness across time and cultures. *Personality and Social Psychology Bulletin, 39*(5), 559-577.

Parks, A.C. (2014). A case for the advancement of the design and study of online positive psychological interventions. *The Journal of Positive Psychology, 9*(6), 502-508.

Parks, A.C., & Biswas-Diener, R. (2013). Positive interventions: Past, present and future. In: T. Kashdan, & J. Ciarrochi (Eds.), *Bridging acceptance and commitment therapy and positive psychology: A practitioner's guide to a unifying framework*. Oakland, CA: New Harbinger.

Parks, A.C., Della Porta, M.D., Pierce, R.S., Zilca, R., & Lyubomirsky, S. (2012). Pursuing happiness in everyday life: The characteristics and behaviors of online happiness seekers. *Emotion, 12*(6), 1222.

Pluess, M., Wurmser, H., Buske-Kirschbaum, A., Papousek, M., Pirke, K. M., Hellhammer, D., & Bolten, M. (2012). Positive life events predict salivary cortisol in pregnant women. *Psychoneuroendocrinology, 37*(8), 1336-1340.

Polk, D.E., Cohen, S., Doyle, W.J., Skoner, D.P., & Kirschbaum, C. (2005). State and trait affect as predictors of salivary cortisol in healthy adults. *Psychoneuroendocrinology, 30*(3), 261-272.

Reivich, K.J., Seligman, M.E., & McBride, S. (2011). Master resilience training in the US Army. *American Psychologist*, *66*(1), 25.

Schueller, S.M. (2010). Preferences for positive psychology exercises. *The Journal of Positive Psychology*, *5*(3), 192-203.

Schueller, S.M., & Parks, A.C. (2014). The science of self-help. *European Psychologist*, *19*, 145-155.

Seligman, M.E., Csikszentmihalyi, M. (2000). Positive Psychology. [Special Issue] *American Psychologist*, *55*.

Seligman, M.E., Ernst, R.M., Gillham, J., Reivich, K., & Linkins, M. (2009). Positive education: Positive psychology and classroom interventions. *Oxford Review of Education*, *35*(3), 293-311.

Seligman, M.E., Steen, T.A., Park, N., & Peterson, C. (2005). Positive psychology progress: empirical validation of interventions. *American Psychologist*, *60*(5), 410.

Sheldon, K.M., Boehm, J.K., & Lyubomirsky, S. (2012). Variety is the spice of happiness: The hedonic adaptation prevention (HAP) model. *Oxford Handbook of Happiness*, 901-914.

Sheldon, K.M., & Lyubomirsky, S. (2012). The challenge of staying happier: Testing the hedonic adaptation prevention model. *Personality and Social Psychology Bulletin*, *38*(5), 670-680.

Sin, N.L., Della Porta, M.D., & Lyubomirsky, S. (2011). Tailoring positive psychology interventions to treat depressed individuals. In: S.I. Donaldson, M. Csikszentmihalyi, & J.

Nakamura (Eds.), *Applied positive psychology: Improving everyday life, health, schools, work, and society* (pp. 79-96). New York: Routledge.

Sin, N.L., & Lyubomirsky, S. (2009). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A practice-friendly meta-analysis. *Journal of Clinical Psychology, 65*(5), 467-487.

Steptoe, A., Wardle, J., & Marmot, M. (2005). Positive affect and health-related neuroendocrine, cardiovascular, and inflammatory processes. *Proceedings of the National Academy of Sciences of the United States of America, 102*(18), 6508-6512.

Stice, E., Ragan, J., & Randall, P. (2004). Prospective relations between social support and depression: differential direction of effects for parent and peer support?. *Journal of Abnormal Psychology, 113*(1), 155.

Voellmin, A., Entringer, S., Moog, N., Wadhwa, P.D., & Buss, C. (2013). Maternal positive affect over the course of pregnancy is associated with the length of gestation and reduced risk of preterm delivery. *Journal of Psychosomatic Research, 75*(4), 336-340.



# Annexes

# Guide Videos Embarazo y Bienestar

In the CD you will find the following videos which illustrate how to surf the different modules of the online-based intervention “Embarazo y Bienestar”. The videos are in Mp4 format.

## Castellano

**“EB\_inscripción”**: video that show how to surf the inscription pages. These pages are available to everyone.

**“EB\_mód1”**: video that show how to surf the module 2 (mindfulness). The access to the module is granted by the researcher. Women were contacted by e-mail to perform the online pre-assessment on the web platform Survey Monkey (<http://surveymonkey.com>). At the end of the pre-test, they obtained access to this first module of the program.

**“EB\_mód2”**: video that show how to surf the module 2 (savoring). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“EB\_mód3”**: video that show how to surf the module 3 (connectedness and gratitude). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“EB\_mód4a”**: video that show how to surf the module 4a (optimism and meaning in life). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“EB\_mód4byresumen”**: video that show how to surf the module 4b (optimism and meaning in life) and the summary. The access to the module is granted by the researcher. At the end of this last week participants received a hyperlink by e-mail to complete the post-test.

## English

**“PP\_registration”**: video that show how to surf the inscription pages. These pages are available to everyone.

**“PP\_mod1”**: video that show how to surf the module 2 (mindfulness). The access to the module is granted by the researcher. Women were contacted by e-mail to perform the online pre-assessment on the web platform Survey Monkey (<http://surveymonkey.com>). At the end of the pre-test, they obtained access to this first module of the program.

**“PP\_mod2”**: video that show how to surf the module 2 (savoring). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a

short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“PP\_mod3”**: video that show how to surf the module 3 (connectedness and gratitude). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“PP\_mod4a”**: video that show how to surf the module 4a (optimism and meaning in life). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“PP\_mod4bandresume”**: video that show how to surf the module 4b (optimism and meaning in life) and the summary. The access to the module is granted by the researcher. At the end of this last week participants received a hyperlink by e-mail to complete the post-test.

## Italian

**“G&B\_iscrizione”**: video that show how to surf the inscription pages. These pages are available to everyone.

**“G&B\_mod1”**: video that show how to surf the module 2 (mindfulness). The access to the module is granted by the researcher. Women were contacted by e-mail to perform the online pre-assessment on the web platform Survey Monkey (<http://surveymonkey.com>). At the end of the pre-test, they obtained access to this first module of the program.

**“G&B\_mod2”**: video that show how to surf the module 2 (savoring). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“G&B\_mod3”**: video that show how to surf the module 3 (connectedness and gratitude). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“G&B\_mod4a”**: video that show how to surf the module 4a (optimism and meaning in life). The access to the module is granted by the researcher. Every week, each woman was contacted by e-mail and asked to perform a short assessment, at the end of which she could find the hyperlink to access the following module of the intervention.

**“G&B\_mod4beriepilogo”**: video that show how to surf the module 4b (optimism and meaning in life) and the summary. The access to the module is granted by the researcher. At the end of this last week participants received a hyperlink by e-mail to complete the post-test.

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## Case series study

# Effect of a web-based positive psychology intervention on prenatal well-being: A case series study

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## ABSTRACT

**Background:** Detrimental effects of women's negative feelings during pregnancy have been extensively examined and documented, but research on the influence of positive feelings and protective factors on their prenatal mental health is scarce. Evidence from the positive psychology field has shown that practicing some brief positive exercises, called positive psychology interventions, can maximize well-being by increasing positive emotions, engagement, and meaning.

**Aim:** The aim of this study is to examine the effect of a positive psychology web-based intervention on indices of women's prenatal well-being.

**Methods:** Specifically, a case series design was adopted, and data from six women are presented. Participants were involved in a 5-week online positive psychology intervention that includes a set of positive psychology interventions specifically adapted for pregnant women. Measures of women's mental well-being, depression, pregnancy-related anxiety, life satisfaction, and social support were measured at pre- and post-intervention. Compliance with the intervention and exercise preferences were assessed at post-test. Single-item related well-being measures were assessed weekly.

**Findings and discussion:** The findings of this case series study indicate potential effects of the intervention on supporting mental well-being and decreasing depressive symptomatology in these pregnant women. Furthermore, this study provides some suggestions for developing future online-based positive interventions addressed to pregnant women. However, these findings are preliminary, and future studies are needed in order to assess the effects of the intervention in a wider population of pregnant women.

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## Statement of significance

### Problem

The detrimental repercussions of negative feelings during pregnancy have been extensively examined and documented, whereas interventions aimed to support and maximize maternal prenatal well-being are scarce.

### What is already known

Recent studies suggest that positive maternal mood can buffer the effects of negative feelings and promote maternal and infant well-being. Evidence from the field of positive psychology has shown the effects of positive psychology interventions on maximizing well-being in general and depressed populations.

### What this paper adds

The findings of this case series study indicate potential effects of a novel online positive psychology intervention on supporting women's prenatal mental well-being and decreasing depressive symptomatology.

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## 1. Introduction

Pregnancy is a time of change and demands, which can impact both maternal and infant well-being. The nature, prevalence, and detrimental repercussions of negative feelings (e.g., stress, depression, anxiety) during pregnancy have been extensively examined and documented. Pregnant women are more vulnerable to developing some psychological problems such as depression,<sup>1</sup> or anxiety disorders.<sup>2</sup> Furthermore, it has been estimated that 25% of women experience prenatal stress.<sup>3</sup> Acute and chronic stressors for these women can be, for instance, worries about the baby's health and childbirth, concerns about physical changes, job-related stressors, and lack of perceived social support.<sup>4</sup> Low women's prenatal well-being is also associated with preterm childbirth, low baby weight, and even difficulties in the neurocognitive development of the fetus and emotional regulation abilities during infancy and childhood.<sup>5,6</sup> Therefore, because pregnancy is no longer considered an un-problematic period, it is essential to support and enhance mental well-being in pregnant women. This study contributes to a novel positive approach to pregnancy care, focused on the potential benefits of positive aspects (e.g. women's positive affect, positive life events) and protective factors (e.g., women's optimism, perceived social support) that can impact the course of pregnancy.

### 1.1. Positive prenatal well-being

Recent studies suggest that positive maternal mood can buffer the effects of negative feelings and promote maternal and infant well-being.<sup>4,7–10</sup> In one study of 60 pregnant women, experiencing positive life events during the prenatal period significantly predicted lower morning cortisol in late pregnancy.<sup>9</sup> Because the fetal programming hypothesis assumes that increased maternal cortisol during pregnancy can have a negative effect on fetal development, these findings indicate that prenatal positive life experiences can attenuate – or even totally buffer – the negative effects of adverse influences on pregnant women and the developing fetus.<sup>9</sup> A recent study investigated whether women's positive affect in pregnancy could be a protective factor against postpartum depression.<sup>11</sup> Results showed that positive affect (i.e. frequency of experienced positive emotions) played a protective role, whereas negative affect was a predictor of postpartum depression. Maternal positive affect was also found to be associated with length of gestation and lowered risk of preterm birth.<sup>10</sup> McManus et al.<sup>8</sup> conducted the first study to examine the association between positive feelings and feeding practices. The results showed that positive maternal feelings during pregnancy were associated with better feeding practices, and that these feeding habits were associated with fewer common childhood diseases. The primary focus of psychological research on pregnancy has been on the role of social support.<sup>3</sup> Women's perceived social support can buffer the negative effects of stress and depression.<sup>12</sup> Pregnant women who reported higher levels of social support also reported low indices of distress and uncertainty, a greater sense of control over pregnancy-related changes, and improved self-image.<sup>13</sup> Women's perceived social support has also been associated with more optimal fetal movement, decreased risk of preterm birth, a better childbirth process (i.e., reduced labor length and birth complications, more spontaneous onset of labor, and natural childbirth), and higher birth weight.<sup>14,15</sup> A growing number of studies has assessed the effect of mindfulness interventions on women's prenatal well-being. Findings from a recent systematic review indicate potential benefits of mindfulness interventions on women's well-being, especially for decreasing levels of negative affect, depression, and anxiety during pregnancy.<sup>16</sup> Nevertheless, due to the variety of

research designs, gestational characteristics, timing of evaluations, and outcome measurements, improved methodological quality is necessary to accurately examine the effects of mindfulness interventions on women's prenatal well-being.<sup>16</sup> Despite these promising findings, research on the influence of positive feelings and protective factors on women's prenatal mental health is still scarce.

Evidence from the field of positive psychology has shown that practicing some brief positive exercises, called positive psychology interventions (PPIs),<sup>17</sup> such as counting one's blessings,<sup>18,19</sup> writing gratitude journals,<sup>19</sup> or writing about one's best possible self,<sup>20</sup> can maximize individual well-being in general and depressed populations by increasing positive emotions, engagement, and meaning.<sup>18,21</sup> To the authors' knowledge, only one pilot study reported the effects of a gratitude and mindfulness intervention on women's prenatal stress, cortisol levels, and well-being indices, indicating potential direct effects of the intervention on reported stress in comparison to a treatment-as-usual control condition.<sup>7</sup>

### 1.2. Web-based intervention for prenatal mental health

In the past decade, web-based delivered interventions have been used to enhance the access to and effectiveness of traditional treatments (e.g., face-to-face treatments). Online interventions offer several potential advantages. They can overcome existing barriers, such as cost, service availability, waiting time, and transportation, and greater anonymity may encourage individuals to seek help and/or reveal more sensitive health information. Several meta-analyses have shown that web- or computer-based programs can be as effective as traditional face-to-face programs, and significantly more effective than control conditions, for a variety of mental health disorders (e.g., depression, anxiety, and adjustment disorders) and across different populations.<sup>22</sup> Indeed, a recent systematic review provides preliminary evidence that web-based interventions can be a promising and advisable form of intervention during the prenatal period.<sup>23</sup> Women can access the web contents of an intervention at no or minimal cost, and at the most convenient time and place for them. These advantages can be particularly suitable for pregnant women, taking into account the demanding schedule of coping with pregnancy and a new baby.<sup>23</sup> Furthermore, the anonymity offered by web-based interventions might help pregnant women to overcome the stigma of seeking and accessing help.<sup>23</sup> Preliminary evidence suggests that online positive psychology interventions (OPPIs) can effectively enhance well-being and reduce depressive symptoms,<sup>24</sup> but to the authors' knowledge, the effectiveness of OPPIs for pregnant women has not yet been investigated.

The aim of this study is to examine the effect of a novel positive psychology web-based intervention on indices of women's prenatal well-being. Specifically, a case series design was adopted, and data from six women are presented.

