

P- 2021/39308

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

DIRECCIÓN DE NUEVAS CREACIONES

E. S. D.

Re: Expediente No. **NC2021/0017697**

Solicitud de patente a nombre de **GIVAUDAN SA**

Yo, CAROLINA DAZA MONTALVO identificada como aparece al pie de mi firma, domiciliada en la Carrera 11 No. 86-53, obrando como apoderada de la sociedad **GIVAUDAN SA**, domiciliada en Vernier, Suiza, solicitante de la patente de la referencia, en respuesta al oficio No. **13383** notificado electrónicamente el 20 de agosto de 2025, relacionado con los requerimientos de fondo de la solicitud, y para el cual oportunamente solicité prorroga el pasado 7 de noviembre de 2025, atentamente me permito presentar la siguiente información:

1. Título

En primera medida, con respecto a la observación sobre la falta de relación del título con el objeto de la solicitud contenido en la descripción y las reivindicaciones, me permito señalar que es deseo del solicitante modificar el título siguiendo la amable recomendación realizada por el examinador, de modo que ahora se lee:

"COMPOSICIONES DE PERFUMES PARA MEJORAR EL BIENESTAR"

En vista de lo anterior, amablemente solicito que la objeción al respecto se dé por superada.

2. Modificación al capítulo reivindicatorio:

Con fundamento en la facultad que confiere el artículo 34 de la Decisión 486 al solicitante para modificar la solicitud de patente en cualquier momento del trámite, presento junto a este memorial un nuevo capítulo reivindicatorio que consta de tres (3) reivindicaciones, el cual reemplaza completamente la versión presentada el 19 de mayo de 2025. Específicamente, se realizaron las siguientes modificaciones:

- 1.1 Se eliminó la referencia a la optimización en la reivindicación 1, por lo tanto, el método reclamado se refiere únicamente a la preparación de una composición de perfume.
- 1.2 Se eliminaron las antiguas reivindicaciones 4 a 8.

Estas modificaciones no amplían de ninguna manera la materia objeto de la presente solicitud, ya que se encuentran sustentadas en la descripción originalmente presentada y se realizan con el fin de definir la materia reclamada de forma clara, respondiendo a su vez las objeciones planteadas por su despacho.

3. Pago de tasas

Considerando que el presente memorial se presenta junto con modificaciones a las reivindicaciones, se adjunta recibo por concepto de pago de tasa de modificación a la solicitud, según lo establecido en la Resolución 59669 de 2020.

Adicionalmente me permito resaltar que no se realiza el pago de la tasa por concepto de reivindicaciones adicionales, dado que el nuevo capítulo reivindicatorio cuenta con menos de 10 reivindicaciones.

4. Sobre la elegibilidad de la materia reclamada

El examinador sostiene que el objeto de la anterior reivindicación 1 no sería patentable, al considerar que *"la metodología descrita se fundamenta en la evaluación subjetiva de emociones humanas mediante encuestas ponderadas aplicadas a sujetos, y en el análisis y comparación de ingredientes de perfume con base en patrones obtenidos de dichas evaluaciones"*, concluyendo que dicho procedimiento corresponde al ejercicio de actividades intelectuales de carácter abstracto. En consecuencia, aun cuando el resultado final del método sea una composición de perfume, el examinador estima que la secuencia de pasos reivindicada constituye esencialmente un proceso intelectual de análisis y selección, por lo que no se trataría de una invención conforme al artículo 15, literal d).

Al respecto, respetuosamente se manifiesta que la reivindicación 1 modificada se refiere de manera expresa a un método para la preparación de una composición de perfume, es decir, a una reivindicación de proceso orientada a la obtención de un producto técnico concreto. En particular, la reivindicación comprende el paso h), consistente en la

creación de una nueva composición de perfume, lo cual implica necesariamente la selección y mezcla de ingredientes de perfumería. En consecuencia, el objeto de la reivindicación 1 es, por su propia naturaleza, técnico, y se refiere en última instancia a la preparación de nuevas composiciones de perfumería, actividad que excede claramente el ámbito de los actos puramente intelectuales o abstractos.

Adicionalmente, resulta relevante precisar que el carácter técnico de la reivindicación no se limita al paso h). En efecto, el sistema de puntuación del bienestar, que forma parte de la etapa d) de la reivindicación 1, cumple una función técnica concreta dentro del método, al permitir distinguir entre composiciones de perfumería de prueba y aquellas que generan un impacto significativo en la mejora del bienestar. Una vez identificadas dichas composiciones, el perfumista compara sus ingredientes y determinar los atributos olfativos comunes entre ellas. Con base en esta información técnica, el perfumista diseña y prepara nuevas composiciones de perfumería que incorporan mayores cantidades de los ingredientes identificados, conforme al paso h), con la expectativa técnica fundada de que dichas composiciones contribuirán positivamente a la mejora del bienestar, y no únicamente a la satisfacción sensorial.

En este sentido, contrariamente a lo señalado por el examinador, la metodología de la invención no se fundamenta en la mera evaluación subjetiva de emociones humanas, sino que se apoya en una etapa de ponderación claramente definida, integrada dentro de un método técnico de preparación de composiciones de perfumería. Dicho método no se agota en etapas intelectuales de carácter abstracto, sino que incorpora componentes técnicos que resuelve un problema técnico concreto y presenta aplicación industrial, tal como el propio examinador reconoce (véase página 10 del Oficio No. 13383).

Ahora bien, es pertinente señalar que, de acuerdo con las disposiciones del Manual Andino para el examen de patentes:

"Al igual que sucede con los métodos matemáticos, si un medio técnico lleva a cabo una tarea que es considerada como actividad intelectual o actividad económica, se debe evaluar la solicitud como un todo y definir si soluciona un problema técnico o no. En caso de que sí exista dicha solución técnica, la solicitud es una invención. Ejemplos de esto último es cuando una maquina toma una

decisión por si sola; decidir es considerada una actividad intelectual propia del hombre, pero realizada por una maquina podría tener un efecto técnico”¹

En este punto vale la pena resaltar que, como se mencionó previamente y se explicará más adelante en el presente memorial, el método de la presente invención sí resuelve un problema técnico. Además, es pertinente tener en cuenta que, como se establece en la descripción de la solicitud, los métodos de la presente invención pueden ser facilitados por medios informáticos, lo cual pone en evidencia aún más el carácter técnico de la invención a la luz de la práctica local.

En virtud de lo anterior, resulta evidente que el método reivindicado constituye una invención en los términos de la normativa aplicable. Por lo tanto, respetuosamente se solicita que se tengan por superadas las objeciones formuladas en relación con la elegibilidad de la solicitud y se continúe con el examen de fondo correspondiente.

5. Claridad, concisión y soporte de las reivindicaciones

El solicitante manifiesta que mediante la presentación del nuevo capítulo reivindicatorio quedan subsanadas la totalidad de las objeciones presentadas por el examinador en su concepto técnico, de modo tal que las nuevas reivindicaciones reclaman de manera clara y concisa la invención descrita. Con respecto a las objeciones específicas del examinador, me permito manifestar lo siguiente:

5.1 El Examinador señala que la reivindicación 4 carecería de claridad y concisión, en la medida en que caracteriza los componentes de la composición mediante nombres de fragancias comerciales o atributos olfativos tales como “cítrico-mandarina”, “cítrico-naranja”, “floral-flor de naranja”, “animálico-fecal”, “floral-medicinal”, “afrutado-fruta confitada”, “picante-canela”, “dulce-tonka”, “cítrico-lima” y “picante-clavo”, preferiblemente del grupo que consiste en “cítrico-mandarina”, “cítrico-naranja”, “floral-flor de naranja”, “animálico-fecal”, “floral-medicinal” y “afrutado-fruta confitada”. Según el Examinador, dichos términos no corresponderían a sustancias estandarizadas a nivel mundial, por lo que se sugiere reemplazarlos por el nombre químico del compuesto responsable de la fragancia.

¹ Página 78.

Al respecto, el solicitante desea precisar, en primer lugar, que la reivindicación 4 no hace parte del capítulo modificado. No obstante, dado que los términos objetados se mantienen en las reivindicaciones de método 2 y 3, el solicitante considera oportuno formular las siguientes aclaraciones frente a la objeción planteada.

En particular, el solicitante se permite responder a las observaciones relativas a los términos “cítrico-mandarina” y “floral-naranja”. Aun en el evento hipotético de considerar que dichos términos no constituyen denominaciones “estandarizadas”, debe tenerse en cuenta que una solicitud de patente puede definir su propia terminología, siempre que dicha definición sea clara para la persona normalmente versada en la materia. Más aún, en el presente caso, estos términos no se emplean de manera abstracta o ambigua, sino que se encuentran expresamente delimitados mediante grupos cerrados de ingredientes de perfumería específicos, tal como se establece en la reivindicación 3.

En consecuencia, la persona normalmente versada en la materia comprende sin dificultad qué materiales de perfumería quedan comprendidos dentro de cada uno de estos atributos olfativos, contando para ello con orientación suficiente tanto en las reivindicaciones como en la descripción. La utilización de descriptores olfativos de este tipo es, además, habitual y aceptada en el ámbito técnico de la perfumería, donde el uso exclusivo de denominaciones químicas no siempre refleja adecuadamente la función técnica del ingrediente dentro de la composición.

En vista de lo anterior, y considerando que la solicitud de patente se dirige a una persona normalmente versada en la materia, quien está en capacidad de determinar su alcance de manera clara y sin ambigüedad a la luz de la descripción, el solicitante respetuosamente solicita que la objeción relativa a la falta de claridad y concisión sea tenida por superada.

5.2 El Examinador presenta múltiples objeciones con respecto a las reivindicaciones 4 a 8, señalando su supuesta falta de claridad y soporte.

En este sentido, el solicitante desea resaltar que, el nuevo capítulo reivindicatorio no incluye las antiguas reivindicaciones 4 a 8. En vista de lo anterior, se solicita amablemente dar por superadas las objeciones en este aspecto.

En vista de lo anterior, las objeciones relacionadas con la claridad, la concisión y el soporte en la descripción del capítulo reivindicatorio, han quedado completamente superadas.

6. Novedad

El Examinador afirma en su concepto técnico que las antiguas reivindicaciones 6 a 11 carecerían de novedad a la luz de las enseñanzas del documento D1 (WO 2018/206297).

Al respecto, resulta pertinente recordar que el artículo 16 de la Decisión 486 de la Comisión de la Comunidad Andina establece que una invención se considera nueva cuando no se encuentra comprendida en el estado de la técnica. Conforme al alcance de esta disposición, una invención únicamente carece de novedad cuando todas y cada una de sus características técnicas se encuentran total y absolutamente divulgadas en un único documento del estado de la técnica, considerado en su integridad. En consecuencia, el análisis de novedad no puede realizarse a partir de una evaluación fragmentaria o aislada de características conocidas, sino que debe recaer sobre la invención en su conjunto, incluyendo aquellos elementos técnicos que le confieren su carácter distintivo.

En este sentido, para que un documento del estado de la técnica destruya la novedad de una solicitud, deben concurrir, al menos, los siguientes presupuestos:

- que el objeto de la invención esté contenido total y absolutamente en el documento citado; y
- que la comparación entre la invención y el estado de la técnica se realice teniendo en cuenta las características técnicas inéditas que la distinguen, esto es, el aporte técnico que introduce la invención al campo al que pertenece.

Lo anterior implica que un documento del estado de la técnica únicamente afecta la novedad cuando revela todas y cada una de las características técnicas que definen la invención reivindicada.

Ahora bien, el Examinador considera que el documento D1 anticipa el objeto de las antiguas reivindicaciones 4 a 5 y 8, por cuanto divulga composiciones de fragancias adecuadas para mejorar el estado de ánimo de un sujeto, así como productos que las contienen, sus usos y métodos asociados.

Sobre este punto, el solicitante desea precisar que la antigua reivindicación 4 y sus reivindicaciones dependientes no forman parte del capítulo reivindicatorio presentado junto a este memorial, el cual se encuentra ahora exclusivamente dirigido a un método para preparar una composición de perfume.

Sin perjuicio de lo anterior, aun considerando el contenido técnico de D1, dicho documento no divulga ni sugiere una metodología para la preparación de una composición de perfume basada en la identificación, selección y combinación de componentes a partir de una etapa de ponderación de composiciones de perfume de prueba, como la definida en la nueva reivindicación 1. En efecto, de la lectura de D1 se desprende que sus autores se limitan a evaluar composiciones de perfume con base en el comportamiento de los panelistas (véase, por ejemplo, el Ejemplo 3), sin describir una metodología estructurada de puntuación, y mucho menos una metodología que incluya una etapa de selección de componentes basado en una etapa de puntuación del bienestar como la que caracteriza el método reivindicado.

En este contexto, resulta evidente que ninguna de las referencias citadas por el Examinador divulga una metodología para la preparación de un perfume que incluya una etapa de puntuación del bienestar, integrada como parte esencial del método reivindicado. Dado que dicha etapa forma parte inseparable de la reivindicación del método, y que los pasos técnicos que la componen no se encuentran revelados en la técnica anterior, el objeto de las reivindicaciones no había sido anticipado.

Por lo tanto, la reivindicación 1 es novedosa frente al documento D1. En la medida en que las reivindicaciones 2 y 3 dependen directamente de la reivindicación 1, estas también cumplen el requisito de novedad con respecto a dicho documento.

En consecuencia, dado que el documento D1 no divulga de manera total y absoluta las características técnicas esenciales que definen la materia reivindicada en la nueva reivindicación independiente, es posible concluir que la presente solicitud satisface el requisito de novedad establecido en el artículo 16 de la Decisión 486 de la Comisión de la Comunidad Andina.

7. Nivel inventivo

El Examinador señala en su concepto técnico que las antiguas reivindicaciones 6 y 7 no cumplirían con el requisito de nivel inventivo a la luz de una combinación de las enseñanzas de los documentos D1 (WO 2018/206297) y D2 (EP 1 343 466 B1).

Al respecto, resulta pertinente recordar que el artículo 18 de la Decisión 486 de la Comisión de la Comunidad Andina establece que *"se considerará que una invención tiene nivel inventivo si, para una persona del oficio normalmente versada en la materia técnica correspondiente, dicha invención no hubiese resultado obvia ni se hubiese derivado de manera evidente del estado de la técnica"*.

En consecuencia, el análisis de nivel inventivo no se limita a una simple comparación de características entre la solicitud y los documentos citados, sino que exige demostrar que la solución propuesta carece de obviedad, es decir, que no se deriva de manera directa, lógica o previsible del estado de la técnica para la persona normalmente versada en la materia.

Si bien las objeciones de nivel inventivo fueron formuladas respecto de las antiguas reivindicaciones de producto 6 y 7, las cuales ya no forman parte del capítulo reivindicatorio, el solicitante considera oportuno pronunciarse sobre el fondo de la objeción, presentando a continuación los argumentos que sustentan el nivel inventivo de las reivindicaciones de método 1 a 3 frente a los documentos D1 y D2.

Antes de abordar el análisis de actividad inventiva, es importante señalar que el bienestar constituye un fenómeno ampliamente estudiado y de naturaleza compleja. La presente reivindicación 1 aborda dos de sus componentes esenciales: el bienestar afectivo y, de manera particularmente relevante, el bienestar cognitivo (véase la sección "Antecedentes" de la descripción).

Estos componentes han sido reconocidos de forma consistente en la literatura académica como elementos fundamentales del bienestar general.

A título ilustrativo, Huppert *et al.*, que se presenta como anexo, mencionan lo siguiente:

"Los estados psicológicos positivos se ejemplifican mediante emociones como la felicidad y la satisfacción, actitudes como la generosidad y la empatía, y procesos mentales como las capacidades cognitivas, el interés y la motivación. Los estados físicos positivos se caracterizan por la vitalidad y las capacidades físicas, mientras

que los estados sociales positivos incluyen vínculos sociales satisfactorios y relaciones afectivas" (página 1331: columna derecha, párrafo 3)

Otro artículo de Arthaud-day *et al.*, también incluido como anexo, describe el concepto de "bienestar" en tres dominios:

- (1) evaluaciones cognitivas de la propia vida (es decir, satisfacción vital o felicidad);
- (2) afecto positivo; y
- (3) afecto negativo.

Una publicación más reciente de Costa *et al.*, incluida como anexo, también analiza los predictores del bienestar subjetivo, identificando elementos cognitivos, afectivos (es decir, emociones) y contextuales, lo que ilustra nuevamente que el bienestar va más allá de las emociones positivas, sino que se relaciona con los objetivos, la motivación y la satisfacción vital.

En conjunto, esta literatura demuestra que el bienestar trasciende la dimensión emocional, incorporando de forma esencial componentes cognitivos y evaluativos.

Así, si bien el bienestar ha sido tradicionalmente medido mediante cuestionarios de autoinforme, no existía en la técnica un sistema objetivo basado en puntuaciones ponderadas que integrara de manera estructurada tanto los aspectos afectivos como los cognitivos del bienestar, ni que permitiera utilizar dicha información como base para la preparación de composiciones de perfume. Precisamente, este es el problema técnico que aborda la presente solicitud.

En este contexto, la reivindicación 1 se refiere a un método para la preparación de una composición de perfume destinada a mejorar el bienestar de una persona, mediante la evaluación del impacto de determinados atributos olfativos sobre dicho bienestar y la posterior creación de una nueva composición de perfume que incorpora una mayor proporción de ingredientes con un efecto positivo demostrado.

Ahora bien, como ya se ha señalado, el documento D1 no describe un método que incluya todos los pasos a) a h) de la reivindicación 1. En particular, D1 no divulga los pasos a) a d) de la presente invención, los cuales permiten obtener una medida objetiva del bienestar que integra aspectos afectivos y cognitivos. D1 se limita a evaluar estados emocionales con el fin de mejorar el estado de ánimo, utilizando herramientas como la denominada "Rueda Emocional" (véase Ejemplo 3), la cual refleja exclusivamente reacciones emocionales y no mide el impacto cognitivo de una composición de perfume.

En contraste, la presente invención requiere que los sujetos evalúen su bienestar en ausencia de una composición de perfume de prueba (paso a), calculando una puntuación base de bienestar mediante la ponderación de múltiples atributos (paso b), para luego repetir dicha evaluación en presencia de la composición de prueba (paso c). Estos pasos, junto con los atributos evaluados, no se encuentran descritos ni sugeridos en D1, el cual utiliza además descriptores emocionales distintos a los empleados en la presente solicitud.