## 2. Method

### 2.1. Participants

Pregnant women (in any week of pregnancy) who decided to keep the baby, Spanish or German speaking, and with regular Internet access, were invited to participate in the study. Six pregnant women were included in this study (see [Table 1](#)).

### 2.2. Measures

Participants provided information about age, country of residence, current week of pregnancy, previous children,

**Table 1**  
Characteristics of the participants.

	P1	P2	P3	P4	P5	P6
Age	28	32	41	30	19	18
Country of residency	Austria	Spain	Spain	Spain	Germany	Germany
Week of pregnancy	29th	27th	12th	9th	29th	20th
Previous children	No	Yes	No	No	No	No
Status	In a relationship	Married	Married	Married	Separated	Separated
Psychological problems	No	No	No	No	No	No
Physical problems	No	No	No	Yes (food intolerance, migraines, irritable bowel syndrome)	No	No
Education level	High	High	High	High	High	High
Occupation	Unemployed	Unemployed	Employed	Employed	Student	Student
Planned pregnancy	Yes	Yes	Yes	Yes	No	No

P, participant.

relationship status, presence of psychological and/or physical problems, education level, occupation, and whether the pregnancy was planned or not. The following questionnaires were administered at pre- and post-intervention.

The Warwick–Edinburgh Mental Well-Being Scale (WEMWBS<sup>25</sup>) is a 14-item self-report instrument that assesses subjective well-being and psychological functioning. For each item, respondents are asked to describe their experience over a two-week reference period on a 5-point frequency scale, ranging from 1 = “none of the time” to 5 = “all of the time”. For the original WEMWBS, Cronbach's alpha was 0.89 for the student sample and 0.91 for the population sample.<sup>25</sup>

The Patient Health Questionnaire-9 (PHQ-9<sup>26</sup>) is a 9-item instrument, based on the DSM-IV diagnostic criteria, that measures depression severity. The 9 items are scored on a 4-point scale, ranging from 0 = “not at all” to 3 = “nearly every day”. Cut-off points of 5, 10, 15, and 20 represent the thresholds for mild, moderate, moderately severe, and severe depression, respectively. Previous studies have shown that the scale has good internal consistency ( $\alpha = 0.89$ ), and its validity and reliability as a diagnostic measure, as well as its utility in assessing depression severity, have been well established.<sup>26,27</sup>

The Pregnancy Related Anxiety Scale (PRAS<sup>28</sup>) is a 10-item self-report scale that evaluates the frequency or extent to which pregnant women are worried or concerned about their health, their baby's health, labor and childbirth, and caring for a newborn. Responses are given on a 4-point scale ranging from 1 = “never or not at all” to 4 = “a lot of the time or very much”. The authors report acceptable internal reliability of the scale in both English (Cronbach's  $\alpha = 0.78$ ) and Spanish (Cronbach's  $\alpha = 0.80$ ) versions.<sup>28</sup>

The Satisfaction With Life Scale (SWLS<sup>29</sup>) is 5-item self-report measure of global life satisfaction. Respondents are asked to indicate the extent to which they agree with each item on a 7-point scale ranging from 1 = “strongly disagree” to 7 = “strongly agree”. The original SWLS has high internal consistency ( $\alpha = 0.87$ ) and high test-retest reliability ( $r = 0.82$ ).<sup>29</sup>

The Multidimensional Scale of Perceived Social Support (MSPSS<sup>30</sup>) is a 12-item scale that assesses the adequacy of perceived social support from three different sources: family, friends, and significant others. Respondents are asked to report the extent of their agreement with each item on a 7-point scale ranging from 1 = “very strongly disagree” to 7 = “very strongly agree”. The reliability of the total original scale is 0.88. The three subscales also show good internal consistency. For the significant other, family, and friends subscales, the values are  $\alpha = 0.91$ ,  $\alpha = 0.87$ , and  $\alpha = 0.85$ , respectively.<sup>30</sup>

An exercise preferences questionnaire was specifically developed for this research. It is composed of four questions designed to measure the participant's opinion about each positive exercise

proposed by the program (i.e., “How many times did you actually practice the exercise during the past week?”; on a 7-point scale ranging from 1 = “not at all” to 7 = “extremely”; “How much did you enjoy the exercise?”, “How much did you benefit from the exercise?”, “How difficult was the exercise for you?”). Participants' preferences for the positive activities were assessed with four items (i.e., “Which intervention exercise is your favorite?”; “Which intervention exercise do you like least?”; “Which exercise was the most difficult to practice?”; “Which exercise was the easiest to practice?”). A single item was also included in order to assess the participant's general opinion about Positive Pregnancy (i.e. on a 5-point scale: “Would you recommend this intervention program? Why?”).

A compliance with intervention measure was developed by the research team. Participants were asked to indicate the frequency with which they engaged in each of the daily exercises (e.g., “How many times did you actually do the body scan exercise during the past week?”).

### 2.2.1. Other measures

Weekly measures related to women's well-being. This instrument was specifically developed for this research. The six items assess different factors related to women's well-being (i.e., self-confidence, self-acceptance, satisfaction with life, connectedness, perceived social support, and optimism). Every week, participants were asked to indicate the extent to which they agreed with each item on a 7-point scale ranging from 1 = “very strongly disagree” to 7 = “very strongly agree”.

### 2.3. Intervention program

“Positive Pregnancy” (in Spanish: “Embarazo y Bienestar”, in German: “In blühenden Umständen”) is a 5-week, self-applied, web-based program designed to enhance the well-being of pregnant women. The program was developed by LabPsiTec (Laboratory of psychology and technology, University of Valencia) in collaboration with the University of Twente (Netherlands). It is composed of four modules. Each module includes a brief psycho-education unit focused on a positive psychology dimension (i.e., mindfulness and self-acceptance; savoring; connectedness and social support; optimism and life satisfaction) and a positive psychology exercise, with a duration of approximately 20 min. The set of PPIs (i.e., body scan exercise, three good things in life exercise, savoring the moment exercise, connectedness exercise, best possible self exercise, baby steps exercise) has been used in previous studies with different populations.<sup>17–21</sup> In the present study, the exercises have been specifically adapted to the topic of pregnancy. Table 2 summarizes the contents of each module. Different interactive elements, such as videos, sounds, and images, are provided in order to increase engagement.



**Table 2**  
Intervention program structure.

Week	Name of module	Dimension of module	Description of exercise
1	“Mindfulness and Self-acceptance”	Mindfulness and self-acceptance	Body scan exercise <sup>31</sup> Participants are asked to listen to an audio recording that guides them to pay attention to various areas of their body and their breathing, gently observing these body parts and allowing other thoughts to recede
2	“Savoring”	Savoring	Three good things in life exercise <sup>19</sup> Participants identify three good things that went well each day and why Savoring the moment exercise <sup>19</sup> Participants take a picture of something that is beautiful or meaningful and write a short description about what they appreciate and value in it
3	“Connectedness ”	Connectedness and social support	Connectedness exercise Participants identify and draw on a graphic about their most important relationships and find an activity to do together
4	“Optimism. Part 1”	Optimism and life satisfaction	Best possible self exercise <sup>20</sup> Participants visualize and write their ideal future life in as much detail as possible
5	“Optimism. Part 2”	Optimism and life satisfaction	Baby steps exercise <sup>20</sup> Participants write a list of goals and initial steps toward achieving their best possible self

## 2.4. Procedure

The study was advertised online via social networks (e.g., Facebook, Twitter). Interested women were directed to the research website (in Spanish: <http://pospre.wixsite.com/ebinsc>, in German: <http://pospre.wixsite.com/iuanmel>), where they found further information about the study and what participation entailed. Pregnant women could request participation through the website and by signing the informed consent form. After the registration, the clinical team contacted each participant by e-mail to perform the online pre-assessment on the web platform Survey Monkey (<http://surveymonkey.com>). At the end of the evaluation, they obtained access to the first module of the program. Participants were involved in the 5-week training program. Every week, participants were contacted by e-mail and asked to perform a short assessment, at the end of which they found the hyperlink to access the following module. At the end of the last module, participants received a hyperlink by e-mail to complete the post-assessment. The training was delivered using a distance approach (i.e., web platform and e-mails). There was no face-to-face contact with the participants at any time.

## 2.5. Ethical approval

The study protocol was approved by the ethical committee of the University of Valencia.

## 3. Results

In keeping with the case-series design, data from the six women were examined individually. Patterns and trends are outlined below.

**Table 3**  
Pre-post scores of the participants on indices of mental well-being.

Dependent variables	P1		P2		P3		P4		P5		P6		Total (N=6) M(SD)	
	Pre	Pos	Pre	Pos	Pre	Pos	Pre	Pos	Pre	Pos	Pre	Pos	Pre	Post
Mental well-being (WEMWBS <sup>25</sup> )	62	60	53	52	43	50	52	45	34	44	43	53	47.8(9.8)	50.7(5.9)
Depression (PHQ-9 <sup>26</sup> )	4	1	4	3	9	7	9	3	7	6	3	0	6(2.7)	3.3(2.7)
Pregnancy related anxiety (PRAS <sup>28</sup> )	20	19	16	23	19	18	23	23	18	12	22	17	19.7(2.6)	18.7(4.1)
Satisfaction with life (SWLS <sup>29</sup> )	29	30	30	30	20	28	27	20	22	23	20	25	24.7(4.5)	27(2.8)
Perceived social support (MSPSS <sup>30</sup> )	7	7	6.9	6.5	5.3	5.8	6.7	6.1	4.1	2.3	6.3	6.6	6.1(1.1)	5.7(1.7)

P, participant; Pre, pre-assessment; Pos, post-assessment; WEMWBS, Warwick Edinburgh Mental Well-Being Scale (raw scores range: 14–70, high scores indicate higher level of mental well-being); PHQ-9, Patient Health Questionnaire-9 (raw scores ranges: 1–4 none, 5–9 mild, 10–14 moderate, 15–19 moderately severe, and 20–27 severe depression); PRAS, Pregnancy Related Anxiety Scale (raw scores range: 10–40, high scores indicate higher level of pregnancy related anxiety); SWLS, Satisfaction With Life Scale (raw scores ranges: 5–9 extremely dissatisfied, 10–14 dissatisfied, 15–19 slightly below average, 20–24 average score, 25–29 high score, 30–35 very highly satisfied); MSPSS, Multidimensional Scale of Perceived Social Support (raw scores ranges: 1–2.9 low support, 3–5 moderate support, 5.1–7 high support).

## 3.1. Mental well-being

On average, women’s mental well-being levels increased from pre- to post-intervention. Specifically, participants 3, 5, and 6 reported lower mental well-being scores at pre-assessment compared to the levels reported by other studies with the general population<sup>32</sup> ( $M=59.9$ ;  $SD=7.8$ ; range: 14–72) (see Table 3). Mental well-being scores for participants 1, 2, and 4 decreased slightly, whereas mental well-being scores for participants 3, 5 and 6 increased from baseline to end-of-program.

## 3.2. Depression

At baseline, participants’ depression scores ranged from minimum to mild. In all cases, there was a decrease in participants’ depressive symptoms from baseline to post-test. Depressive symptomatology of participants 1, 2, and 6 decreased at post-intervention, even though their initial scores were in the range corresponding to “none” depression.<sup>26</sup> Depression severity scores of participants 3 and 5 decreased at post-assessment, but they remained in the “mild” range. Specifically, the level of depression of participant 4 decreased from the “mild” to “none” depression range at post-assessment.

## 3.3. Pregnancy-related anxiety

Levels of pregnancy-related anxiety at baseline were similar to those reported in previous studies.<sup>33</sup> On average, women’s pregnancy-related anxiety decreased from pre- to post-intervention. At post-intervention, changes were observed in 2 of the 6 participants, who reported a decrease in pregnancy

anxiety. Only participant 2 reported a slight increase in her pregnancy anxiety scores at post-test.

### 3.4. Satisfaction with life and perceived social support

Overall, women's levels of satisfaction with life increased from pre- to post-intervention. The satisfaction with life score of participant 2 was high and maintained at post-assessment. SWLS score of participant 5 slightly increased, but they remained within the average level. Scores of participants 3 and 6 increased, from a high score to very high score, whereas participant 1's scores increased from high to very high score. Only participant 4's satisfaction with life score decreased from high to average. On average, women reported less perceived social support at post-assessment, compared to pre-intervention. Specifically, all participants, with the exception of participant 5, reported high levels of social support that remained stable across the 5-week intervention. However, participant 5 reported a decrease from moderate to low perceived social support at post-test.