El efecto técnico derivado de estas diferencias radica en que, mientras la técnica anterior únicamente permite determinar el estado emocional de los sujetos de prueba, la presente invención posibilita evaluar de manera más objetiva y completa el impacto de una composición de perfume, incluyendo su dimensión cognitiva. Ello permite, además, derivar directrices técnicas que facilitan un desarrollo más eficiente de nuevas composiciones de perfume, reduciendo iteraciones y etapas de ensayo.

De este modo, el problema técnico objetivo que resuelve la presente invención se relaciona con la necesidad de proporcionar medios para preparar composiciones de perfume que mejoren el bienestar de manera objetiva y reproducible, incorporando parámetros cognitivos y reduciendo la complejidad y duración del proceso de desarrollo.

D1 no resuelve este problema, ni ofrece indicación alguna sobre cómo medir objetivamente el impacto de una composición de perfume en los aspectos afectivos y cognitivos del bienestar, ni sobre cómo utilizar dicha información para adaptar composiciones orientadas a mejorar el bienestar general. En ausencia de esta solución, el desarrollo de composiciones de perfume no se vuelve más eficiente ni se optimiza el proceso creativo del perfumista.

Estas deficiencias tampoco son subsanadas por el documento D2. D2 emplea un enfoque completamente distinto para evaluar reacciones humanas, basado en técnicas de electroencefalografía (EEG), y no describe ni sugiere una metodología de puntuación del bienestar como la definida en las reivindicaciones presentes. Asimismo, aunque D2 menciona composiciones de perfume que afectan el estado de ánimo, no divulga un método de preparación que integre una etapa de ponderación del bienestar ni la utilización de dicha ponderación para diseñar nuevas composiciones.

En consecuencia, aun combinando las enseñanzas de D1 y D2, la persona normalmente versada en la materia no habría llegado de manera obvia al método reivindicado en la

reivindicación 1. Por lo tanto, el objeto de dicha reivindicación implica actividad inventiva. Dado que las reivindicaciones 2 y 3 dependen directamente de la reivindicación 1, estas también cumplen con el requisito de nivel inventivo.

En virtud de lo anterior, resulta claro que las características técnicas definidas en el capítulo reivindicatorio presentado junto con el presente memorial no se derivan de manera obvia ni evidente de las enseñanzas combinadas de D1 y D2. En consecuencia, la presente solicitud cumple con el requisito de nivel inventivo establecido en el artículo 18 de la Decisión 486 de la Comisión de la Comunidad Andina.

8. Conclusión

Con las modificaciones introducidas y los argumentos presentados puede concluirse que:

- i) El nuevo título de la solicitud es claro y se relaciona con el objeto reclamado, cumpliendo así con el literal d) del artículo 27 de la Decisión 486 de 2000;
- ii) El nuevo pliego reivindicatorio se ajusta a las disposiciones del Artículo 34 de la Decisión 486/00;
- iii) La invención de la presente solicitud es clara y cuenta con el debido sustento en el capítulo descriptivo, a la vez que se encuentra divulgada de manera suficientemente completa, cumpliendo así con los requerimientos de los Artículos 30 y 28 de la Decisión 486;
- iv) El objeto de la presente solicitud es una invención y no se encuentra enmarcada en lo establecido en el Artículo 15(d) de la Decisión 486;
- v) La invención de la presente solicitud no había sido divulgada previamente en el estado de la técnica cumpliendo así con los requerimientos del Artículo 16 de la Decisión 486; y
- vi) La invención de la presente solicitud no resulta obvia ni se derivada de manera evidente del estado de la técnica, cumpliendo así con los requerimientos del Artículo 18 de la Decisión 486.

Por tanto, atentamente me permito solicitar a ese Despacho otorgar el privilegio de patente solicitado a la solicitud en estudio, toda vez que cumple a cabalidad con los requerimientos de la Decisión 486 de 2000.

Asimismo, respetuosamente solicito a ese Despacho pronunciarse en relación con todos los argumentos presentados en este memorial dando estricta aplicación al principio del debido proceso consagrado en el artículo 29 de la Constitución Nacional.

9. Anexos

- Nuevo capítulo reivindicatorio conformado por tres (3) reivindicaciones.
- Investigación de Huppert *et al.*
- Investigación de Arthaud-day *et al.*
- Investigación de Costa *et al.*
- Recibo de pago por concepto de modificaciones a las reivindicaciones.

Señora Directora,


CAROLINA DAZA MONTALVO
C.C. 66.783.790 de Palmira Valle
TP-141563 CSJ
notificaciones@clarkemodet.com.co

REIVINDICACIONES

1. Un método para preparar una composición de perfume para mejorar el bienestar de un sujeto humano, caracterizado porque comprende las etapas de:

determinar el impacto de una o más composiciones de perfume en el bienestar de sujetos humanos mediante:

a) hacer que uno o más sujetos humanos evalúen su bienestar en ausencia de la composición de perfume de prueba calificando una pluralidad de atributos de bienestar;

i) en donde los atributos de bienestar incluyen "no ansioso", "no triste", "no inquieto", "no frustrado", "no estresado", "feliz", "optimista", "emocionado", "satisfecho", "motivado", "vigorizado", "interesado", "no aburrido", "no fatigado", "mentalmente alerta", "tranquilo", "relajado" y "paciente"; y

ii) donde cada atributo de bienestar tiene un peso;

b) calcular una puntuación de bienestar base en ausencia de la composición del perfume de prueba, multiplicando la puntuación de cada atributo de bienestar por el peso correspondiente para formar un producto y sumando estos productos sobre todos los atributos de bienestar;

c) repetir los pasos a) y b) en presencia de una composición de perfume de prueba para determinar una puntuación de bienestar con la composición de perfume de prueba; y

d) determinar el impacto de la composición de perfume de prueba en el bienestar, restando la puntuación de bienestar base de la puntuación de bienestar con la composición de perfume de prueba.

en donde los pesos de los atributos de bienestar son los siguientes:

atributo de bienestar	peso
"no ansioso"	10.65%
"no triste"	10.32%
"no inquieto"	9.84%
"no frustrado"	9.65%
"no estresado"	7.54%
"contento"	4.70%
"optimista"	4.61%

"emocionado"	4.13%
"satisfecho"	3.91%
"motivado"	3.34%
"vigorizado"	3.31%
"interesado"	6.12%
"no aburrido"	5.88%
"no fatigado"	4.59%
"Mentalmente alerta"	4.41%
"tranquilo"	2.66%
"relajado"	2.24%
"paciente"	2.10%

- e) seleccionar una composición de perfume con impacto positivo sobre el bienestar.
- f) comparar los ingredientes de perfume presentes en aquellas composiciones de perfume que tienen un impacto positivo sobre el bienestar;
- g) identificar los atributos de olor comunes a esas composiciones de perfume;
- y
- h) crear una nueva composición de perfume con una proporción aumentada de ingredientes de perfume con los atributos de olor identificados en el paso g).

2. El método de conformidad con la reivindicación 1, caracterizado porque en el paso h), se incrementa la proporción de uno o más ingredientes de perfume que tienen atributos de olor seleccionados del grupo que consiste en "cítrico-mandarina", "cítrico-naranja", "floral-flor de naranja", "animálico-fecal", "floral-medicinal", "afrutado-fruta confitada", "picante-canela", "dulce-tonka", "cítrico-lima" y "picante-clavo".

3. El método de acuerdo con la reivindicación 2, en donde dicha nueva composición de perfume creada en el paso h) comprende:

- uno o más ingredientes de perfume que tienen un atributo de olor "cítrico-naranja", seleccionados del grupo que consiste en aceites de naranja y reconstituciones de naranja, tales como aceite crudo de naranja de Brasil, aceite de toronja, aceite de naranja, aceite amargo de naranja, aceite de sangre de naranja; aceite de naranja incoloro, aceite de naranja

concentrado, esencia de naranja, terpenos de naranja, aceite de fase bigarada, aceite de tangelo, carbonilos y aldehídos de naranja natural y mezclas de los mismos; y/o

- uno o más ingredientes de perfume que tienen un atributo de olor "cítrico-lima", seleccionados del grupo que consiste en cimeno para (4-metil-1-isopropilbenceno), aceite de cedrat, citratal R (1,1-dietoxi-3,7-dimetilocta-2,6-dieno), delta-3-careno (3,7,7-trimetilbiciclo[4.1.0]hept-3-eno), dipenteno (1-metil-4-(prop-1-en-2-il)ciclohex-1-eno), aceite de elemi, resinoide de elemi al 50% en benzoato de bencilo, aceite de fase verde de limón, dienos de lima, aceite de lima destilado, aceite lima exprimido, óxido de lima, reconstitución de terpenos de lima, ocimeno ((E)-3,7-dimetilocta-1,3,6-trieno), terpineno alfa (1-metil-4-propan-2-ilciclohexa-1,3-dieno), terpineno gamma (1-metil-4-propan-2-ilciclohexa-1,4-dieno), terpineol (2-(4-metil-3-ciclohexen-1-il)-2-propanol) y terpinoleno (1-metil-4-propan-2-ilidenciclohexeno) y mezclas de los mismos; y/o
- uno o más ingredientes de perfume que tienen un atributo de olor "cítrico-mandarina", seleccionados del grupo que consiste en aceite clementina, antranilato de dimetilo (2-metilaminobenzoato de metilo), aceite de mandarina, aceite de madarina incoloro, aceite verde de mandarina, aceite amarillo de mandarina, aceite de fase de mandarina, aceite de tamarindo, reconstituciones de tamarindo, aceite de tangerina, reconstitución de tangerina, tangerinol (acetato de (E)-6,10-dimetilundeca-5,9-dien-2-ilo) y mezclas de los mismos; y/o
- uno o más ingredientes de perfume que tienen un atributo de olor "dulce-tonka", seleccionados del grupo que consiste en biciclo nonalactona (3,4,4a,5,6,7,8,8a-octahidrocromen-2-ona), cumarina (cromen-2-ona) y tolil aldehído para (4-metilbenzalaldehído), reconstitución de cumarina, aceite de flouve, reconstitución de flouve, aceite de heno, heno absoluto, koumalactona (3,6-dimetil-3a,4,5,6,7,7a-hexahidro-3H-benzofuran-2-ona), absoluto de malvavisco, absoluto de mate, reconstitución de mate, metil-octalactona (5-butil-4-metiloxolan-2-ona), toncarosa (3-(2-hidroxifenil)acrilato de (E)-dec-9-en-1-ilo), absoluto de ajonjolí tostado, absoluto de hoja de tabaco, absoluto de tonka, absoluto de tonka incoloro, aceite de haba tonka, acetanisol (1-(4-metoxifenil)etanona), acetofenona extra (1-feniletanona), aldehído anísico (4-metoxibenzaldehído), alcohol anisílico ((4-metoxifenil)metanol), aubepina paracresol (4-metoxibenzaldehído), cristales de dimetil-hidroquinona (1,4-dimetoxibenceno), cristales de heliotropina (benzo[d][1,3]dioxol-5-carbaldehído), aldehído hidratrópico (2-fenilpropanal), metil-acetofenona

- (1-(p-tolil) etanona), mimosa absoluta, veratril aldehído (3,4-dimetoxibenzaldehído) y mezclas de los mismos; y/o
- comprende uno o más ingredientes de perfume que tienen un atributo de olor "afrutado-fruta confitada", seleccionado del grupo que consiste de cristalón (2,6,6-trimetilciclohexa-1,3-dieno-1-carboxilato de etilo), givescona (2-etil-6,6-dimetilciclohex-2-eno-1-carboxilato de etilo), damascenona ((E)-1-(2,6,6-trimetilciclohexa-1,3-dien-1-il) but-2-en-1-ona), damascona alfa ((E)-1-(2,6,6-trimetil-1-ciclohex-2-enil)but-2-en-1-ona), damascona beta ((E)-1-(2,6,6-trimetil-1-ciclohexenil)but-2-en-1-ona), damascona delta (1-(2,6,6-trimetil-1-ciclohex-3-enil)but-2-en-1-ona; y/o
 - uno o más ingredientes de perfume que tienen un atributo de olor "flor de naranja floral", seleccionados del grupo que consiste en reconstituciones de flor de naranja, antranilato de metilo (2-aminobenzoato de metilo), cristales de naranja (1-naftalen-2-iletanona), 1asm en sambac aceite y mezclas de los mismos; y/o
 - uno o más ingredientes de perfume que tienen un atributo de olor "floral-medicinal", seleccionados del grupo que consiste en yara samba (2-metoxinaftaleno), cresil metil éter para (1-metoxi-4-metilbenceno), etil benzoato, etil salicilato, metil reconstituciones de benzoato, salicilato de m etilo, flores de tubérculo y mezclas de los mismos; y/o
 - uno o más ingredientes de perfume que tienen un atributo de olor a "clavo picante", seleccionados del grupo que consiste en acetato de eugenilo ((2-metoxi-4-prop-2-enilfenil) acetato), acetil isoeugenol (2-metoxi-4-prop acetato de l-en-2-ilfenol), aceite de hoja de clavo crudo, incoloro y rectificado, dihidroeugenol (2-metoxi-4-propilfenol), eugenol (2-metoxi-4-prop-2-enilfenol) e isoeugenol (2-metoxi-4-prop-1-en-2-ilfenol) y mezclas de los mismos; y/o
 - uno o más ingredientes de perfume que tienen un atributo de olor "animal-fecal", seleccionados del grupo que consiste en indol e indoleno (8,8-bis (1H-indol-3-il) -2,6-dimetiloctan-2-ol), indoflor (4,4a,5,9b-tetrahidroindeno [1,2-d] [1,3] dioxina) y mezclas de los mismos; y/o
 - uno o más ingredientes de perfume que tienen un atributo de olor a "canela picante", seleccionados del grupo que consiste en aldehído cinámico (3-fenilprop-2-enal), cinamalva ((E)-3-fenilprop-2-enenitrilo), aceite de corteza de canela; aldehído m etil cinámico ((z) -2-metil-3-fenilacrilaldehído), y mezclas de los mismos.

Introduction: why do we need a science of well-being?

1. BACKGROUND AND CONTEXT TO THE MEETING

The Royal Society Discussion Meeting on 'The science of well-being: integrating neurobiology, psychology and social science' was convened to advance our scientific understanding of life going well; that is to say, a life characterized by health and vitality, by happiness, creativity and fulfilment, and by the sorts of positive social relationships and civic institutions that harness and enhance these desirable characteristics.

This fresh approach has a crucial contribution to make, because biomedical and behavioural sciences have long operated on the assumption that by studying disorder we would come to understand effective functioning. However, recent developments show this assumption to be false. Studying depression sheds no light on happiness; studying Alzheimer's disease tells us little about successful ageing; and studying learning disability is of scant value in understanding intellectual excellence. It has become clear that a scientific understanding of well-being is both necessary and timely. Consider, for example, how epidemics of eating disorder, substance abuse and depression currently afflict young people despite the best efforts of psychology, medicine and social science, which are all disorder-focused. A scientific understanding of how to live life well may help to shift the focus from remediation to effective intervention.

Many before us have contemplated happiness and the good life, from Aristotle and Spinoza, to Jeremy Bentham and Abraham Maslow. In the UK, outstanding recent contributions have been made by the social psychologist Michael Argyle in his work on happiness, by the psychiatrist Michael Rutter with his developmental studies of psychological resilience, and by economists Amartya Sen and Partha Dasgupta on the importance of nurturing human and natural resources to increase well-being. Most of the recent developments, however, have come from the USA, and this is reflected in our high proportion of American contributors who are acclaimed for their innovative work in the field.

It was our intention that a meeting held at an early stage in the development of this field in the UK would attract a fresh body of first-rate researchers. We anticipated that the impact of the scientific study of well-being would also reach well beyond basic research. Our society's scientists, educators, citizens and leaders would all benefit greatly from knowing how individuals and communities can thrive and flourish. By contrast, policies that focus on survival and damage limitation lead to a tragic waste of individual and national potential. It is promising that governments are beginning to identify well-being as a more pertinent goal

than Gross National Product, and that the British government and policymaking bodies are now actively considering ways to increase human capability, resilience and social capital. Their efforts will surely be enhanced if scientists can offer a deeper understanding of the mechanisms by which individual and social factors produce a range of positive outcomes.

2. THE QUESTIONS WE EXPLORED

Among the questions our meeting sought to answer were the following. Why do people seek happiness and fulfilment? What is the adaptive value of positive emotions? What is the relationship between positive emotions, good health, creativity and high achievement? What are the individual and social determinants of positive outcomes? What is the influence of early life factors on disease resistance and psychological resilience? What are the neurobiological processes that mediate the effects of psychological and social factors on health and capability? How can we characterize the types of societies and value systems that encourage well-being and excellence in individuals, organizations and communities?

3. OUR WORKING DEFINITION OF WELL-BEING

For the purposes of the Discussion Meeting, we defined well-being in broad terms as 'a positive and sustainable state that allows individuals, groups or nations to thrive and flourish'. This means that at the level of an individual, well-being refers to psychological, physical and social states that are distinctively positive. Positive *psychological* states are exemplified by emotions such as happiness and contentment, attitudes such as generosity and empathy, and mental processes such as cognitive capabilities, interest and motivation. Positive *physical* states are characterized by vitality and physical capabilities, while positive *social* states include satisfying social bonds and loving relationships. Our definition of well-being also encompasses human resilience—the ability to survive and thrive in the face of the setbacks inherent in the process of living.

4. MEASUREMENT OF WELL-BEING

One of the fundamental means by which science progresses is the necessity to measure the concepts we seek to understand. So a key challenge facing us is how to measure positive states. Subjective well-being is typically measured in social and economic surveys using simple questions about present happiness or general life satisfaction, while psychologists tend to use more comprehensive scales to capture the various dimensions of subjective well-being. One of the controversies currently raging in the field relates to the measurement of positive emotions. The issue is whe-

One contribution of 12 to a Discussion Meeting Issue 'The science of well-being: integrating neurobiology, psychology and social science'.

ther we can rely on people's self-reports of their subjective experiences or whether we need objective measures of behaviour. Recent developments in psychophysiology and neuroscience offer the prospect of developing objective measures such as specific patterns of brain activation, which are highly correlated with self-reported subjective states. However, some would argue that while brain scans and other objective measures are valuable for advancing our understanding of the anatomy and physiology of emotions, the subjective experiences themselves remain the 'gold standard' units of measurement.