### 3.5. Compliance with the intervention and weekly measures related to women's well-being

On average, women reported practicing the body scan and the baby steps exercise more frequently, compared to the three good things in life, savoring the moment, connectedness, and the best possible self. Overall, participants reported a preference for – in order – the baby step exercise, savoring the moment, and the best possible self, followed by the body scan, connectedness, and three good things in life (see Table 4). Regarding exercises' perceived benefits, women reported having benefitted more from – in order – the baby steps exercise, connectedness, three good things in life, savoring the moment, body scan, and the best possible self. On

average, the most difficult exercises were those in module 2 (i.e. three good things in life and savoring the moment), followed by the body scan, baby steps, best possible self, and connectedness (see Table 4). Regarding the weekly single items, on average, self-confidence, perceived social support, connectedness, and optimism decreased from pre- to post-intervention. By contrast, satisfaction with life and self-acceptance levels increased from pre- to post-assessment (see Table 5). Specifically, participant 1 reported having practiced all the exercises at least once a week. She reported high scores at pre-intervention that remained consistently high during the five-week intervention. Participant 2 also reported having practiced all the exercises in the program. Her pre-test measures of well-being were high; they fluctuated during the five weeks, but at the end of the intervention they were still high. Participant 3 reported having practiced only the body scan, connectedness, and the baby steps exercises. Specifically, participant 3 did not perform the exercises that she did not like, which were perceived as more difficult and having fewer benefits. Her self-acceptance score remained low at post-test, whereas her scores on satisfaction with life, connectedness, and optimism decreased from pre-test to post-intervention. Only the self-acceptance score increased, whereas the social support score remained high at post-test. Participant 4 did not perform the body scan exercise because she found it difficult, she did not like it, and she did not perceive benefits from it. She liked both the best possible self and baby steps exercises, but she did not perceive any benefit from performing them. Her self-confidence, self-acceptance, connectedness, and optimism scores decreased at post-test, although her life satisfaction and social support scores remained high at post-intervention. Participant 5 reported having practiced all the exercises at least twice a week. Her level of self-confidence decreased, whereas satisfaction with life increased at post-test. Her self-acceptance, perceived social support, connectedness, and

**Table 4**  
Compliance with and evaluation of the intervention exercises.

Exercise	Variable	P1	P2	P3	P4	P5	P6	Total (N = 6) M(SD)
Body scan exercise	Frequency	5	3	1	0	2	4	2.5(1.9)
	Appreciation	6	5	4	2	4	2	3.8(1.6)
	Perceived benefit	5	5	4	1	4	1	3.3(1.9)
	Perceived difficulty	4	1	5	5	4	2	3.5(1.6)
Three good things in life exercise	Frequency	1	2	0	1	3	4	1.8(1.4)
	Appreciation	2	5	1	5	4	5	3.7(1.8)
	Perceived benefit	2	5	1	5	4	5	3.7(1.8)
	Perceived difficulty	6	6	5	5	1	1	4(2.4)
Savoring the moment exercise	Frequency	1	2	0	1	3	2	1.5(1)
	Appreciation	2	5	3	5	5	4	4(1.3)
	Perceived benefit	2	5	2	5	4	2	3.3(1.5)
	Perceived difficulty	6	5	5	5	1	2	4(2.4)
Connectedness exercise	Frequency	3	2	1	0	3	2	1.8(1.2)
	Appreciation	6	5	5	1	3	3	3.8(1.8)
	Perceived benefit	7	5	5	1	3	2	3.8(1.5)
	Perceived difficulty	5	5	2	1	3	2	3(1.7)
Best possible self exercise	Frequency	3	1	0	0	4	3	1.8(1.7)
	Appreciation	5	4	2	6	4	3	4(1.4)
	Perceived benefit	6	4	2	1	3	2	3(1.8)
	Perceived difficulty	5	4	4	2	3	1	3.2(1.5)
Baby steps exercise	Frequency	3	2	1	0	3	4	2.2(1.5)
	Appreciation	5	6	4	4	3	4	4.3(1)
	Perceived benefit	5	4	5	1	3	3	4.3(1)
	Perceived difficulty	6	4	4	2	3	1	3.3(1.8)

P, participant; frequency, how many times did you actually do the exercise?; appreciation, how much did you like the exercise? (range: 1 = "not at all" to 7 = "extremely"); perceived benefit, how much did you benefit from the exercise? (range: 1 = "not at all" to 7 = "extremely"); perceived difficulty, how difficult was the exercise? (range: 1 = "not at all" to 7 = "extremely").

**Table 5**  
Weekly measures related to well-being.

Single-item well-being dimension	Time	P1	P2	P3	P4	P5	P6	Total (N=6) M(SD)
Self-confidence (range: 1–7)	T0	6	6	2	6	7	4	5.2(1.8)
	T1	6	6	3	6	3	5	4.8(1.5)
	T2	6	4	2	6	3	5	4.3(1.6)
	T3	6	5	3	6	3	5	4.7(1.4)
	T4	6	4	4	5	5	5	4.8(0.8)
T5	6	6	2	3	3	6	4.3(1.8)	
Satisfaction with life (range: 1–7)	T0	6	6	5	6	3	5	5.2(1.2)
	T1	6	6	5	6	5	6	5.7(0.5)
	T2	6	6	5	6	3	6	5.3(1.2)
	T3	6	6	5	5	3	5	5(1.1)
	T4	6	4	5	6	3	5	4.8(1.2)
T5	6	6	4	6	7	6	5.8(1)	
Self-acceptance (range: 1–7)	T0	7	6	4	6	6	3	5.3(1.5)
	T1	7	6	3	7	5	6	5.7(1.5)
	T2	6	6	6	6	7	5	6(0.6)
	T3	7	5	5	6	6	6	5.8(0.8)
	T4	7	4	5	6	6	6	5.7(1)
T5	7	6	5	5	6	5	5.7(0.8)	
Perceived social support (range: 1–7)	T0	7	7	6	6	4	7	6.2(1.2)
	T1	7	6	6	7	4	7	6.2(1.2)
	T2	7	6	6	6	5	7	6.2(0.8)
	T3	7	6	6	7	3	7	6(1.5)
	T4	7	4	6	6	3	7	5.5(1.6)
T5	7	6	6	6	4	7	6(1.1)	
Connectedness (range: 1–7)	T0	7	6	6	7	4	6	6(1.1)
	T1	6	6	5	6	4	6	5.5(0.8)
	T2	7	6	5	6	5	6	5.8(0.8)
	T3	7	6	6	5	4	6	5.7(1)
	T4	7	4	6	6	3	6	5.3(1.5)
T5	6	6	5	6	4	7	5.7(1)	
Optimism (range: 1–7)	T0	7	7	5	7	4	6	6(1.3)
	T1	7	6	6	6	4	6	5.8(1)
	T2	6	6	5	6	6	6	5.8(0.4)
	T3	6	6	4	6	3	6	5.2(1.3)
	T4	6	4	5	6	3	6	5(1.3)
T5	6	6	4	6	4	6	5.3(1)	

P, participant; T0, pre-intervention; T1, post-module 1; T2, post-module 2; T3, post-module 3; T4, post-module 4a; T5, post-intervention.

optimism scores did not vary from pre-test to post-intervention. Participant 6 also reported having practiced the exercises at least twice a week. Her self-confidence, satisfaction with life, self-acceptance, and connectedness scores increased at post-test, whereas her social support and optimism scores remained consistently high during the intervention (see Table 5).

#### 4. Discussion

This paper provides the first examination of the effects of a positive psychology web-based intervention on women's prenatal well-being. Six women completed the trial, and these primary results are promising.

##### 4.1. Women's mental well-being and depression

The level of well-being was maintained at post-intervention, except for participant 4, whose well-being decreased. Nevertheless, participant 4's level of depression decreased, and her levels of pregnancy anxiety did not increase at post-test. Regarding depression severity, all participants reported lower scores at the end of the program. These findings provide initial promising evidence about the possible positive effects of the program on reducing women's depressive symptoms during pregnancy.

##### 4.2. Pregnancy related anxiety

In general, pregnancy-related anxiety decreased, except for participants 2 and 4. Several studies indicate that pregnancy anxiety can vary during the pregnancy.<sup>33,34</sup> It tends to be highest in the first trimester, drops during the second one, and then increases during the final trimester.<sup>33,34</sup>

##### 4.3. Satisfaction with life and perceived social support

Satisfaction with life remained almost stable in three cases. Participant 4's SWLS score decrease coincides with lower mental well-being at post intervention, suggesting that this participant obtained the least benefit from the program, compared to the other participants. All participants reported high perceived social support at both baseline and post-intervention.

##### 4.4. Weekly measures of well-being and intervention use

Regarding the weekly measures of women's well-being, the scores decreased in the two women (i.e., P3 and P4) who did not perform all the program exercises, and in participant 5. We can hypothesize that low compliance with the intervention could influence the decline in well-being shown by participants 3 and 4.

This hypothesis must be verified in a future controlled study. The decrease in participant 5's self-confidence, satisfaction with life, social support, and connectedness scores could be caused by the experience of a negative event.

#### 4.5. Limitations

This study has some limitations that should be highlighted. First, findings are preliminary and cannot be generalizable to a wider population of pregnant women. Second, pregnant women were in different moments in their pregnancies, which could have affected the results somehow. In this regard, women (i.e., P1, P2, and P5) beyond their first trimester of pregnancy obtained the greatest benefits from the program. Future research should examine the potential moderator role of the gestation trimester. Other moderators, such as age, status, and level of education, should also be analyzed.<sup>33,34</sup>

#### 4.6. Future directions

Future studies should include a control condition (e.g., waiting-list condition) and a follow-up evaluation in order to investigate whether the effects of the intervention can be maintained over time. The limitations of this study would be solved by implementing the program in a large-scale study with an experimental controlled design. Future interventions should also allow the intervention to be personalized, so that participants can choose from a set of positive activities. The personalization of the intervention could increase compliance and, therefore, produce a stronger positive impact on women's well-being during pregnancy.

### 5. Conclusion

Despite these limitations, to the best of our knowledge, this is the first study to show the preliminary results of a web-based positive psychology intervention for pregnant women. Our preliminary results tend to show that this intervention can support women's well-being and decrease depression during pregnancy. Moreover, this study also provides some indications that can be taken into consideration in the design of future online-based positive interventions. This study contributes to a novel line of studies that investigate the potential benefits of positive aspects (e.g. positive emotions, positive life events) and protective factors (e.g., optimism, perceived social support) on the course of the pregnancy. Nevertheless, these findings are preliminary, and future controlled studies are needed in order to assess the effects of the intervention in a wider population of pregnant women.

#### Ethical statement

*Name of the ethics committee:* Comité Ético de Investigación en Humanos de la Comisión de Ética en Investigación Experimental de la Universitat de València.

*Approval number:* H1429002403332.

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#### References

1. Zuckerman B, Bauchner H, Parker S, Cabral H. Maternal depressive symptoms during pregnancy, and newborn irritability. *J Dev Behav Pediatr* 1990;**11**(4):190–4.
2. Buist A, Gotman N, Yonkers KA. Generalized anxiety disorder: course and risk factors in pregnancy. *J Affect Disord* 2011;**131**(1):277–83.
3. Dunkel-Schetter C. Psychological science on pregnancy: stress processes, biopsychosocial models, and emerging research issues. *Annu Rev Psychol* 2011;**62**:531–58.
4. O'Leary K. *The effect of positive psychological interventions on psychological and physical well-being during pregnancy*. DCLinPsych thesis. Cork (Ireland): University College Cork; 2015.
5. Entringer S, Buss C, Shirtcliff EA, Cammack AL, Yim IS, Chic-DeMet A, et al. Attenuation of maternal psychophysiological stress responses and the maternal cortisol awakening response over the course of human pregnancy. *Stress* 2010;**13**(3):258–68.
6. Huizink AC, Robles de Medina PG, Mulder EJ, Visser GH, Buitelaar JK. Stress during pregnancy is associated with developmental outcome in infancy. *J Child Psychol Psychiatry* 2003;**44**(6):810–8.
7. Matvienko-Sikar K, Dockray S. Effects of a novel positive psychological intervention on prenatal stress and well-being: a pilot randomized controlled trial. *Women Birth* 2016;**30**: pp. 111–e118.
8. McManus MA, Khalessi AA, Lin J, Ashraf J, Reich SM. Positive feelings during pregnancy, early feeding practices, and infant health. *Pediatr Int* 2016;**59**:593–9.
9. Pluess M, Wurmsler H, Buske-Kirschbaum A, Papousek M, Pirke KM, Hellhammer D, et al. Positive life events predict salivary cortisol in pregnant women. *Psychoneuroendocrinology* 2012;**37**(8):1336–40.
10. Voellmin A, Entringer S, Moog N, Wadhwa PD, Buss C. Maternal positive affect over the course of pregnancy is associated with the length of gestation and reduced risk of preterm delivery. *J Psychosom Res* 2013;**75**(4):336–40.
11. Bos SC, Macedo A, Marques M, Pereira AT, Maia BR, Soares MJ, et al. Is positive affect in pregnancy protective of postpartum depression? *Rev Bras Psiquiatr* 2013;**35**(1):5–12.
12. Collins NL, Dunkel Schetter C, Lobel M, Scrimshaw SC. Social support in pregnancy: psychosocial correlates of birth outcomes and postpartum depression. *J Pers Soc Psychol* 1993;**65**(6):1243.
13. Giurgescu C, Penckofer S, Maurer MC, Bryant FB. Impact of uncertainty: social support, and prenatal coping on the psychological well-being of high-risk pregnant women. *Nurs Res* 2006;**55**(5):356–65.
14. Dejin-Karlsson E, Hanson BS, Östergren PO, Lindgren A, Sjöberg NO, Marsal K. Association of a lack of psychosocial resources and the risk of giving birth to small for gestational age infants: a stress hypothesis. *BJOG* 2000;**107**(1):89–100.
15. Feldman PJ, Dunkel Schetter C, Sandman CA, Wadhwa PD. Maternal social support predicts birth weight and fetal growth in human pregnancy. *Psychosom Med* 2000;**62**(5):715–25.
16. Matvienko-Sikar K, Lee L, Murphy G, Murphy L. The effects of mindfulness interventions on prenatal well-being: a systematic review. *Psychol Health* 2016;**31**(12):1415–34.
17. Seligman ME, Steen TA, Park N, Peterson C. Positive psychology progress: empirical validation of interventions. *Am Psychol* 2005;**60**(5):410.
18. Lyubomirsky S, Layous K. How do simple positive activities increase well-being? *Curr Dir Psychol Sci* 2013;**22**(1):57–62.
19. Schueller SM, Parks AC. The science of self-help. *Eur Psychol* 2014;**19**(2):145–55.
20. Layous K, Nelson SK, Lyubomirsky S. What is the optimal way to deliver a positive activity intervention? The case of writing about one's best possible selves. *JHS* 2013;**14**(2):635–54.
21. Bolier L, Haverman M, Westerhof GJ, Riper H, Smit F, Bohlmeijer E. Positive psychology interventions: a meta-analysis of randomized controlled studies. *BMC Public Health* 2013;**13**(1):1.
22. Andrews G, Cuijpers P, Craske MG, McEvoy P, Titov N. Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: a meta-analysis. *PLoS One* 2010;**5**(10):e13196.
23. Ashford MT, Olander EK, Ayers S. Computer- or web-based interventions for perinatal mental health: a systematic review. *J Affect Disord* 2016;**197**:134–46.
24. Bolier L, Abello KM. Online positive psychological interventions: state of the art and future directions. In: Parks AC, Schueller SM, editors. *The Wiley Blackwell handbook of positive psychological interventions*. Chichester, UK: John Wiley & Sons, Ltd.; 2014. p. 286–309.
25. Tennant R, Hiller L, Fishwick R, Platt S, Joseph S, Weich S. The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. *Health Qual Life Outcomes* 2007;**5**(1):63.
26. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr Ann* 2002;**32**(9):509–15.
27. Huang FY, Chung H, Kroenke K, Delucchi KL, Spitz RL. Using the patient health questionnaire-9 to measure depression among racially and ethnically diverse primary care patients. *J Gen Intern Med* 2006;**21**(6):547–52.
28. Rini CK, Dunkel-Schetter C, Wadhwa PD, Sandman CA. Psychological adaptation and birth outcomes: the role of personal resources, stress, and sociocultural context in pregnancy. *Health Psychol* 1999;**18**(4):333.
29. Diener ED, Emmons RA, Larsen RJ, Griffin S. The satisfaction with life scale. *J Pers Assess* 1985;**49**(1):71–5.
30. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *J Pers Assess* 1988;**52**(1):30–41.

31. Williams M, Penman D. *Mindfulness: a practical guide to finding peace in a frantic world*. UK: Hachette; 2011.
32. Castellví P, Forero CG, Codony M, Vilagut G, Brugulat P, Medina A, et al. The Spanish version of the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) is valid for use in the general population. *Qual Life Res* 2014;**23**(3):857–68.
33. Schetter CD, Tanner L. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Curr Opin Psychiatry* 2012;**25**(2):141.
34. Guardino CM, Schetter CD. Understanding pregnancy anxiety: concepts, correlates, and consequences. *Zero Three* 2014;**34**(4):12–21.



# Assessing future expectations and the two-dimensional model of affect in an Italian population



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## ABSTRACT

Future-directed thinking has been described as part of two underlying systems that integrate dimensions of affect, motivational systems, orientation to the future, and future expectations, which are initiated at the cognitive, affective, biological, behavioral, and motivational levels. The main aim of the present study is to test the two underlying frameworks model and explore future expectations in a general Italian-speaking population (N=345). Therefore, the second aim of the present paper is to confirm the factorial structure of the Subjective Probability Task (SPT; MacLeod et al., 1996), a questionnaire designed to assess specific positive and negative orientations towards the future. Results showed that the SPT has good psychometric properties and it is a reliable instrument to assess future-directed thinking. Moreover, our findings confirmed the role of future expectancies as cognitive correlates of depression and anxiety. Differently from previous studies (Clark and Watson, 1991; MacLeod et al., 1996), our results did not confirm that depression was characterized by low positive affect. We believe this paper contributes to the understanding of future expectancies and their relation with anxiety and depression, and will help to expand the availability of an instrument to assess future directed thinking.

## 1. Introduction

Thinking about the future is a central component of human cognition. It involves the ability to project the self forward in time in order to pre-experience an event (Atance and O'Neill, 2001). Many studies have demonstrated the relationship between future-related thinking and well-being. For instance, previous research has shown that patterns of positive future-directed thinking, such as hope and optimism, are linked to reported higher quality of life and life satisfaction (Scheier et al., 1989), less distress (e.g. Brissette et al., 2002), more adaptive behaviors, and overall higher well-being (Carver et al., 2010). By contrast, patterns of negative future-directed thinking, as in the case of hopelessness and pessimism, are associated with maladaptive behaviors, such as alcohol (O'hannessian et al., 1994) and substance abuse (Park et al., 1997), less persistence facing life's challenges, more avoidance coping, and poor health (Carver et al., 2010; Snyder et al., 1991). Moreover, reduced anticipation of future positive events is a defining characteristic of depression, whereas anxiety is characterized by an increase in the number of perceived negative future events (Balsamo et al., 2013; Bjärehed et al., 2010; Rief

et al., 2015). Besides, expectancies have been considered a core feature of mental disorders and for that reason a focal objective of treatment (Rief et al., 2015).

In their study, MacLeod et al. (1996) tested a new model of affect. They explored if the positive and negative future expectancies could be included in the tripartite model of Clark and Watson (1991). The tripartite model of anxiety and depression proposed by Clark and Watson (1991) theorizes three main factors: negative affect (NA), positive affect (PA), and arousal. According to this model, both anxiety and depression are characterized by a higher NA component; however, only depression consisting of low PA and anxiety is uniquely characterized by hyperarousal (Clark and Watson, 1991; Miloyan et al., 2014). With an exploratory factor analysis (EFA), MacLeod et al. (1996) tested a model composed by two factors: the first one characterized by anxiety, depression, NA, and expectancies for future negative events; the second factor dominated by depression (negative loading), PA (positive loading), and expectancies for future positive events. Therefore, MacLeod et al. (1996) described future-directed thinking as part of two underlying systems that integrate dimensions of affect, motivational systems, orientation to the future, and future

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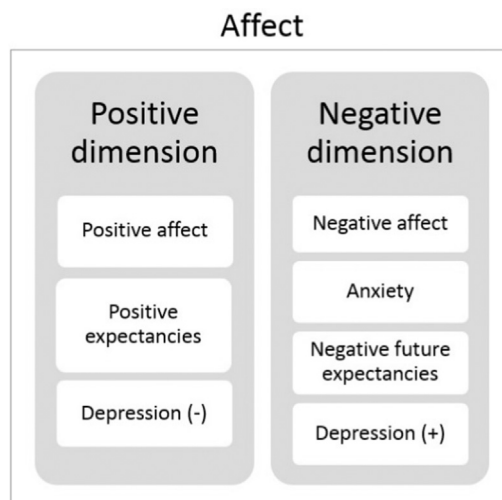
E-mail addresses: [guadalupemolinari@gmail.com](mailto:guadalupemolinari@gmail.com), [giulia.me.corno@gmail.com](mailto:giulia.me.corno@gmail.com) (G. Corno).

expectations, which are initiated at the cognitive, affective, biological, behavioral, and motivational levels.

Regarding affect, PA and NA have been described as two orthogonal dimensions (Clark and Watson, 1991; MacLeod et al., 1996). PA refers to pleasurable engagement and reflects the extent to which one feels enthusiastic, active and alert. NA instead refers to unpleasant engagement and reflects the extent to which one feels angry, disgusted or afraid. Both PA and NA have also been used to conceptualize anxiety and depression. Anxiety and depression are characterized by a higher NA component, whether only depression is distinguished of low PA, and anxiety is singularly characterized by hyperarousal (Clark and Watson, 1991; Miloyan et al., 2014). Referring to the motivational level, previous studies (e.g. Fowles, 1988) have shown the distinction between a punishment-driven, aversive motivational system and a reward-driven, appetitive motivational system. Specifically, McNaughton (1982) referred to the former as the behavioral inhibition system, which is linked to aversive outcomes (i.e. punishment or frustrated non-reward) and inhibits ongoing behavior when an aversive outcome is perceived as likely. By contrast, the appetitive motivational system has been called the behavioral activation system or behavioral approach system. The behavioral approach system mediates responses to signs of desirable outcomes (i.e. relieving non-punishment or reward) and initiates approach behavior when such outcomes are perceived as probable (e.g. Fowles, 1988; Gray, 1987). Regarding future-oriented cognitive processes, they have been associated with emotional disturbances (Beck et al., 1987). Anxiety and depression are similarly associated with an increased tendency to anticipate the occurrence of negative events, and an increased tendency to believe that future events will yield negative outcomes (MacLeod et al., 1996; Miranda and Mennin, 2007). For instance, hopelessness has been described as the typical orientation to the future found in depression (Beck et al., 1988; MacLeod et al., 1996), whereas worry and negative bias for future personal (i.e., related to the self), but not for impersonal (i.e., other-oriented), events has been described as a characteristic of anxiety (Barlow, 2000; Butler and Mathews, 1987; MacLeod et al., 1996; Molina and Borkovec, 1994). Moreover, mood-disturbed individuals have been found to overestimate the probability of negative events (e.g. Andersen et al., 1992) and sometimes underestimate the probability of positive events (e.g. Pyszczynski et al., 1987).

To assess future-directed thinking, MacLeod et al. (1996) developed the Subjective Probability Task (SPT), a questionnaire designed to measure the tendency toward specific positive and negative future expectancies (e.g. Meevissen et al., 2011; Peters et al., 2010). Different variations and adaptations of the SPT have been used in research (e.g. Boselie et al., 2014; Hanssen et al., 2013; Stöber, 2000). The original authors developed a revised version by increasing the number of positive items (from 10 to 14) and reducing the number of negative items (from 20 to 16). Nevertheless, this change did not produce significant improvements. The original version of the SPT has been validated in English-speaking samples mostly composed by students (MacLeod et al., 1996; Meevissen et al., 2011; Peters et al., 2010).

The main aim of this study is to test the model with two underlying cognitive-affective frameworks (e.g. Clark et al., 1994; Fowles, 1988; Gray, 1987; MacLeod et al., 1996; McNaughton, 1982), in an Italian-speaking general population. To achieve this objective, we translate and assess the factorial structure and psychometric properties of the Italian SPT, a measure of future expectations, and we test the correlations between this measure and the other components of the two underlying systems (i.e. depression, anxiety, and positive and negative affect). We hypothesize that the Italian version of the SPT will present a two-factor structure and good internal consistency, like the previous version (MacLeod et al., 1996). The second objective is to test with a confirmatory factor analysis (CFA) the structure of the two-framework model, which includes future-related thinking, affect, anxiety, and depression. Based on previous outcomes (MacLeod et al., 1996), we hypothesize that analyses will reveal a two-factor structure with one



**Fig. 1.** Two underlying systems that integrate dimensions of affect, motivational systems, orientation to the future, and future expectations (MacLeod et al., 1996).

factor dominated by anxiety, depression, NA, and expectancies for future negative events, and the second factor dominated by depression (negative loading), and a positive loading of PA, and expectancies for future positive events (Fig. 1).

## 2. Methods

### 2.1. Participants

The sample was composed of 345 participants who voluntarily took part in the present study. The sample was composed of 34.8% (n=120) men and 65.2% (n=225) women. The participant average age was 33.5 years (SD=12.20.; range: 18–80 years old). Specifically, 63.9% of subjects were between 18 and 30 years old, 11.4% between 31 and 40, 13.2% between 41 and 50, 10.5% between 51 and 60, and 1% more than 60 years old. All participants were native Italian speakers. Regarding education, 2.6% (n=9) had completed middle school, 20.3% (n=70) had finished high school, and 77.1% (n=266) reported a university level of education. Of 250 participants who filled-out the BDI-II, 21 (8.4%) reported a moderate level of depression, and 9 (3.6%) moderate–severe depression. Mean score on the BDI was  $9.61 \pm 7.70$  (range: 1–39). Of 256 subjects who completed the STAI-Y trait, 102 (39.84%) scored more than 40. Mean score on the STAI-Y trait was  $43.65 \pm 9.26$  (range: 26–72).

### 2.2. Italian translation of the SPT

Permission to translate and validate the SPT was granted by the authors of the instrument (MacLeod et al., 1996). First, a native Italian speaker who was aware of the purpose of the SPT translated the items from English to Italian. Second, an Italian-English bilingual speaker who was not familiar with the SPT performed a back-translation from Italian to English. The two English versions were compared and any discrepancies were detected. Therefore, the Italian version of the SPT was judged to be an accurate translation of the English version.

### 2.3. Measures

#### 2.3.1. Positive and Negative affect

Affect was assessed with a widely used scale, the Positive and Negative Affect Scale (PANAS; Watson et al., 1988), which consists of two subscales, one measuring PA and the other measuring NA. Each subscale contains 10 items, scored on a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). The Italian validated

version of the PANAS was used in this study (Terraciano et al., 2003). The internal consistency coefficients found for the PANAS subscales in the present study were  $\alpha=0.91$  for NA and  $\alpha=0.90$  for PA.

### 2.3.2. Depression

Depression was assessed with the Beck Depression Inventory-II (BDI-II; Beck et al., 1996). This self-report instrument is a 21-item scale. Each item is rated on a 4-point scale (0–3). Analyzing the psychometric properties and the factor structure of the BDI-II in both analogue and clinical populations, Beck et al. (1996) found that it has good internal consistency ( $\alpha$ 's of 0.92 and 0.93, respectively) and 1-week test–retest reliability ( $r=0.93$ ). It has been found to be a valid indicator of depression with good diagnostic discrimination (Dozois et al., 1998). The Italian version of the BDI-II has been validated by Ghisi et al. (2006), which shown a satisfying internal validity (from  $\alpha=0.76$  to  $\alpha=0.87$ ) (Balsamo and Saggino, 2007). The internal consistency coefficient for the Italian version of the BDI-II in the present study was  $\alpha=0.89$ .

### 2.3.3. Anxiety

Anxiety was assessed using one of the most popular measures: the Spielberger State-Trait Anxiety Inventory- Form Y (STAI-Y; Spielberger, 1973, 2010). It consists of a brief self-report questionnaire designed to measure and differentiate between trait (a stable personality trait) and state (a temporary and fluctuating condition) anxiety. The STAI-Y consists of two subscales with 20 items each. It is a reliable and sensitive measure of anxiety ( $\alpha=0.90$  for trait scale,  $\alpha=0.93$  for state scale) (Bados et al., 2010; Barnes et al., 2002; Gros et al., 2008; Spielberger et al., 1970). In this study, the validated Italian version of the STAI-Y trait was used (Pedrabissi and Santinello, 1989), which have shown a good internal validity ( $\alpha$  between 0.85 and 0.90) (Balsamo et al., 2013). The internal consistency coefficients found for the Italian version of the STAY-Y trait in the present study was  $\alpha=0.89$ .

### 2.3.4. Future expectancies

Future-directed expectancies have been assessed through the Subjective Probability Task (SPT; MacLeod et al., 1996), composed of 30 items rated on a 7-point Likert scale. The participant has to estimate the probability of each item happening to him/her in the future, from 1 (“not at all likely to occur”) to 7 (“extremely likely to occur”). The SPT has two subscales: one with 20 items referring to negative expectancies, and the other with 10 items referring to positive expectancies. An independent subtotal for each subscale has to be calculated. The negative expectancies subtotal score ranges from a minimum of 20 to a maximum of 140, while the positive expectancies subtotal score ranges from a minimum of 10 to a maximum of 70. The authors of the original version of the SPT reported that the scale has good internal consistency ( $\alpha=0.90$  for the negative subscale and  $\alpha=0.86$  for the positive subscale). The two subscales also showed good discriminant validity (MacLeod et al., 1996). The internal consistency coefficients found for the Italian version of the SPT subscales in the present study were 0.92 and 0.85 for negative and positive expectancies, respectively.

### 2.4. Procedure

Participants were recruited through e-mail, social networks, and word of mouth. The survey was carried out using the Survey Monkey web platform. Demographic data (i.e. gender, age, education level, nationality, and country of residence) were collected. The translated version of the SPT and the Italian validated versions of the STAY-Y trait, BDI-II, and PANAS were administered, in that order. It was possible to answer to the survey in approximately 30 min.