5. WHY NOW?

With any significant development in science or culture, it is instructive to ask 'why now?' So why is there now such a surge of interest in happiness and well-being? This question presents us with an apparent paradox, because in many ways we have never had it so good. Many nations have more wealth than ever before, better access to education and health care, more travel and leisure opportunities, and a long period of relative peace. Yet, in this era of apparent plenty, many people seem to be generally dissatisfied with their life, and there are increasingly high rates of depression, crime and social disintegration. This widespread malaise is reflected in the predominant focus of social and biomedical sciences on dysfunction and pathology, and the tacit assumption that supports this approach is the belief that if we could only do away with the negatives, we and our world would be in good shape. It is for this very reason that we need a science of well-being, because living life well is not simply about moving from a state of disorder to a state of adequate function or 'getting by'. Our new science must be ambitious and must aim to increase health, happiness and high achievement in the majority of the population. For health is not simply the absence of disease, just as happiness is more than the lack of misery, and towering strengths cannot be fostered by putting all of our resources into the remediation of deficits. It is on this premise that our Discussion Meeting focused not on those with serious problems, but on understanding and improving the well-being of the great majority of our citizens and institutions. Judging by the recent interest shown in the popular media, there is a deep and pervasive demand for accessible information about how to live life

well. Only a genuinely *scientific* exploration of well-being can provide a source of trustworthy information to guide interventions.

6. OUR AIMS

Our specific aims were twofold: first, to bring together outstanding researchers and practitioners in this multi-disciplinary field, who could introduce us to the latest theoretical concepts and scientific evidence; second, to encourage both novice and established scientists to contribute to this new and promising endeavour. Advances in our understanding of well-being require a holistic, multi-disciplinary approach, and consequently we have included a wide range of exciting developments, some focusing on well-being at an individual level, others at a societal level. The presentations covered four broad domains: evolution and development; psychology; neuroscience and physiology; and social science.

Despite the diversity of the invited papers, it is clear that a fuller understanding of the causes and consequences of a state of well-being requires a far broader approach than we were able to offer on this occasion. For example some important areas, such as the role of nutrition and religious beliefs and practices, received only limited coverage. Other areas, such as the roles of exercise and the physical environment, including the contribution of the arts to human flourishing, were not addressed. Nevertheless, like the Discussion Meeting itself, we believe these Royal Society Proceedings offer a fine foundation and a powerful inspiration for future work on well-being, across diverse fields of research and practice.

Felicia A. Huppert¹

Nick Baylis²

Barry Keverne³

May 2004

¹*Department of Psychiatry, University of Cambridge, Box 189, Addenbrooke's Hospital, Cambridge CB2 2QQ, UK*

²*Department of Social and Developmental Psychology, Faculty of Social and Political Sciences, University of Cambridge, Free School Lane, Cambridge CB2 3RQ, UK*

³*Department of Zoology, University of Cambridge, Downing Street, Cambridge CB2 3EJ, UK*

MARNE L. ARTHAUD-DAY, JOSEPH C. RODE, CHRISTINE
H. MOONEY and JANET P. NEAR

THE SUBJECTIVE WELL-BEING CONSTRUCT: A TEST OF ITS CONVERGENT, DISCRIMINANT, AND FACTORIAL VALIDITY

(Accepted 20 December 2004)

ABSTRACT. Using structural equation modeling, we found empirical support for the prevailing theory that subjective well-being consists of three domains: (1) cognitive evaluations of one's life (i.e., life satisfaction or happiness); (2) positive affect; and (3) negative affect. Multiple indicators of satisfaction/happiness were shown to have strong convergent validity as well as discriminant validity from positive and negative affect. Positive and negative affect likewise exhibited discriminant validity from one another. At both the item and scale levels of analysis, we obtained an intercorrelated three-factor solution corresponding to the three proposed subjective well-being domains.

KEY WORDS: construct validation, factor structure, subjective well-being

INTRODUCTION

Over the last several years, psychologists and others have argued for a “positive psychology,” with an increased focus on investigating happiness and other positive emotions (e.g., Luthans, 2002). Rather than continue a more traditional focus on negative or dysfunctional forces in daily life, they argue that researchers should attempt to understand how to make life better. Among the topics that have received particular attention is subjective well-being and its relationship to life at work. For example, Luthans (2002) has suggested that it is important for researchers in organizational behavior to understand the interrelationships among well-being, job satisfaction, and work and nonwork conditions. Investigating such “positive” phenomena is feasible, however, only to the extent that researchers can agree on a conceptual definition and measurement strategy for a construct that has proven elusive.

Across multiple publications, Diener and colleagues have proposed that subjective well-being is a multidimensional construct consisting of three separate components: (1) the presence of positive affect; (2) the relative lack of negative affect; and (3) people's cognitive evaluations of their life circumstances (Diener et al., 1997). However, most existing research utilizes cognitive and affective scales interchangeably, as equivalent proxies for overall well-being, suggesting it is unidimensional in nature. In an attempt to resolve this contradiction, we provide a comprehensive examination of the dimensionality of the subjective well-being construct by testing: (1) the convergent and discriminant validity of multiple measures of the proposed component factors; and (2) the overall factor structure. Specifically, we ask whether a one-factor (overall well-being), two-factor (cognition and affect) or three-factor (cognition, positive affect, and negative affect) structure best fits the data. To our knowledge, this is the first study to simultaneously consider the convergent, discriminant, and factorial validity of subjective well-being utilizing structural equation modeling techniques in three large samples (897 students, 731 students, and 1799 U.S. respondents).

THEORETICAL DEVELOPMENT

Cognition Versus Affect

As early as 1976, Andrews and Withey noted that individuals' assessments of their lives involves "both a cognitive evaluation and some degree of positive and/or negative feeling, i.e., 'affect'" (1976, p. 18). This simple observation placed well-being research squarely in the midst of an ongoing psychological debate regarding the relative independence versus interrelationship of cognition and affect. The psychological literature in this area is well developed and beyond the scope of this paper, but a simple comparison between the expression and experience of emotion may serve to illustrate the nature of the problem: A person may *express* an emotion, by involuntarily responding to a stimulus (e.g., large noise, extreme heat, or alcoholic intake), without an accompanying cognitive process; thus emotion and cognition may occur independently of one another. The *experience* of an emotion, however, necessarily implies some form of self-perception or cognition that interprets what emotion is being felt

(Zajonc et al., 1982); in this case, cognition and emotion are interconnected and interact with one another. Zajonc (1980) reconciles this paradox by explaining that “affect and cognition are under the control of separate and partially independent systems that can influence each other in a variety of ways, and that both constitute independent sources of effects in information processing” (1980, p. 151).

Subjective well-being research is by definition interested in the *experience* of life and its emotions – not their mere expression. The nearly exclusive use of self-report assessment tools (Diener, 1994) means that both affect and cognition are involved at some level (Andrews and McKennell, 1980; Horley and Little, 1985; Larsen et al., 1985). The very nature of the question (e.g., “How satisfied/happy are you with your life?”) demands a cognitive evaluation, yet what people are evaluating is their overall life experiences, which are laden with emotion (Organ and Near, 1985; Crooker and Near, 1998). Our purpose is to examine whether cognition and affect are so interrelated as to be indistinguishable from one another (i.e., one overall factor), or whether they do in fact constitute separate domains of well-being. To phrase this differently, do “cognitive” measures that ask respondents to report on their general level of happiness/life satisfaction encapsulate the affect component sufficiently, or is it necessary to include specific affect measures in order to comprehensively assess both components of an individual’s subjective well-being? A one-factor solution would suggest sufficient overlap among affective and cognitive components, such that using cognitive scales alone would allow researchers to measure both components implicitly. If a two- or three-factor solution shows better fit than a one-factor solution, then subjective well-being is best viewed as a multidimensional construct and should be measured accordingly.

Scales have been developed to measure both cognition and affect, although their interaction in human thought processes makes a “pure” self-report measure of either unlikely. On the cognitive side, the past 30 years has seen the development of multiple questionnaires, including the Life-3 Delighted-Terrible Scale (Andrews and Withey, 1976), Well-Being Index (Campbell et al., 1976), and the Satisfaction with Life Scale (Diener et al., 1985). The item and response scale wordings span the happiness/satisfaction spectrum,

but these scales intercorrelate highly with one another and show convergent validity (e.g., Andrews & Crandall, 1976; Diener et al., 1985; Larsen et al., 1985; Fordyce, 1988). Researchers have created a separate series of scales designed to measure affect – the frequency or intensity of experienced emotions over time. Examples include the widely used Bradburn (1969) Affect Balance Scale and the Positive and Negative Affect Scale developed by Watson et al. (1988). These affectively oriented scales have likewise demonstrated convergent validity amongst themselves (Watson et al., 1988).

Independence of Positive and Negative Affect

Bradburn (1969) was one of the first to report that positive and negative affect vary independently, rather than being bipolar opposites on the same affect spectrum (i.e., affect is bidimensional). This suggested that positive and negative affect are produced by different processes and exhibit different degrees of relationship with other variables. Subsequent studies have supported this finding, and underscore the importance of assessing positive and negative affect separately (Zevon and Tellegen, 1982; Warr et al., 1983; Diener and Emmons, 1985; Watson and Tellegen, 1985; Clark and Watson, 1988; Watson, 1988; Watson et al., 1988; Diener and Lucas, 2000). However, other researchers have continued to report a strong, inverse correlation between positive and negative affect (i.e., affect is unidimensional; Benin et al., 1988; Diener et al., 1995). For example, Green et al. (1993) found the correlation between positive and negative affect to be strongly negative (-0.85 to -0.92), controlling for random measurement error using structural equation modeling (Diener & Lucas, 2000).