### 2.5. Data analysis

Internal consistency of the Italian SPT subscales was assessed using

Cronbach's  $\alpha$  coefficient. This coefficient ranges from 0 to 1, with higher values corresponding to better reliability. The analysis assesses the correlation of each item with the subscale, as well as the change in the Cronbach's  $\alpha$  coefficient if an item was excluded. Criterion validity of the Italian SPT was examined by calculating the correlation of each subscale with measures of affect, depression, and anxiety. The discriminant validity of the SPT subscales was tested by calculating item-total correlations for the positive and negative items. Construct validity of the model composed of two affect dimensions (one factor dominated by anxiety, depression, NA and expectancies for future negative events, and the second factor dominated by depression [negative loading], PA [positive loading], and expectancies for future positive events) was estimated with two confirmatory factor analyses (CFA), using the EQS program, version 6.1. First, we tested a model composed by one factor dominated by anxiety, depression, NA and expectancies for future negative events, and the second factor dominated by PA and expectancies for future positive events. Then, we tested another model with one factor dominated by anxiety, NA and expectancies for future negative events, and the second factor dominated by depression (negative loading), PA (positive loading), and expectancies for future positive events.

## 3. Results

Table 1 shows the means and standard deviations of all the measures included in the study. T tests were conducted and no significant differences related to age level were found.

### 3.1. Confirmatory factor analysis of the SPT

Initially, the factorability of the SPT items was examined. The assessment of the distribution of data showed that our data were not characterized by a normal distribution (Skewness range:  $-0.489$  to  $2.487$ ; Kurtosis range:  $-0.923$  to  $7.772$ ).

A CFA with the Robust Maximum Likelihood estimation method was used to test the Italian version of the SPT. First, a one-factor model (Model 1) was fit to the data to serve as a baseline and identify salient sources of error. This model did not fit the data well (see Table 2). Second, a model containing two correlated first-order factors of the SPT was tested. This latter model agrees with the original version of the questionnaire (MacLeod et al., 1996) (see Table 2). The fit indexes indicated that the two-factor structure of the Italian version of the SPT

**Table 1**  
Descriptive statistics for all the measures described above.

	Men M (SD)	Women M (SD)	Total M (SD)	Range	t	d
SPT-NE	52.26 (17.51)	55.17 (18.53)	54.12 (18.28)	13–140	-1.22	-0.16
SPT-PE	47.71 (10.39)	44.38 (9.52)	46.62 (9.29)	2–70	0.264	0.034
PANAS-N	16.86 (6.54)	21.78 (8.07)	20.30 (7.93)	5–45	-4.48**	-0.64
PANAS-P	29.72 (6.97)	27.22 (6.83)	31.20 (7.59)	5–48	2.60	0.36
STAY-Y (t)	39.82 (7.62)	45.30 (9.42)	43.61 (10.32)	26–72	-4.51**	-0.61
BDI-II	6.52 (6.14)	10.93 (18.53)	9.57 (7.70)	1–39	-4.2**	-0.59

Note. M=Mean; SD=Standard deviation.

\*  $p < 0.05$ ; Cohen (1988) defines  $d=0.2$  as a “small” effect size,  $d=0.5$  as “medium,” and  $d=0.8$  as “large” effect size; SPT-NE=Subjective Probability Task–Negative Expectancies; SPT-PE=Subjective Probability Task–Positive Expectancies; PANAS-N=Positive and Negative Affect Schedule–Negative Affect; PANAS-P=Positive and Negative Affect Schedule–Positive Affect; STAY-Y (t)=State-Trait Anxiety Inventory-Form Y (trait); BDI-II=Beck Depression Inventory-II.

\*\*  $p < 0.001$ .



**Table 2**

Confirmatory factor analysis of the Italian version of the Subjective Probability Task (n=345).

	CFI	RMSEA	90% CI RMSEA	sbX <sup>2</sup>	df	p
<b>Model 1</b>	0.818	0.122	(0.116, 0.127)	1944.8543	405	< 0.001
<b>Model 2</b>	0.942	0.069	(0.063, 0.075)	896.0034	404	< 0.001

Note. CFI &gt; 0.90; RMSE &lt; 0.08.

**Table 3**

Factor loadings of the items for the Italian Subjective Probability Task (N=345).

	Factor	
	1 (NE)	2 (PE)
Item 1	0.502	
Item 2		0.536
Item 3	0.432	
Item 4	0.602	
Item 5	0.473	
Item 6		0.709
Item 7		0.700
Item 8	0.565	
Item 9		0.673
Item 10	0.595	
Item 11	0.602	
Item 12	0.541	
Item 13	0.737	
Item 14		0.540
Item 15	0.647	
Item 16		0.606
Item 17		0.493
Item 18	0.710	
Item 19		0.548
Item 20	0.754	
Item 21	0.628	
Item 22	0.700	
Item 23	0.459	
Item 24	0.559	
Item 25	0.634	
Item 26		0.559
Item 27	0.687	
Item 28	0.727	
Item 29		0.485
Item 30	0.599	

Note. NE=Negative expectancies; PE=Positive expectancies; loadings factors &gt; 0.40.

was a better representation than the one-factor model. As Table 3 shows, all factor loadings were above 0.40.

### 3.2. Reliability: internal consistency

The internal consistency coefficients of the two subscales of the SPT were excellent (for negative expectancies  $\alpha=0.92$ , and for positive expectancies  $\alpha=0.85$ ). These results are similar to those reported by other authors (MacLeod et al., 1996; Meevissen et al., 2011; Peters et al., 2010).

### 3.3. Correlation analyses

Correlation coefficients are presented in Table 4. All correlations were significant at  $p < 0.01$ . Measures of negative affect, anxiety, and depression correlated positively with the negative expectancies subscale and negatively with the positive expectancies subscale, while positive affect correlated negatively with the negative expectancies subscale and positively with the positive expectancies subscale. The two SPT subscales were negatively correlated ( $p=-0.20$ ).

### 3.4. Confirmatory factor analysis of the two affective systems

The factorability of the model (MacLeod et al., 1996) composed of two affect dimensions (one factor dominated by anxiety, depression, NA and expectancies for future negative events, and the second factor dominated by depression-negative loading, PA and expectancies for future positive events) was estimated by confirmatory factor analysis (CFA). The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy showed that the factor model was appropriate (0.800). Additionally, Bartlett's test of sphericity was significant ( $\chi^2(15)=776.821$ ;  $p < 0.00$ ), revealing the data's suitability for a CFA. Two models containing two correlated first-order factors were tested. Model 1 agrees with the EFA results of MacLeod et al. (1996) in terms of one factor dominated by anxiety, depression, NA and expectancies for future negative events, and the second factor dominated by PA and expectancies for future positive events. The fit indexes support the two-factor structure of the model. Although almost all of the indexes show adequate fit, it should be noted that the RMSEA value is not adequate, as it is  $> 0.08$  (see Table 5). As Table 6 shows, all factor loadings were excellent and above 0.65. In Model 2, we tested the model sustained by Clark and Watson and by the EFA results of MacLeod et al., according to which depression loads in the positive affect dimension. This model does not present an adequate fit (CFI and GFI < 0.90; RMSEA > 0.08) (see Table 5).

## 4. Discussion

The main aim of this study was to test the model with two underlying cognitive-affective frameworks, theorized and demonstrated by different authors (e.g. Clark et al., 1994; Fowles, 1988; Gray, 1987; MacLeod et al., 1996; McNaughton, 1982), in an Italian-speaking general population. In order to achieve this objective, we translated and assessed the factorial structure and psychometric properties of the Italian SPT, a measure of future expectations. In addition, we tested the correlations between this measure and the other components of the two underlying systems (i.e. depression, anxiety, and positive and negative affect).

We hypothesized that the Italian version of the SPT would present the same factor structure, psychometric characteristics, and good internal consistency as the previous version (MacLeod et al., 1996). Our findings showed that the Italian version of the SPT has good internal consistency, all items loaded in the same factor structure as the original version, and the two subscales were negatively correlated, as reported in previous versions of the questionnaire.

Moreover, the CFA showed that the factors were accurate representations of the two original subscales of the SPT: negative expectancies- NE (F1), and positive expectancies -PE (F2). Our findings also confirmed the negative correlations between the two subscales reported in the original version.

Our second hypothesis, confirm a two-factor structure with one factor dominated by anxiety, depression, NA, and expectancies for future negative events, and the second factor dominated by depression (negative loading), and a positive loading of PA, and expectancies for future positive events, has been partially confirmed. The CFA with measures of depression, anxiety, and positive and negative affect partially confirmed the model proposed by the authors (Clark and Watson, 1991; MacLeod et al., 1996) for the two cognitive-affective-motivational systems. Our results confirmed the features of the negative factor proposed by MacLeod et al. (1996), whether the positive factor has not been confirmed by our results. In the original study conducted by MacLeod et al. (1996) with a student sample, both anxiety and depression have been associated with the negative affect system, while only depression has been associated with the positive affect system. This is in line with the tripartite model proposed by Clark and Watson (1991) that posits that anxiety and depression share a common component of negative affect, but can be differentiated by low

**Table 4**

Correlations between the Italian Subjective Probability Task and measures of affect, anxiety, and depression (n =345).

	SPT–NE	SPT–PE	PANAS–N	PANAS–P	STAY–Y (t)	BDI–II
SPT–NE	–					
SPT–PE	–0.16	–				
PANAS–N	0.54	–0.32	–			
PANAS–P	–0.28	0.63	–0.33	–		
STAY–Y (t)	0.55	–0.44	0.71	–0.50	–	
BDI–II	0.49	–0.37	0.67	–0.51	0.68	–

Note. Correlations are significant at  $p < 0.01$ . SPT–NE=Subjective Probability Task–Negative Expectancies; SPT–PE=Subjective Probability Task–Positive Expectancies; PANAS–N=Positive and Negative Affect Schedule–Negative Affect; PANAS–P=Positive and Negative Affect Schedule–Positive Affect; STAY–Y (t)=State-Trait Anxiety Inventory- Form Y (trait); BDI–II=Beck Depression Inventory–II.

**Table 5**

Confirmatory Factor Analysis of the two cognitive-affective dimension models (n=345).

	CFI	GFI	RMR	RMSEA	90% CI RMSEA	sbX <sup>2</sup>	df	p
Model 1	0.960	0.954	0.042	0.107	(0.068, 0.148)	30.2367	8	< 0.001
Model 2	0.876	0.857	0.093	0.192	(0.154, 0.230)	79.7507	8	< 0.001

Note. CFI > 0.90; RMSEA < 0.08.

**Table 6**

Factor loadings of the CFA of measures in the two affective system model.

	Factor	
	1 (NA)	2 (PA)
SPT–PE		<b>0.767</b>
SPT–NE	<b>0.652</b>	
PANAS–P		<b>0.896</b>
PANAS–N	<b>0.835</b>	
BDI–II	<b>0.834</b>	
STAY–Y (t)	<b>0.877</b>	

Note. Factor loadings of 0.30 or above are shown in bold. SPT–PE=Subjective Probability Task–Positive Expectancies; SPT–NE=Subjective Probability Task–Negative Expectancies; PANAS–P=Positive and Negative Affect Schedule–Positive Affect; PANAS–N=Positive and Negative Affect Schedule–Negative Affect; BDI–II=Beck Depression Inventory–II; STAY–Y (t)=State-Trait Anxiety Inventory- Form Y (trait).

positive affect associated with depression and high physiological hyperarousal associated with anxiety (Anderson and Hope, 2009). Although this theoretical background suggests that depression is also characterized by reduced activation of the motivational system that mediates PA, approach behavior, hope, and expectancies of positive outcomes, our findings did not confirm this perspective. Evaluations of the tripartite model have had varying results, possibly due to methodological and sampling differences (Anderson and Hope, 2009). We can hypothesize that the different result could be attributed to other factors. First, anxiety and depression are difficult to discriminate in community samples with available measures but are more easily differentiated as symptomatology reaches diagnosable levels (Cummings et al., 2014). Second, our sample was taken from the general population with low scores on depression and high positive affect. Furthermore, another significant difference is the type of analyses conducted. We performed a CFA instead of an EFA. Exploratory factor analysis is not designed to test hypotheses or theories; it is used to explore a data set. On the contrary, confirmatory factor analysis allow researchers to test hypotheses via inferential techniques, and can provide more informative analytic options. Lastly, the scale used to measure depression in the original study differed from

the one used in the present study. In one of their two studies, MacLeod et al. (1996) evaluated depression and anxiety with a self-report scale specifically designed for the study, and in the second study they included the Hospital Anxiety and Depression scale (HADS; Zigmond and Snaith, 1983). Therefore, future studies should clarify whether depression is characterized by both an increase in negative expectancies for the future and a decrease in positive expectancies, or only by the latter, using different scales to measure depression. Regarding the high root mean square error of approximation (RMSEA=0.107) reported by the CFA of the two-affect dimension model, it could be explained by the sample size. In fact, as Chen et al. (2008) suggested, the widely adopted cutoff value of 0.05 for this index rejects too many valid models in small sample sizes ( $n \leq 100$ ), while performing better in larger sample sizes (although it tends to over-accept at  $n \geq 800$ ). Nevertheless, future studies should be carried out to verify our findings.

These findings about the role of future expectancies could represent a target for psychological interventions aimed to prevent depression and anxiety symptomatology. In fact, recent studies involving exercises that promote positive future thinking (e.g. best possible self; Peters et al., 2010; MacLeod et al., 2008) show that these pathway thinking can effectively increase positive affect and reduce depression, negative affect, and dysfunctional attitudes (Renner et al., 2014). Therefore, the SPT questionnaire represents a valid instrument that can assess the effectiveness of psychological interventions aimed to establish the casual relationship between optimism and various cognitive behavioral and affective correlates (Meevissen et al., 2011).

This study presents some limitations. First, it involved only the general population, whereas it would be interesting to use a clinical sample as well. Second, the present study is characterized by the lack of a test-retest reliability analysis for the Italian version of the SPT. In order to overcome this limitation, additional studies are needed to determine whether the Italian version of the SPT is a reliable instrument over time. Third, it would be interesting to analyze the role of other variables, such as worry and hopelessness, in the two underlying systems identified by the original authors, in a general and/or clinical Italian population.

There are different and, sometimes, contradictory approaches in the literature about models of affect (e.g. Denollet and De Vries, 2006). Therefore, further studies are recommended in order to investigate more about this thematic. The present study generated new findings that can feed the debate on the characterization of a model of affect. Moreover, since psychology has become an international science (Alonso-Arbiol and van de Vijver, 2010; Ziegler and Bensch, 2013), it is necessary to guarantee the comparability of the method of assessment used in order to be able to compare findings of researches in different languages (Ziegler and Bensch, 2013). Therefore, the present validation of the SPT in an Italian-speaking population will help to expand the availability of this instrument beyond the English- and Spanish-speaking world, creating new opportunities to conduct research with the Italian population.

## References

- Alonso-Arbiol, I., van de Vijver, F.J.R., 2010. A historical analysis of the European Journal of Psychological Assessment. *Eur. J. Psychol. Assess.* 26, 238–247.
- Andersen, S.M., Spielman, L.A., Bargh, J.A., 1992. Future-event schemas and certainty about the future: automaticity in depressives' future-event predictions. *J. Pers. Soc. Psychol.* 63 (5), 711–723.
- Anderson, E.R., Hope, D.A., 2009. A review of the tripartite model for understanding the link between anxiety and depression in youth. *Clin. Psychol. Rev.* 28 (2), 275–287.
- Atance, C.M., O'Neill, D.K., 2001. Episodic future thinking. *Trends Cogn. Sci.* 5 (12), 533–539.
- Bados, A., Gomez-Benito, J., Balaguer, G., 2010. The state-trait anxiety inventory, trait version: does it really measure anxiety? *J. Pers. Assess.* 92 (6), 560–567.
- Balsamo, M., Saggino, A., 2007. Test per l'assessment della depressione nel contesto italiano: un'analisi critica. *Ital. J. Cogn. Behav. Psychother.* 13 (2), 167.
- Balsamo, M., Romanelli, R., Innamorati, M., Ciccarese, G., Carlucci, L., Saggino, A., 2013. The state-trait anxiety inventory: shadows and lights on its construct validity. *J. Psychopathol. Behav.* 35 (4), 475–486.
- Barlow, D.H., 2000. *Anxiety and its Disorders*. Guilford Press, New York.
- Barnes, L.L., Harp, D., Jung, W.S., 2002. Reliability generalization of scores on the Spielberger state-trait anxiety inventory. *Educ. Psychol. Meas.* 62 (4), 603–618.
- Beck, A.T., Riskind, J.H., Brown, G., Steer, R.A., 1988. Levels of hopelessness in DSM-III disorders: a partial test of content specificity in depression. *Cogn. Ther. Res.* 12 (5), 459–469.
- Beck, A.T., Brown, G., Steer, R.A., Eidelson, J.I., Riskind, J.H., 1987. Differentiating anxiety and depression: a test of the cognitive content-specificity hypothesis. *J. Abnorm. Psychol.* 96, 179–183.
- Beck, A.T., Steer, R.A., Brown, G.K., 1996. *Beck Depression Inventory-II*. San Antonio. Bjaehed, J., Sarkohi, A., Andersson, G., 2010. Less positive or more negative? Future-directed thinking in mild to moderate depression. *Cogn. Behav. Ther.* 39 (1), 37–45.
- Boselie, J.J., Vancleef, L.M., Smeets, T., Peters, M.L., 2014. Increasing optimism abolishes pain-induced impairments in executive task performance. *Pain* 155 (2), 334–340.
- Brissette, I., Scheier, M.F., Carver, C.S., 2002. The role of optimism in social network development, coping, and psychological adjustment during a life transition. *J. Pers. Soc. Psychol.* 82 (1), 102.
- Butler, G., Mathews, A., 1987. Anticipatory anxiety and risk perception. *Cogn. Ther. Res.* 11, 551–565.
- Carver, C.S., Scheier, M.F., Segerstrom, S.C., 2010. Optimism. *Clin. Psychol. Rev.* 30 (7), 879–889.
- Chen, F., Curran, P.J., Bollen, K.A., Kirby, J., Paxton, P., 2008. An empirical evaluation of the use of fixed cutoff points in RMSEA test statistic in structural equation models. *Sociol. Methods Res.* 36 (4), 462–494.
- Clark, D.A., Steer, R.A., Beck, A.T., 1994. Common and specific dimensions of self-reported anxiety and depression: implications for the cognitive and tripartite models. *J. Abnorm. Psychol.* 103 (4), 645.
- Clark, L.A., Watson, D., 1991. Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *J. Abnorm. Psychol.* 100 (3), 316.
- Cummings, C.M., Caporino, N.E., Kendall, P.C., 2014. Comorbidity of anxiety and depression in children and adolescents: 20 years after. *Psychol. Bull.* 140 (3), 816.
- Denollet, J., De Vries, J., 2006. Positive and negative affect within the realm of depression, stress and fatigue: the two-factor distress model of the Global Mood Scale (GMS). *J. Affect. Disord.* 91 (2), 171–180.
- Dozois, D.J., Dobson, K.S., Ahnberg, J.L., 1998. A psychometric evaluation of the Beck Depression Inventory-II. *Psychol. Assessment* 10 (2), 83.
- Fowles, D.C., 1988. Psychophysiology and psychopathology: a motivational approach. *Psychophysiology* 25 (4), 373–391.
- Ghisi, M., Flebus, G.B., Montano, A., Sanavio, E., Sica, C., 2006. *Beck Depression Inventory-II. Manuale italiano*. Organizzazioni Speciali, Firenze.
- Gray, J.A., 1987. *The Psychology of Fear and Stress* 2nd ed.. Cambridge University Press.
- Gros, D.F., Antony, M.M., Simms, L.J., McCabe, R.E., 2008. Psychometric properties of the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA): comparison to the State-Trait Anxiety Inventory (STAI). *Psychol. Assess.* 19 (4), 369–381.
- Hanssen, M.M., Peters, M.L., Vlaeyen, J.W., Meevissen, Y.M., Vancleef, L.M., 2013. Optimism lowers pain: evidence of the causal status and underlying mechanisms. *Pain* 154 (1), 53–58.
- MacLeod, A.K., Byrne, A., Valentine, J.D., 1996. Affect, emotional disorder, and future-directed thinking. *Cogn. Emot* 10 (1), 69–86.
- MacLeod, A.K., Coates, E., Hetherington, J., 2008. Increasing well-being through teaching goal-setting and planning skills: results of a brief intervention. *J. Hand Surg.* 9 (2), 185–196.
- McNaughton, N., 1982. Gray's neuropsychology of anxiety: an enquiry into the functions of septohippocampal theories. *Behav. Brain Sci.* 5 (03), 492.
- Meevissen, Y., Peters, M.L., Alberts, H.J., 2011. Becoming more optimistic by imaging a best possible self: effects of a two week intervention. *J. Behav. Ther. Exp. Psychiatry* 42 (3), 371–378.
- Miloyan, B., Pachana, N.A., Suddendorf, T., 2014. The future is here: a review of foresight systems in anxiety and depression. *Cogn. Emot.* 28 (5), 795–810.
- Miranda, R., Mennin, D.S., 2007. Depression, generalized anxiety disorder, and certainty in pessimistic predictions about the future. *Cogn. Ther. Res.* 31 (1), 71–82.
- Molina, S., Borkovec, T.D., 1994. The Penn State Worry Questionnaire: psychometric properties and associated characteristics. In: Davey, G., Tallis, F. (Eds.), *Worrying: Perspectives on Theory, Assessment, and Treatment*. John Wiley & Sons, Oxford, England, 265–283.
- Ohannessian, C.M., Hesselbrock, V.M., Tennen, H., Affleck, G., 1994. Hassles and uplifts and generalized outcome expectancies as moderators on the relation between a family history of alcoholism and drinking behaviors. *J. Stud. Alcohol Drugs* 55 (6), 754.
- Park, C.L., Moore, P.J., Turner, R.A., Adler, N.E., 1997. The roles of constructive thinking and optimism in psychological and behavioral adjustment during pregnancy. *J. Pers. Soc. Psychol.* 73 (3), 584.
- Pedrabissi, L., Santinello, M., 1989. *Inventario per l'ansia di "Stato" e di "Tratto": nuova versione italiana dello STAI Forma Y: Manuale*. Organizzazioni Speciali, Firenze.
- Peters, M.L., Flink, I.K., Boersma, K., Linton, S.J., 2010. Manipulating optimism: can imagining a best possible self be used to increase positive future expectancies? *J. Posit. Psychol.* 5 (3), 204–211.
- Pyszczynski, T., Holt, K., Greenberg, J., 1987. Depression, self-focused attention, and expectancies for positive and negative future life events for self and others. *J. Pers. Soc. Psychol.* 52 (5), 994.
- Renner, F., Schwarz, P., Peters, M.L., Huibers, M.J., 2014. Effects of a best-possible-self mental imagery exercise on mood and dysfunctional attitudes. *Psychiatry Res.* 215 (1), 105–110.
- Rief, W., Glombiewski, J.A., Gollwitzer, M., Schubö, A., Schwarting, R., Thorwart, A., 2015. Expectancies as core features of mental disorders. *Curr. Opin. Psychiatry* 28 (5), 378–385.
- Scheier, M.F., Matthews, K.A., Owens, J.F., Magovern, G.J., Lefebvre, R.C., Abbott, R.A., Carver, C.S., 1989. Dispositional optimism and recovery from coronary artery bypass surgery: the beneficial effects on physical and psychological well-being. *J. Pers. Soc. Psychol.* 57 (6), 1024.
- Snyder, C.R., Irving, L.M., Anderson, J.R., 1991. Hope and health. *Handbook of Social and Clinical Psychology: The Health Perspective*. 162, pp. 285–305.
- Spielberger, C.D., 1973. *STAI Preliminary Manual*. Consulting Psychologists Press, Palo Alto, CA.
- Spielberger, C.D., 2010. *Test Anxiety Inventory*. John Wiley & Sons, Inc.
- Spielberger, C.D., Gorsuch, R.L., Lushene, R.E., 1970. *Manual for the State-Trait Anxiety Inventory*. Consulting Psychologists Press, Palo Alto, CA.
- Stöber, J., 2000. Prospective cognitions in anxiety and depression: replication and methodological extension. *Cogn. Emot.* 14 (5), 725–729.
- Terraciano, A., McCrae, R.R., Costa Jr., P.T., 2003. Factorial and construct validity of the Italian Positive and Negative Affect Schedule (PANAS). *Eur. J. Psychol. Assess.* 19 (2), 131.
- Watson, D., Clark, L.A., Tellegen, A., 1988. Development and validation of brief measures of positive and negative affect: the PANAS scales. *J. Pers. Soc. Psychol.* 54 (6), 1063.
- Ziegler, M., Bensch, D., 2013. Lost in translation: thoughts regarding the translation of existing psychological measures into other languages. *Eur. J. Psychol. Assess.* 29 (2), 81–83.
- Zigmond, A.S., Snaith, R.P., 1983. The hospital anxiety and depression scale. *Acta Psychiatr. Scand.* 67 (6), 361–370.

# Assessing positive and negative experiences: validation of a new measure of well-being in an Italian population

## *Valutare le esperienze positive e negative: la validazione di una nuova misura del benessere in una popolazione italiana*

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**SUMMARY.** The aim of this study is to explore the psychometric properties of an affect scale, the Scale of Positive and Negative Experience (SPANE), in an Italian-speaking population. The results of this study demonstrate that the Italian version of the SPANE has psychometric properties similar to those shown by the original and previous versions, and it presents satisfactory reliability and factorial validity. The results of the Confirmatory Factor Analysis support the expected two-factor structure, positive and negative feeling, which characterized the previous versions. As expected, measures of negative affect, anxiety, negative future expectancies, and depression correlated positively with the negative experiences SPANE subscale, and negatively with the positive experiences SPANE subscale. Results of this study demonstrate that the Italian version of the SPANE has psychometric properties similar to those shown by the original and previous versions, and it presents satisfactory reliability and factorial validity. The use of this instrument provides clinically useful information about a person's overall emotional experience and it is an indicator of well-being. Although further studies are required to confirm the psychometric characteristics of the scale, the SPANE Italian version is expected to improve theoretical and empirical research on the well-being of the Italian population.

**KEY WORDS:** subjective well-being, positive emotions, negative emotions, affect, positive experiences, negative experiences.

**RIASSUNTO.** Lo scopo del presente studio è quello di esplorare le proprietà psicometriche di uno strumento di misurazione dell'affetto, la Scala di Esperienze Positive e Negative (SPANE), all'interno di una popolazione italiana. Gli esiti dell'analisi fattoriale confermativa comprovano l'attesa struttura a due fattori, sentimenti positivi e negativi. Le correlazioni con altre dimensioni (per es., ansia, depressione, affetto, aspettative future) confermano i risultati ottenuti con le precedenti versioni della scala: affetto negativo, ansia, depressione e aspettative future negative correlano positivamente con la subscale di esperienze negative e negativamente con la subscale di esperienze positive dello SPANE. In conclusione, i risultati del nostro studio dimostrano che la versione italiana dello SPANE presenta caratteristiche psicometriche simili a quelle mostrate dalla versione originale e da successive validazioni dello strumento in altre lingue. La scala presenta, inoltre, affidabilità e validità fattoriale. Lo SPANE è un indice utile dal punto di vista clinico che può fornire informazioni rilevanti circa l'esperienza emotiva e il benessere della persona. Nonostante ulteriori studi siano necessari per confermare le caratteristiche psicometriche della scala, la presente validazione della versione italiana dello SPANE può contribuire ad ampliare la ricerca nell'ambito del benessere in una popolazione italiana.

**PAROLE CHIAVE:** benessere soggettivo, emozioni positive, emozioni negative, esperienze positive, esperienze negative.

## INTRODUCTION

### Two-factor model of affect

Affect is a central theme in the field of psychology, and many studies have been conducted on this topic. For instance, well-being studies shown that emotional experience, together with life satisfaction, is a central component of subjective well-being, which includes experiencing high life satisfaction, positive emotions and low negative emotions<sup>1</sup>.

Watson and Tellegen<sup>2</sup> summarized the evidence and presented a two-factor model composed of two highly distinctive orthogonal dimensions called Positive Affect (PA) and Negative Affect (NA). Although some investigators still endorse a model characterized by unrotated dimensions, referred to as pleasantness-unpleasantness and arousal<sup>3</sup>, the varimax-rotated factors proposed by Watson and Tellegen are the most widely used in studies on affect.