Attempts to explain these contradictory results have generally followed one of two trajectories: attention to the differences between affect measurement scales and/or an analysis of the underlying components of affect. For example, Watson et al. (1988) reviewed studies using the Bradburn and other affect measures, and generally found these scales to have questionable reliability and validity. This prompted them to develop and validate their own Positive and Negative Affect Scale (PANAS), with which they reaffirmed the independence of positive and negative affect. Diener and colleagues, in contrast, examined various underlying aspects of affect, and found

that the relationship between positive and negative affect depended on time frame (Diener and Emmons, 1985), and the interaction between affect intensity and frequency (Diener et al., 1985). They reported that the frequency and intensity of affect varied independently, resulting in low average levels of correlation between positive and negative affect, but that a strong inverse relationship was evident when the effects of affect intensity were partialled out. Thus, the relationship between positive and negative affect is neither “truly inverse and linear” (Diener and Iran-Nejad, 1986) nor “strictly orthogonal” (Diener et al., 1995), but on average, positive and negative affect may be distinguished separately.

The “Tripartite Theory” of Subjective Well-Being

Based on these findings, Diener and colleagues proposed that subjective well-being consists of three components: (1) the presence of positive affect; (2) the relative lack of negative affect; and (3) people’s cognitive evaluations of their life circumstances (Diener et al., 1997). Recognizing the mixed semantic nature of many of the existing well-being scales, they developed and validated the Satisfaction with Life Scale (Diener et al., 1985; Diener et al., 1991; Pavot et al., 1991; Pavot & Diener, 1993; Sandvik et al., 1993; Lucas et al., 1996), to serve as a more purely cognitive measure of well-being. In scale validation studies, they confirmed the convergent validity of the Satisfaction with Life Scale with other satisfaction/happiness measures as well as its discriminant validity from positive and negative affect (Lucas et al., 1996). However, they have done so largely using correlational statistics in small or moderately sized samples. In this study, we replicate their correlational results in multiple large samples, including a nationally representative U.S. sample, and then test them more extensively through the use of structural equation modeling.

We hypothesize that indicators of the same well-being domain (i.e., cognition, positive affect, and negative affect) should show convergent validity with one another, while indicators of different domains demonstrate discriminant validity. Next, we explicitly test Diener’s theory that subjective well-being consists of three intercorrelated first-order factors by examining whether a one- (overall well-being), two- (cognition and affect), or three- (cognition, positive affect, negative affect) factor model provides the best fit to the data.

DESCRIPTION OF THE THREE SAMPLES

Student Sample 1

Subjects ($n = 880$, item level; $n = 897$, scale level) were enrolled in a required undergraduate class on organizational behavior at a large Midwestern university and received class credit for completing five on-line surveys. Most were male (57%), U.S. citizens of European descent (79%), and juniors in college (72%). The mean age was 20.7 years.

Student Sample 2

The next semester, we collected data from a second sample ($n = 731$) using the same procedures. Again, most students were male (57%), U.S. citizens of European descent (78%), and juniors in college (74%), with a mean age of 20.8 years. We considered undergraduate students an appropriate population for this validation study based on their relatively homogeneous demographic characteristics (Oishi et al., 1999). Administration of multiple measures of the same constructs to two similar, large samples provided for the most conservative test of discriminant validity. We controlled for common method effects by administering the surveys at different times, rather than all at once. Exploratory factor analyses revealed multiple distinct factors (as opposed to a single factor) at both the item and scale (student sample 1 only) level, indicating that method effects were not responsible for the majority of the observed covariance (Podsakoff and Organ, 1986). Additionally, prior well-being research has indicated that social desirability is a “substantive personality characteristic which enhances well-being” (Diener et al., 1991, p. 35), and not a response artifact or source of error variance that requires statistical control.

U.S. Sample

We cross-validated the student sample results using the U.S. dataset from the second wave of the World Values Survey (1990–1993), available from the Inter-University Consortium for Political and Social Research. The World Values Study Group (1999) interviewed

a representative national sample of 1839 U.S. adults ($n = 1799$ cases with complete data). The sample was randomly stratified by race, with minorities overrepresented. Although the World Values Survey data are from an earlier time period, we were not concerned about comparing data from two points in time. Extensive analysis has shown that happiness and life satisfaction are mostly stable over time for a given culture (Veenhoven, 1986).

MEASURES FOR THE THREE SAMPLES

Self-report measures such as the ones used in this study are the most direct method of assessing respondents' thoughts and feelings about their lives (Andrews and Crandall, 1976; Pavot and Diener, 1993). Many of the same self-report measures correlate with non-self-report measures (Sandvik et al., 1993) and appear to be valid tools for measuring subjective well-being.

Student Sample 1

NLS happiness item

The NLS happiness item is a variant of a survey question developed by Gurin, et al. (1960), and subsequently incorporated by the National Opinion Research Center into multiple large-scale social surveys (Andrews and Robinson, 1991). In our study, the item stem ("Taken all together, how would you say things are these days") was followed by a Likert scale ranging from 1 (very happy) to 4 (very unhappy), recoded so that higher values indicated higher levels of happiness. As a single-item measure with a restricted response range, the NLS happiness item tends to be more sensitive to contextual effects and item placement than its multi-item counterparts (Larsen et al., 1985; Pavot and Diener, 1993), but it has nevertheless demonstrated adequate reliability and validity (Pavot and Diener, 1993).

Life-3 delighted-terrible scale

Another widely used measure is the Life-3 delighted-terrible scale developed by Andrews and Withey (1976). We asked respondents to indicate how they felt about their life as a whole, ranging from 1 (terrible) to 7 (delighted). In its original form, the scale also permitted

respondents to select “neutral,” “never thought about it,” or “does not apply.” For analysis purposes, we recoded any “neutral” responses as “mixed” (scale midpoint = 4), and treated the other two categories as missing data points. The delighted-terrible scale has been shown to capture approximately 65% valid variance, and has been subjected to thorough reliability and validity testing by its authors (Andrews and Withey, 1976).

Well-being index

The Campbell et al. (1976) well-being index consists of an overall life satisfaction item (“How satisfied or dissatisfied are you with your life as a whole?”) and a series of eight semantic differential responses to the question: “Overall, how would you rate your life these days?” The well-being index has been shown to have adequate reliability and validity in prior research (Larsen et al., 1985). All items utilized a seven-point scale, recoded so that higher values indicated higher levels of well-being ($\alpha = 0.92$). For this index, the semantic differential questions are averaged to create an overall index (weight = 1), which is then averaged with the overall satisfaction item (weight = 1.1) to create the composite index score.

Satisfaction with life scale

We measured life satisfaction using the five-item satisfaction with life scale (Diener et al., 1985). The reliability and validity of this measure has been demonstrated in prior studies (e.g., Larsen et al., 1985; Pavot et al., 1991; Lucas et al., 1996). A sample item was, “I am satisfied with the conditions of my life.” Each item was rated using a seven-point Likert scale, and then recoded as needed (higher scores = higher life satisfaction), so that an average scale score could be computed ($\alpha = 0.82$).

PANAS short-term

The Positive Affect and Negative Affect Scales (PANAS) were expressly designed to compensate for the low reliability and poor convergent and/or discriminant validity of other affect measures (Watson et al., 1988). We used the short-term version to measure state-mood by asking respondents to indicate the degree to which they were feeling a list of 20 emotions (10 positive/10 negative) *at the present moment*, using a five point Likert scale; the respective item

scores were then averaged to create scale scores. Sample positive affect items ($\alpha = 0.88$) included “alert,” “proud,” and “interested,” whereas sample negative affect items included “hostile,” “upset,” and “nervous” ($\alpha = 0.84$). Due to a clerical error, one item (“strong”) was inadvertently omitted from the survey; thus, short-term positive affect was calculated as an average of nine instead of ten items.

Long-term affect

Instead of repeating the PANAS scales for long-term affect, we utilized the high positive and negative affect scales developed by Huelsman et al., (1998) to gain more precise measurement. The authors submitted items from the PANAS (Watson et al., 1988), Job Affect Scale (Burke et al., 1989), Mood Adjective Check List (recounted by Nowlis, 1965), the Activation-Deactivation Adjective Check List (Thayer, 1986), and the Affective Lexicon (Clore et al., 1987), to principal components and confirmatory factor analysis, and derived two discriminant sets of adjectives to measure high positive and negative affect. Four PANAS items (one positive affect, three negative affect) were included in the final version (Huelsman et al., 1998), resulting in partial overlap with the PANAS short-term items. Respondents indicated the extent to which they generally felt each affect item on a five-point Likert scale ($\alpha = 0.75$ for high positive affect; $\alpha = 0.85$ for high negative affect), from which we computed average scale scores.

Bradburn (1969) affect scale

This scale consists of five positive affect items (e.g., “particularly excited”) and five negative affect items (e.g., “depressed or very unhappy”), which were averaged to create scale scores. We asked respondents whether they had experienced each feeling during the past weeks (0 = “No”; 1 = “Yes”). The scale’s reliability has been questioned (e.g., Larsen et al., 1985), but we included it based on its prevalence in prior research ($\alpha = 0.64$ for positive affect; $\alpha = 0.55$ for negative affect).

Student Sample 2

Measures utilized in the second student sample included the satisfaction with life scale ($\alpha = 0.86$; Diener et al., 1985) and the long-

term affect scales ($\alpha = 0.76$ for high positive affect; $\alpha = 0.84$ for high negative affect) developed by Huelsman et al. (1998).