Following this model, emotional experience has been defined as being dominated by these two broad and independent dimensions. PA is a general dimension that reflects the

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extent to which a person feels excited, enthusiastic, alert, and active<sup>4,5</sup>. High PA corresponds to a state characterized by full concentration, high energy, and pleasurable engagement. By contrast, low PA is distinguished by lethargy and sadness. NA, on the other hand, reflects subjective distress and unpleasant engagement. The NA factor includes a wide range of aversive mood states, such as guilt, anger, disgust, contempt, fear, scorn, and depression<sup>4,5</sup>, whereas low negative affect corresponds to a state of calmness and serenity<sup>4</sup>. Negative and positive affect can represent either a state (i.e. transient fluctuations in mood) or trait (i.e. stable individual differences in general affective level) dimension. Specifically, these traits, referred to as negative affectivity (or trait NA) and positive affectivity (or trait PA)<sup>6</sup>, denote tendencies to experience the associated state mood factor. Thus, trait NA is linked to the dominant personality factor of anxiety/neuroticism, whereas trait PA is related to extroversion<sup>7,8</sup>. Individuals who report high negative affectivity are more likely to experience significant levels of dissatisfaction and distress, they are introspective, and they tend to focus on the negative side of life. By contrast, individuals with low negative affectivity are more likely to be secure, self-satisfied, and content<sup>8</sup>. High trait PA is associated with happiness, a full and interesting life, and energy<sup>6-9</sup>. Moreover, numerous studies have indicated that anxiety and depression both involve NA, whereas only low PA is related to depression<sup>10-13</sup>.

### **Affect scales**

Given the two-factor structure of affect, numerous scales have been developed to assess pleasant and unpleasant emotions in a variety of research areas<sup>4,14,15</sup>, but the most widely used scale is the Positive and Negative Affect Schedule (PANAS)<sup>4</sup>. This tool consists of two subscales, one measuring PA and one measuring NA. This scale presents some limitations. First, PANAS was designed to measure a specific conception of emotional well-being and ill-being; thus, it includes some items that are not usually considered feelings (e.g., “strong”, “alert”, “active”, and “determined”). Second, PANAS omits some core emotional feelings that are considered important to well-being (i.e. “pride”, “envy”, “jealousy”, “contentment”, “joy”, “happiness”, and “love”). Third, this scale omits other feelings that are widely believed to be core emotional feelings in some individuals and certain situations and does not consider the difference in the desirability of feelings in different contexts or cultures<sup>16,17</sup>. Lastly, some feelings, such as anxiety, are represented by a number of similar adjectives (i.e. “jittery”, “nervous”, “scared,” and “afraid”). Therefore, the inclusion of various synonyms for a single feeling means that the scale is heavily weighted toward one specific type of feeling.

### *Scale of Positive and Negative Experience*

To overcome these limitations, the new Scale of Positive and Negative Experience (SPANE) developed by Diener and his colleagues<sup>18</sup> has been used to assess a broad range of pleasant and unpleasant feelings by asking people to report their feelings, in terms of their duration, after recalling their activities and experiences during the previous 4 weeks. This

approach is coherent with Diener and colleagues<sup>19</sup> conceptualization that overall judgements of subjective well-being, as for instance satisfaction with life, are based more on the frequency of an experience than on its intensity. Furthermore, the authors suggested that the amount of time having experienced a feeling might be more comparable among the respondents than the intensity of their feelings<sup>18</sup>. Moreover, the reference time, “4 weeks”, is short enough in order to permit to the person to recall actual feelings and experiences instead of refer to general self-concepts. In the same way, this scale is based on a time period that allows avoiding to refer just to a short-lived mood.

SPANE assesses the full range of positive and negative experiences, including specific feelings that may be defined by one’s culture. It includes items that reflect all types of feelings. The emotions used permit to investigate the major emotions theorized by the many of the affect theories. In the same time, using terms as “pleasant” or “unpleasant”, “positive” or “negative” allow to investigate also other negative or positive feelings making it possible to assess the full range of possible desirable and undesirable experiences. Moreover, using the SPANE is possible also to gather all levels of arousal for both negative (e.g. sad, angry, afraid) and positive (e.g. joy, happy, contented) feelings. It also assesses feelings such as interest, flow, boredom, pain, engagement, and physical pleasure, which are not considered in most of the other scales<sup>18</sup>. The scale is composed of 12 items, 6 related to positive experiences and 6 related to negative experiences. The scores of negative and positive feelings can be combined to create a balance score (i.e. SPANE-B). Regarding both the positive and negative items, 3 are more specific (e.g. joyful, afraid), and 3 are more general (e.g. good, bad).

The original version of the SPANE showed good psychometric properties (Cronbach between .81 and .89), and performed well in terms of convergent validity and reliability with others measures related to well-being, emotions, life satisfaction, and happiness. The negative and positive subscales correlated significantly with each other ( $r=-.60$ )<sup>18</sup>. Validations in Portuguese and Japanese showed similar results<sup>20-22</sup>.

The aim of this study is to assess the psychometric proprieties of the SPANE in an Italian-speaking population. First, using the Italian translation already provided by the original authors, we examined the component factors and internal consistency of the Italian version of the scale. Second, we assessed the factorial validity with confirmatory factor analysis (CFA). Finally, we explored the convergent validity of the scale by evaluating its correlations with other measures linked to the affect dimension. We hypothesize that the Italian version of the SPANE will present the same factor structure and good internal consistency as the previous English, Portuguese, and Japanese versions<sup>18,20-22</sup>. We expect that the negative SPANE subscale will correlate positively with anxiety, negative future expectancies, depression and the negative PANAS subscale, and negatively with the positive SPANE and PANAS subscales and positive expectancies. Moreover, we expect that the positive SPANE subscale will correlate positively with the positive PANAS subscale and positive future expectancies, and negatively with depression, anxiety, negative future thinking and the negative SPANE and PANAS subscales.

## METHODS

Participants were recruited through online public social networks and our research group's Facebook page. Then, participants asked other persons (relatives, friends, partners, and acquaintances) to take part to the study by completing questionnaires on the Survey Monkey platform. The combined sample consisted of 345 participants, who voluntarily agreed to be involved in the study. The sample was composed of 34.8% (n=120) men and 65.2% (n=225) women, with an average age of 33.5 years (SD=12.20; range: 18-80 years old). All participants were native Italian speakers. Regarding education, 2.6% (n=9) had completed middle school, 20.3% (n=70) had completed a high-school level, and 77.1% (n=266) reported a university level of instruction. Demographics are similar to what would be expected according to SPANE original validation (67.9% women, all the sample were university students)<sup>18</sup> and the Italian validation of the PANAS (62.9% women, mean age 27.9, with an average to high level of education)<sup>23</sup>. On 250 subjects who completed the BDI-II, 21 (8.4%) reported a moderate level of depression, and 9 (3.6%) moderate-severe depression. Mean score on the BDI was  $9.61 \pm 7.70$  (range: 1-39). On 256 subjects who completed the STAI-Y, 102 (39.84%) participants scored more than 40 at the STAI-Y (t), and 131 (39.84%) scored more than 40 at the STAI-Y (s). Mean score on the STAI-Y (t) was  $43.65 \pm 9.26$  (range: 26-72), and on the STAI-Y (s) was  $42.73 \pm 12.23$  (range: 22-76).

## Measures

The SPANE is a brief 12-item scale with six items devoted to positive experience and six items designed to assess negative experience. Each item is scored on a scale ranging from 1 ("very rarely or never") to 5 ("very often or always"). The positive and negative scales are scored separately. Both the total positive (SPANE-P) and negative (SPANE-N) scores can range from 6 to 30. The two scores can be combined by subtracting the negative score from the positive score, and the resulting SPANE-B scores can range from -24 to 24. The SPANE Italian translated version already provided by the original authors was used in the present study<sup>18</sup>. The internal consistency coefficients found for the SPANE subscales in the present study were  $\alpha=.85$  and  $\alpha=.88$  for negative and positive affect, respectively.

The PANAS<sup>2</sup> consists of two subscales, one measuring PA and one measuring NA. Each subscale consists of 10 items, scored on a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). The PANAS subscales have been shown to be uncorrelated and have good internal consistency and test-retest reliability<sup>2</sup> [3]. The Italian validated version of the PANAS was used in this study<sup>23</sup>. The internal consistency coefficients found for the PANAS subscales in the present study were  $\alpha=.91$  for negative affect and  $\alpha=.90$  for positive affect.

The Beck Depression Inventory-II (BDI-II)<sup>24</sup> has been used to assess depression. This self-report instrument is the second version of the widely used Beck Depression Inventory (BDI)<sup>25</sup>, and it consists of 21 items. Each item is rated on a 4-point scale (0-3). Analyzing the psychometric properties and the factor structure of the BDI-II in both analogue and clinical populations, Beck and colleagues<sup>24</sup> found that it has both good internal consistency ( $\alpha$ 's of 0.92 and 0.93, respectively) and 1-week test-retest reliability ( $r=0.93$ ). It has been found to be a valid indicator of depression and to have good diagnostic discrimination<sup>26</sup> [26]. The internal consistency coefficient for the Italian version of the BDI-II in the present study was  $\alpha=.89$ .

The Spielberger State-Trait Anxiety Inventory- Form Y (STAI-Y)<sup>27</sup> has been used to evaluate anxiety. It consists of a brief self-report questionnaire designed to measure and differentiate between trait (a stable personality trait) and state (a temporary and fluctuating condition) anxiety. The STAI-Y consists of two subscales containing 20 items each. The first subscale assesses state anxiety by asking the individual to report how he/she feels, from 1 ("not at all") to 4 ("very much so"), at a particular point in time (e.g., satisfied, frightened). The second subscale assesses trait anxiety by asking to people to report how they generally feel (e.g., inadequate, rested) from 1 ("almost never") to 4 ("almost always"). It is a reliable and sensitive measure of anxiety ( $\alpha=.90$  for trait scale,  $\alpha=.93$  for state scale). Moreover, test-retest coefficients ranged from .73 to .86 and .16 to .62 for scores on the trait and state scales, respectively<sup>27,28</sup>. In this study, the Italian validated version of the STAI-Y<sup>29</sup> was used. The internal consistency coefficients for the Italian version of the STAI-Y subscales in the present study were  $\alpha=.94$  and  $\alpha=.91$  for the state and trait scales, respectively.

The Subjective Probability Task (SPT)<sup>14</sup> has been used to assess future expectancies. It is composed of 30 items rated on a 7-point Likert scale. The participant has to estimate the probability of each item happening to him/her in the future, from 1 ("not at all likely to occur") to 7 ("extremely likely to occur"). The SPT consists of two subscales: one containing 20 items referring to negative expectancies (NE), and the other with 10 items referring to positive expectancies (PE). An independent subtotal for each subscale has to be calculated. The authors of the original version of the SPT reported that the scale has good internal consistency ( $\alpha=.90$  for the negative items and  $\alpha=.86$  for the positive items). The two subscales also show good discriminant validity<sup>14</sup>. In this study, the Italian validated version of the SPT was used (Corno et al. submitted). The internal consistency coefficients for the Italian version of the SPT subscales in the present study were .91 and .86 for negative and positive expectancies, respectively.

## Procedure

Participants were recruited through e-mail, social network, and word of mouth, and they were directed to a dedicated online survey. The survey was carried out using the SurveyMonkey web platform (<https://www.surveymonkey.com>). Before the survey was administered, participants were informed that the study was voluntary and confidential, and they signed a consent form stating their willingness to participate. First, demographic data (i.e. gender, age, education level, nationality, and country of residence) were collected. The translated version of the SPANE and the Italian validated version of the STAI-Y, BDI-II, and PANAS were administered, in that order. Ethical approval was obtained, as part of a wider study, from the University of Valencia, Spain, Research Ethics Committee.

## Data analysis

Construct validity of the Italian SPANE was estimated using confirmatory factor analysis (CFA) conducted with the EQS program, version 6.1, respectively. Cases with missing data were eliminated from final analysis (n=49). The kurtosis and Skewness of the items were analyzed with SPSS software, version 20 (SPSS Inc., Chicago, Illinois), to verify their normal distribution. Internal consistency of the Italian SPANE subscales was assessed using Cronbach's  $\alpha$  coefficient. This coefficient ranges from 0 to 1; higher values correspond to better reliability. The analysis assesses the correlation of each item with the subscale, as well as the change in

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the Cronbach's  $\alpha$  coefficient if an item is excluded. Criterion validity of the Italian SPANE was examined by calculating the correlations of each subscale with measures of affect, depression, future expectancies, and anxiety. The discriminant validity of the SPANE subscales was tested by calculating item-total correlations for the positive and negative items.

Independent Samples T-Tests were conducted for all the measures used in the study, in order to examine gender differences.

**RESULTS**

Table 1 shows the means and standard deviations of all the measures included in the study.

**Confirmatory Factor Analysis of the SPANE**

The factorability of the SPANE items was examined. The assessment of the distribution of data showed that our data were characterized by a normal distribution (Skewness range:  $-.518-.764$ ; Kurtosis range:  $-.659-.532$ ). A CFA with the Robust Maximum Likelihood estimation method was used

to test the Italian version of the SPANE. First, a one-factor model (Model 1) was fit to the data to serve as a baseline and identify salient sources of error. This model did not fit the data well (Table 2). Second, a model (Model 2) containing two correlated first-order factors for the SPANE was tested. This latter model agrees with the original version of the questionnaire<sup>18</sup> (Table 2). The fit indexes indicated that the two-factor structure of the Italian version of the SPANE was a better representation than the one-factor model. As Figure 1 shows, all factor loadings were above .40.

*Reliability: internal consistency*

The internal consistency coefficients for the two subscales of the SPANE were excellent (for negative experiences  $\alpha=.85$ , and for positive experiences  $\alpha=.88$ ). Internal consistency (Cronbach's  $\alpha$ ) for SPANE B was .91.

Table 2. Confirmatory Factor Analysis (CFA) of the Italian version of the SPANE (N=345).

	CFI	RMSEA	90%CI RMSEA	sbX <sup>2</sup>	df	p
Model 1	.852	.114	(.099, .129)	227.5597	54	p<0.001
Model 2	.981	.042	(.017, .062)	75.7687	53	p<0.001

Table 1. Descriptive statistics for all the measures assessed in the present study.