U.S. Sample

Two World Values Survey items served as indicators of the cognitive dimension. The first question asked respondents to indicate how happy they were “taking all things together” (4-point Likert scale), and the second asked people to indicate how satisfied they were with their “life as a whole these days” (10-point Likert scale). The World Values Survey also contained Bradburn’s (1969) affect scale ($\alpha = 0.64$ for positive affect; $\alpha = 0.62$ for negative affect). The importance of cross-validating our student data against a nationally representative sample outweighed any concerns over the psychometric properties of the Bradburn (1969) scale.

RESULTS

We assessed the convergent and discriminant validity of the subjective well-being construct utilizing descriptive statistics, bivariate correlations, scale reliabilities (when applicable), and confirmatory factor analysis. We assessed factor structure using covariance structure modeling. First we examined the data at the item level, to examine whether the proposed factor structure held utilizing a minimal number of measures. Studies of subjective well-being in relationship to other constructs tend to be more constrained in terms of survey length, such that efficiency as well as quality of measurement is of paramount concern. Next we examined the data at the scale level to validate the individual-level results, as aggregate data have several potential psychometric advantages (see discussion in Limitations).

Item-Level Analyses

Item-level analyses for the two student samples included the five items from the satisfaction with life scale (Diener et al., 1985), four high positive affect items (Huelsenman et al., 1998), and six high negative affect items (Huelsenman et al., 1998). Although additional items and scales were available for the first student sample, we address those

measures in the scale-level analyses only. This permitted us to examine the replicability of an identical item-level measurement model across two samples from the same population.

The World Values Survey items included a happiness question, a life satisfaction question, and the ten items (five positive, five negative) from the Bradburn (1969) affect balance scale. Including this sample permitted us to examine whether item level results were robust across both different scales and a different (nationally representative) sample.

Descriptive statistics

To conserve table space, means, standard deviations, and bivariate correlations for the individual items in each of the three samples are not listed but are available upon request. Across both student samples, items from each of the three scales (satisfaction with life, high positive affect, and high negative affect) displayed convergent validity with one another, and discriminant validity from the other dimensions. All intra-measure correlations were higher than any correlations between items from different measures.

We obtained largely the same results in the national U.S. sample. The happiness and life satisfaction items were more strongly correlated with one another than with any of the affect items. Likewise, the positive and negative affect items each displayed a high degree of internal consistency. Two positive affect items (“feel ‘going your way’” and “feel ‘top of the world’”) and two negative affect items (“feel lonely” and “feel depressed”) demonstrated higher than expected relationships with life satisfaction and happiness. These results are not altogether surprising given: (1) the hypothesized higher-order structure of the subjective well-being construct; and (2) the poorer psychometric properties of the Bradburn (1969) scale (e.g., Larsen et al., 1985).

We also examined correlations between demographic variables and life satisfaction, positive affect, and negative affect, respectively, in the U.S. sample only (Table I). Our respondents in the first two studies showed too little variance on demographic variables for us to find differential effects, but the third (nationally representative) sample varied considerably on demographic characteristics. We found that gender was correlated with both positive and negative affect, with women showing stronger affect than males, but gender was not significantly correlated with life satisfaction. Age was cor-

TABLE I

Correlations between demographic variables and the three factor scores, for national U.S. sample (WVS II data)

	<i>n</i>	Factor 1 Negative affect	Factor 2 Positive affect	Factor 3 Life satisfaction
Gender	1759	-0.08*	-0.05**	0.00
Age	1794	-0.12*	-0.17*	0.06**
Education	1587	-0.01	0.18*	0.06**
Socioeconomic status	1700	-0.13*	0.17*	0.17*
Income	1629	-0.08*	0.18*	0.15*
Community size	1742	0.02	-0.05	-0.07*

* $p < 0.01$ level (2-tailed).

** $p < 0.05$ level (2-tailed).

related with affect such that older people showed lower affect scores compared to younger respondents; however older respondents reported slightly higher life satisfaction than younger respondents. Education was positively correlated with positive affect and life satisfaction but uncorrelated with negative affect; we observed the same pattern for socioeconomic status or income. Finally, we conducted a one-way analysis of variance by ethnicity and found significant differences by ethnicity for positive affect ($F = 3.88, p < 0.002$) and life satisfaction only ($F = 3.80, p < 0.002$). Results of a post hoc Scheffé test showed that the significant differences were due to subgroup differences between African-Americans and European-Americans, with the latter experiencing higher levels of positive affect and life satisfaction. These differential associations with positive affect, negative affect, and life satisfaction support the discriminant validity of the three constructs, because different demographic groups seem to experience them all somewhat differently.¹

Reliability

The Cronbach's alphas for the first ($n = 880$) and second ($n = 731$) student samples were acceptable for the satisfaction with life (0.82 and 0.86), high positive affect (0.75 and 0.76), and high negative affect scales (0.85 and 0.84). The representative U.S. sample ($n = 1799$) alphas for the Bradburn (1969) scales were 0.64 (positive affect) and 0.62 (negative affect). With the exception of the Bradburn scales, all

of the multiple item measures met the minimum coefficient alpha cut-off of 0.70 for research purposes (Nunnally, 1967).

Confirmatory factor analysis

To further analyze the structure of subjective well-being at the item level, we performed confirmatory factor analyses (LISREL 8.54) on all three data samples. As the maximum likelihood method of estimation assumes multivariate normality (Byrne, 1998), we first examined the data for skewness and kurtosis. Typical of satisfaction/happiness data in American samples (e.g., Rice et al., 1980; Rain et al., 1991), several of our measures deviated from a normal distribution. We therefore transformed the data with the "Normal Scores" option in LISREL, and utilized the robust maximum likelihood method of estimation, which is less sensitive to distributional violations.

Due to the large sample size, which influences traditional χ^2 model fit statistics, we gauged model fit through the goodness of fit index (GFI; Joreskog and Sorbom, 1984), comparative fit index (CFI; Bentler, 1990), and the root mean squared error of approximation (RMSEA; Brown and Cudeck, 1993), as well as chi-square divided by the degrees of freedom (χ^2/df). GFI and CFI values in the mid .90s, RMSEA values less than 0.08, and χ^2/df values less than 3.0 are all considered indications of good model fit (Kline, 1998). We also included the Akaike information criterion (AIC; Akaike, 1987), which is designed to examine the relative fit of non-nested models, with a lower value indicating comparatively better fit.

In accordance with Diener's "tripartite" theory of subjective well-being, we first estimated a three-factor model, with the satisfaction/happiness, positive affect, and negative affect items loading onto their respective latent variables, which were allowed to inter-correlate. The fit indices for the student samples were as follows: χ^2 (87, $n = 880$) of 185.02 ($p < 0.001$) for sample 1 and χ^2 (87, $n = 731$) of 140.52 ($p < 0.001$) for sample 2, GFI (0.97/0.97), CFI (0.99/0.99), and RMSEA (0.04/0.03). Item factor loadings were all 0.44 or greater. All specified paths were significant at the 0.06 level or below (a few satisfaction with life scale items [1 in sample 1; 2 in sample 2] slightly exceeded the traditional p-value threshold of 0.05), including the correlations among the three first-order factors. The variance in common between the three latent constructs

(positive and negative affect = 0.05/0.09, cognition and positive affect = 0.20/0.18, and cognition and negative affect = 0.14/0.08) was less than the average variance explained across the indicators for each latent variable (cognition, mean = 0.48/0.55; positive affect, mean = 0.45/0.46; negative affect, mean = 0.49/0.47), demonstrating discriminant validity (Fornell and Larcker, 1981).

We next tested a two-factor (cognition and affect) and a one-factor (overall well-being) model to see if they provided acceptable fit to either data set. The RMSEA and AIC were 0.12/0.12 and 1281.80/1027.77 for the two-factor model, and 0.19/0.20 and 2843.66/2745.52 for the one-factor model, compared to 0.04/0.03 and 251.02/206.52 for the three-factor model, indicating a significant decrease in model fit. Factor loadings for the one-factor model are provided in Table II, with the two-factor model provided in Table III and the three-factor model in Table IV; the fit indices are provided in Table V.

Although the initial results for the U.S. sample also indicated adequate model fit, an examination of the residuals and modification indices suggested a significant correlation between two of the

TABLE II

Factor loadings for item-level covariance structure models of subjective well-being: one-factor model

	Student sample 1 (<i>n</i> = 880)	Student sample 2 (<i>n</i> = 731)
Satisfaction with life scale1	0.43	0.78
Satisfaction with life scale2	0.47	0.75
Satisfaction with life scale3	0.49	0.80
Satisfaction with life scale4	0.41	0.62
Satisfaction with life scale5	0.37	0.59
High negative affect1	-0.60	-0.31
High negative affect2	-0.69	-0.29
High negative affect3	-0.73	-0.39
High negative affect4	-0.72	-0.32
High negative affect5	-0.70	-0.38
High negative affect6	-0.49	-0.27
High positive affect1	0.33	0.43
High positive affect2	0.25	0.38
High positive affect3	0.05	0.22
High positive affect4	0.34	0.43

TABLE III

Factor loadings for item-level covariance structure models of subjective well-being: two-factor model