	Men	Women	t	d
SPANE-N	12.99 (SD 4.84)	15.56 (SD 4.67)	-4.38**	-.72
SPANE-P	20.50 (SD 4.51)	20.10 (SD 4.36)	.73	.07
SPANE-B	7.51 (SD 8.21)	4.53 (SD 8.17)	2.93*	.36
PANAS-N	16.86 (SD 6.54)	21.78 (SD 8.07)	-4.48**	-.64
PANAS-P	29.72 (SD 6.97)	27.22 (SD 6.83)	2.60	.36
STAI-Y (s)	39.03 (SD 10.05)	44.32 (SD 12.75)	-3.23*	-.44
STAI-Y (t)	39.82 (SD 7.62)	45.30 (SD 9.42)	-4.51**	-.61
BDI-II	6.52 (SD 6.14)	10.93 (SD 7.96)	-4.2**	-.59
SPT-PE	44.71 (SD 10.39)	44.38 (SD 9.52)	.264	.034
SPT-NE	52.26 (SD 17.51)	55.17 (SD 18.53)	-1.22	-.16

Legend. M= mean; SD = standard deviation; \*\*p<.001; \*p<.05. Cohen (1988) defines d= 0.2 as a "small" effect size, d= 0.5 as "medium" and d= 0.8 as "large"; SPANE-N= Scale of Positive and Negative Experiences - Negative Experiences; SPANE-P= Scale of Positive and Negative Experiences - Positive Experiences; SPANE-B = Scale of Positive and Negative Experiences - Balanced; PANAS-N= Positive and Negative Affect Schedule - Negative Affect; PANAS-P= Positive and Negative Affect Schedule - Positive Affect; STAI-Y (s)= State-Trait Anxiety Inventory-Form Y (state); STAI-Y (t)= State-Trait Anxiety Inventory-Form Y (trait); BDI-II= Beck Depression Inventory-II; SPT-PE= Subjective Probability Task -Positive Expectancies; SPT-NE= Subjective Probability Task - Negative Expectancies.

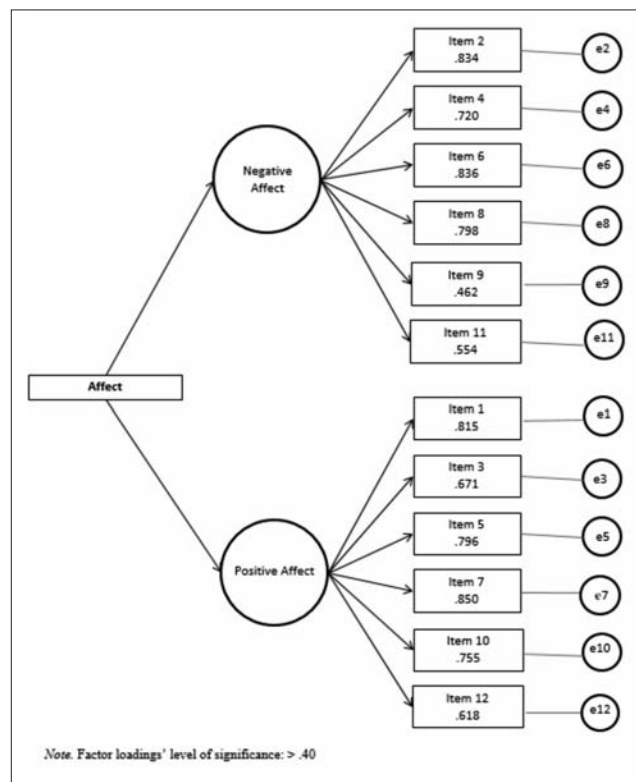


Figure 1. Factor loadings of the items for the Italian version of the SPANE (N=345).

Correlation analyses

Correlation coefficients are presented in Table 3. All correlations were significant at  $p < .001$ . As expected, measures of negative affect, anxiety, negative expectancies, and depression correlated positively with the negative experiences SPANE subscale, and negatively with the positive experiences SPANE subscale and the SPANE-B. Positive affect and positive expectancies correlated negatively with the negative experiences SPANE subscale, and positively with the positive experiences SPANE subscale and the SPANE-B. Moreover, the negative correlation reported in the original study ( $r = -.60$ )<sup>18</sup> between the two factors was confirmed by our findings, which show a lower correlation between the two SPANE subscales ( $r = -.50$ ).

DISCUSSION

The aim of the present study was to assess the psychometric proprieties of an affect scale, the SPANE<sup>18</sup>, in an Italian-speaking population. Results of this study shown that the Italian version of the SPANE is a reliable instrument that can provide useful information about a person’s emotional experiences and it can be appointee as an indicator of well-being. The results of this study demonstrate that the Italian version of the SPANE has psychometric proprieties similar to those shown by the original<sup>18</sup> and previous versions, and it presents satisfactory reliability and factorial validity. The results of the CFA support the expected two-factor structure, positive and negative feeling, which characterized the original English version<sup>18</sup>, the Japanese version<sup>21,22</sup>, and the Portuguese<sup>20</sup> version. All Cronbach’s alpha coefficients for the SPANE subscales

indicate excellent internal consistency (positive feelings:  $\alpha = .88$ , negative feelings:  $\alpha = .85$ , SPANE balanced:  $\alpha = .92$ ). Correlation results confirmed our hypothesis. As expected, the negative SPANE subscale correlates positively with anxiety, negative future expectancies, depression, and the negative PANAS subscale, and negatively with positive expectancies and the positive SPANE and PANAS subscales. Furthermore, and consistent with the nature of the measured construct, the positive SPANE subscale correlates positively with the positive PANAS subscale and with positive future expectancies, and negatively with depression, anxiety, negative future thinking and the negative SPANE and PANAS subscales. In addition, regarding the correlation between the positive and negative SPANE subscales in the present study ( $r = -.50$ ), it is lower than the one found for the original ( $r = -.60$ ) version, but higher than those reported for the Portuguese and Japanese versions (respectively,  $r = -.47$  and  $r = -.28$ )<sup>20-22</sup>.

SPANE has advantages over other affect measures. First, it is short (12 items) and easy to administer. Second, because the SPANE is composed of and assesses general feelings (e.g. “positive”, “negative”), it can be applied across many cultures. Furthermore, the scale can also reflect feelings such as physical pleasure, engagement, pain, interest, and boredom, which are not taken into consideration in most measures of feelings. Third, based on Diener and colleagues<sup>19</sup> conceptualization about the importance of frequency (and not intensity) in the assessment of happiness, the SPANE elicits answers based on the frequency of an emotion and not its intensity, unlike other measures.

Some limitations of the study should be considered. First, test-retest analyses were not conducted and therefore was not possible to conclude about the stability of the scale in this population. Further studies need to establish the temporal

Table 3. Correlations between the SPANE and measures of affect, anxiety, depression, and future expectancies (N=345).

	SPANE-P	SPANE-N	SPANE-B	PANAS-P	PANAS-N	STAI-Y (s)	STAI-Y (t)	BDI-II	SPT-PE	SPT-NE
SPANE-P	-									
SPANE-N	-.50**	-								
SPANE-B	.86**	-.88**	-							
PANAS-P	.48**	-.344**	.49**	-						
PANAS-N	-.37**	.66**	-.62**	-.34**	-					
STAI-Y (s)	-.49**	.58**	-.66**	-.57**	.76**	-				
STAI-Y (t)	-.44**	.61**	-.63**	-.50**	.73**	.76**	-			
BDI-II	-.44**	.58**	-.61**	-.52**	.70**	.71**	.71**	-		
SPT-PE	.52**	-.26**	.46**	.68**	-.32**	-.50**	.45**	-.36**	-	
SPT-NE	-.19**	.44**	-.39**	-.26**	.57**	.50**	.57**	.52**	-.14**	-

Legend. Correlations were significant at  $p < .001$ ; SPANE-P= Scale of Positive and Negative Experiences - Positive Experience; SPANE-N= Scale of Positive and Negative Experiences - Negative Experiences; SPANE-B= Scale of Positive and Negative Experiences - Balanced; PANAS-P= Positive and Negative Affect Schedule - Positive Affect; PANAS-N= Positive and Negative Affect Schedule - Negative Affect; STAI-Y (s)= State-Trait Anxiety Inventory- Form Y (state); STAI-Y (t)= State-Trait Anxiety Inventory- Form Y (trait); BDI-II Beck Depression Inventory-II; SPT-PE= Subjective Probability Task-Positive Expectancies; SPT-NE= Subjective Probability Task-Negative Expectancies.



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stability in Italian populations. Second, we used a web-delivered administration procedure. It is unclear if this might have influenced our findings, however online questionnaires have successfully been used in psychology research with equivalent psychometric properties<sup>30,31</sup>.

In conclusion, the SPANE Italian version proved to be a reliable and valid measure of affect and it is expected to improve theoretical and empirical research on the well-being of the Italian population. Nevertheless, it could be noted that the psychometric findings might differ for different subgroups. It could be interesting, for instance, to investigate the proprieties of the SPANE Italian version among a clinical population. The averages of the scores reported by the participants for the BDI-II and STAI-Y, are in fact in line with the means of normative data<sup>32</sup>. Therefore, further studies are necessary to come to a final appraisal of the scale. Finally, it could be interesting and useful to examine correlations between the scores on the Italian version of the SPANE and scores on other measures of well-being, such as those used in the original study about satisfaction with life (SLS)<sup>33</sup>, flourishing (FS)<sup>18</sup>, happiness (SHS)<sup>34</sup>, Fordyce's single item measure of happiness, optimism (LOT-R)<sup>35</sup>, and loneliness (UCLA Loneliness Scale)<sup>36</sup>. Overall, the Italian SPANE is ready for further use in research and practice. This study adds a new tool to the repertoire of measures that can be used by researchers interested in affect and well-being with the Italian population.

*Conflict of interests:* the authors declare they have no competing interests.

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## REFERENCES

1. Diener E, Wirtz D, Tov W, et al. New well-being measures: Short scales to assess flourishing and positive and negative feelings. *Soc Indic Res* 2009; 97: 143-56.
2. Diener E, Lucas R, Oishi S. Subjective well-being: The science of happiness and life satisfaction. In: Snyder C, Lopez S (eds). *Handbook of positive psychology*. New York: Oxford University Press, 2002.
3. Watson D, Tellegen A. Toward a consensual structure of mood. *Psychol Bull* 1985; 98: 219.
4. Russell JA. A circumplex model of affect. *J Pers Soc Psychol* 1980; 39: 1161-78.
5. Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. *J Pers Soc Psychol* 1988; 54: 1063-70.
6. Watson D, Pennebaker JW. Health complaints, stress, and distress: exploring the central role of negative affectivity. *Psychol Rev* 1989; 96: 234-54.
7. Tellegen A. Brief manual for the Differential Personality Questionnaire. University of Minnesota: Unpublished manuscript, 1982.
8. Tellegen A. Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In: Tuma A, Maser J (eds). *Anxiety and the anxiety disorders*. Hillsdale, NJ: Erlbaum, 1985.
9. Watson D, Clark L. Negative affectivity: the disposition to experience aversive emotional states. *Psychol Bull* 1984; 96: 465.
10. Costa P, McCrae R. Influence of extraversion and neuroticism on subjective well-being: happy and unhappy people. *J Pers Soc Psychol* 1980; 38: 68.
11. Clark L, Watson D. Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *J Abnorm Psychol* 1991; 100: 316.
12. Clark D, Steer R, Beck A. Common and specific dimensions of self-reported anxiety and depression: implications for the cognitive and tripartite models. *J Abnorm Psychol* 1994; 103: 645.
13. Jolly J, Dyck M. Integration of positive and negative affectivity and cognitive content-specificity: improved discrimination of anxious and depressive symptoms. *J Abnorm Psychol* 1994; 103: 544.
14. MacLeod A, Byrne A, Valentine J. Affect, emotional disorder, and future-directed thinking. *Cogn Emot* 1996; 10: 69-86.
15. Bradburn N. The structure of psychological well-being. 1969.
16. Schimmack U, Diener E, Oishi S. Life satisfaction is a momentary judgment and a stable personality characteristic: the use of chronically accessible and stable sources. *J Pers* 2002; 70: 345-84.
17. Oishi S, Schimmack U, Colcombe S. The contextual and systematic nature of life satisfaction judgments. *J Exp Soc Psychol* 2003; 39: 232-47.
18. Tsai J, Knutson B, Fung H. Cultural variation in affect valuation. *J Pers Soc Psychol* 2006; 90: 288-307.
19. Diener E, Sandvik E, Pavot W. Happiness is the frequency, not the intensity, of positive versus negative affect. In: Strack F, Argyle M, Schwarz N (eds). *Subjective well-being: an interdisciplinary perspective*. New York: Pergamon, 1991.
20. Silva A, Caetano A. Validation of the flourishing scale and scale of positive and negative experience in Portugal. *Soc Indic Res* 2013; 110: 469-78.
21. Sumi K. Reliability and validity of Japanese versions of the Flourishing Scale and the Scale of Positive and Negative Experience. *Soc Indic Res* 2014; 118: 601-15.
22. Sumi K. Temporal Stability of the Japanese Versions of the Flourishing Scale and the Scale of Positive and Negative Experience. *J Psychol Psychother* 2014; 4: 140.
23. Terraciano A. Factorial and construct validity of the Italian Positive and Negative Affect Schedule (PANAS). *Eur J Psychol Assess* 2003; 19: 131.
24. Beck A, Steer R, Brown G. *Beck depression inventory-II*. San Antonio, 1996.
25. Beck A, Ward C, Mendelson M, et al. An Inventory for Measuring Depression. *Arch Gen Psychiatry* 1961; 4: 561.
26. Dozois DJ, Dobson KS, Ahnberg JL. A psychometric evaluation of the Beck Depression Inventory-II. *Psychol Assess* 1998; 10: 83-9.
27. Spielberger CD. *State-Trait Anxiety Inventory*. Anxiety 2009; 19.
28. Spielberger C. *Test anxiety inventory*. Hoboken, NJ: John Wiley & Sons, 2010.
29. Pedrabissi L, Santinello M. *Inventario per l'ansia di «Stato» e di «Tratto»: nuova versione italiana dello STAI Forma Y: Manuale*. Firenze: Organizzazioni Speciali, 1989.
30. Carlbring P, Brunt S, Bohman S. Internet vs. paper and pencil administration of questionnaires commonly used in panic/agoraphobia research. *Comput Hum Behav* 2007; 23: 1421-34.
31. Gordon J, McNew R. Developing the online survey. *Nurs Clin N Am* 2008; 43: 605-19.
32. Eysenck S. Cross-cultural comparison of personality for Italian, Sicilian and British subjects. *Boll Psicol Appl* 1985; 176: 11-6.
33. Diener E. *The science of well-being: the collected works of Ed Diener*. Berlino: Springer Science & Business Media, 2009.
34. Lyubomirsky S, Lepper H. A measure of subjective happiness: preliminary reliability and construct validation. *Soc Indic Res* 1999; 46: 137-55.
35. Fordyce M. A review of research on the happiness measures: a sixty second index of happiness and mental health. *Soc Indic Res* 1988; 20: 355-81.
36. Russell D. UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *J Pers Assess* 1996; 66: 20-40.