	Student sample 1 (<i>n</i> = 880)	Student sample 2 (<i>n</i> = 731)
<i>Cognition</i>		
Satisfaction with life scale1	0.75	0.85
Satisfaction with life scale2	0.77	0.80
Satisfaction with life scale3	0.76	0.81
Satisfaction with life scale4	0.62	0.61
Satisfaction with life scale5	0.54	0.60
<i>Affect</i>		
High negative affect1	0.64	0.57
High negative affect2	0.74	0.71
High negative affect3	0.73	0.71
High negative affect4	0.77	0.75
High negative affect5	0.76	0.78
High negative affect6	0.52	0.55
High positive affect1	−0.26	−0.34
High positive affect2	−0.18	−0.25
High positive affect3	0.01	−0.04
High positive affect4	−0.26	−0.33

error terms (“feel proud” and “feel pleased”). Correlations between the error terms of exogenous indicator variables suggest a common influence on the variables other than the factor they were designed to indicate, and are believed to have minimal effects on the integrity of the overall model (Kline, 1998). As these two items were both part of the Bradburn (1969) positive affect scale, we respecified the model with this additional parameter and the fit of the three-factor model improved slightly to: χ^2 (50, *n* = 1799) of 291.64 (*p* < 0.001), GFI (0.97), CFI (0.95), and RMSEA (0.05). Some of the factor loadings (see Table VI) were slightly weaker (≥ 0.30) compared to the student samples, but all paths except one (life satisfaction, *p* = 0.06) were significant at the 0.05 level or lower. The test for discriminant validity (Fornell and Larcker, 1981) was not as conclusive in this data set; only the variance shared by positive and negative affect (0.09; versus 0.48 [cognition and positive affect] and 0.36 [cognition and negative affect]) was consistently less than the average variance explained across the indicators for cognition

TABLE IV

Factor loadings for item-level covariance structure models of subjective well-being: three-factor model

	Student sample 1 (<i>n</i> = 880)	Student sample 2 (<i>n</i> = 731)
<i>Cognition</i>		
Satisfaction with life scale1	0.75	0.85
Satisfaction with life scale2	0.77	0.80
Satisfaction with life scale3	0.77	0.81
Satisfaction with life scale4	0.61	0.61
Satisfaction with life scale5	0.54	0.60
<i>Negative affect</i>		
High negative affect1	0.64	0.57
High negative affect2	0.76	0.73
High negative affect3	0.72	0.71
High negative affect4	0.78	0.76
High negative affect5	0.76	0.78
High negative affect6	0.53	0.55
<i>Positive affect</i>		
High positive affect1	0.79	0.78
High positive affect2	0.62	0.68
High positive affect3	0.44	0.46
High positive affect4	0.77	0.74

(0.42), positive affect (0.25), and negative affect (0.27), respectively. This was likely due to the poorer psychometric properties of the Bradburn (1969) affect scale (e.g., Larsen et al., 1985), the only affect measure available. Respecifying the model with either a two- or single-factor structure did not improve the fit. The fit indices and factor loadings for the U.S. sample models are provided in Tables V and VI, respectively.

Scale-Level Analyses

We completed scale-level analyses for the first student sample only, because the item-level analyses were virtually identical for the two samples, and scale-level analyses would have been similar as well. Only one measure per well-being dimension was available for the U.S. sample, so it was not a candidate for scale-level analyses. A total of four satisfaction/happiness scales, three positive affect scales, and

TABLE V
Fit indices for item-level covariance structure models

	Student sample 1	Student sample 2	U.S. sample
<i>One-factor model</i>			
χ^2/df	2783.66/90 = 30.93	2685.52/90 = 29.84	1252.34/53 = 23.63
Goodness of fit index (GFI)	0.66	0.63	0.89
Comparative fit index (CFI)	0.75	0.72	0.80
Root mean squared error of approximation (RMSEA)	0.19	0.20	0.11
Akaike's information criterion (AIC)	2843.66	2745.52	1302.34
<i>Two-factor model</i>			
χ^2/df	1219.80/89 = 13.71	965.77/89 = 10.85	1234.42/52 = 23.74
Goodness of fit index (GFI)	0.82	0.82	0.89
Comparative fit index (CFI)	0.88	0.89	0.81
Root mean squared error of approximation (RMSEA)	0.12	0.12	0.11
Akaike's information criterion (AIC)	1281.80	1027.77	1286.43
<i>Three-factor model</i>			
χ^2/df	185.02/87 = 2.13	140.52/87 = 1.62	291.64/50 = 5.83
Goodness of fit index (GFI)	0.97	0.97	0.97
Comparative fit index (CFI)	0.99	0.99	0.95
Root mean squared error of approximation (RMSEA)	0.04	0.03	0.05
Akaike's information criterion (AIC)	251.02	206.52	347.64
<i>n</i>	880	731	1799

TABLE VI
Factor loadings for item-level covariance structure models: U.S. sample (N = 1799)

Models	One-factor	Two-factor		Three-factor	
	Subjective well-being	Cognition	Affect	Cognition	Negative affect
Happy	0.48	0.51		0.51	
Life satisfaction	0.67	0.76		0.77	
Excited	0.22		0.22		0.38
Proud	0.22		0.21		0.36
Pleased	0.33		0.34		0.42
Top of world	0.51		0.49		0.66
Going your way	0.48		0.48		0.60
Restless	-0.15		-0.16		0.30
Lonely	-0.50		-0.53		0.65
Bored	-0.40		-0.42		0.49
Depressed	-0.53		-0.56		0.69
Upset	-0.16		-0.18		0.31

three negative affect scales were administered to the first student sample.

Descriptive statistics

The means, standard deviations, and intercorrelations are shown in Table VII. All four satisfaction/happiness scales were positively intercorrelated (0.41 to 0.69, $p < 0.01$). High positive affect and short-term positive affect were positively correlated (0.45, $p < 0.01$), as were the high and short-term negative affect scales (0.59, $p < 0.01$). For these eight scales, all intra-construct correlations were stronger than the correlations between scales of different constructs.

As seen in prior research (e.g., Larsen et al., 1985), the Bradburn (1969) affect scales did not demonstrate the same degree of convergent (with other affect measures) and discriminant (with cognitive measures) validity. Bradburn positive affect was correlated with both high positive affect (0.30, $p < 0.01$) and short-term positive affect (0.25, $p < 0.01$), but was more strongly correlated with the cognitive measures (range 0.32 to 0.45, $p < 0.01$). The Bradburn negative affect scale was correlated with high negative affect (0.33, $p < 0.01$) and short-term negative affect (0.26, $p < 0.01$), but these correlations were not significantly larger than those with the cognitive scales (range -0.21 to -0.28 , $p < 0.01$).

Reliability

The reliabilities for all eight multiple-item scales are provided on the diagonal of Table VII. With the exception of the two Bradburn (1969) scales (positive affect $\alpha = 0.64$; negative affect $\alpha = 0.55$), all measures met the minimum coefficient alpha cut off of 0.70 for research purposes (Nunnally, 1967).

Confirmatory factor analysis

We performed a confirmatory factor analysis using scale scores as indicators of the latent well-being constructs. Analyzing scale scores is appropriate when the scales are based on established, theoretically determined, and reliable measurement instruments, and when the primary interest is in the relations among the latent constructs (Little, et al., 2002).

As with the item-level analyses, we began by estimating an inter-correlated three-factor model, with the satisfaction/happiness ($n = 4$),

TABLE VII

Means, standard deviations, Cronbach's alphas, and intercorrelations among subjective well-being scales (student sample 1, n = 897)

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1 NLS happiness	3.15	0.68										
2 Life-3 D-T scale	5.41	1.04	0.41									
3 Well-being index	11.52	1.79	0.49	0.60	(0.92)							
4 Satisfaction with life scale	5.13	1.04	0.42	0.56	0.69	(0.82)						
5 Bradburn positive affect	0.78	0.24	0.32	0.34	0.45	0.37	(0.64)					
6 Bradburn negative affect	0.54	0.28	-0.26	-0.23	-0.28	-0.21	0.85	(0.55)				
7 High positive affect	3.41	0.66	0.27	0.31	0.39	0.32	0.30	-0.11	(0.75)			
8 High negative affect	2.05	0.70	-0.32	-0.29	-0.40	-0.33	-0.20	0.33	-0.14	(0.85)		
9 Short-term PA (PANAS)	2.87	0.82	0.22	0.24	0.29	0.24	0.25	-0.13	0.45	-0.16	(0.88)	
10 Short-term NA (PANAS)	1.68	0.61	-0.26	-0.23	-0.30	-0.26	-0.12	0.26	-0.09	0.59	-0.02	(0.84)

Note: Correlations $> |0.10|$ are significant, $p < 0.01$; correlations $> |0.085|$ are significant, $p < 0.05$; Cronbach's alphas on diagonal, where applicable.

positive affect ($n = 3$), and negative affect ($n = 3$) scales loading onto their respective factors. An examination of the residuals and modification indices suggested a significant correlation between the error terms of the two Bradburn (1969) scales (likely due to a methods effect [unique response scale]), as well as short-term and high positive affect (likely due to the overlap of three items). We respecified the model accordingly, and obtained the following fit indices (see Table VIII): χ^2 (30, $n = 897$) of 64.31 ($p < 0.001$), GFI (0.99), CFI (0.99), and RMSEA (0.04). All but one of the specified paths were significant at the 0.05 level or below (well-being index, $p = 0.06$; see Table IX for factor loadings). Notably, the well-being index has the strongest affective component (the eight semantic differential items comprise approximately one-half of the overall index score) of all the happiness/life satisfaction scales utilized. However, the variance in common between the three latent constructs (positive and negative affect = 0.12; cognition and positive affect = 0.72; and cognition and negative affect = 0.30) was not consistently less than the average variance explained across the indicators for each construct (cognition, mean = 0.55; positive affect, mean = 0.27; negative affect, mean = 0.45).

Given the poor psychometric properties of the Bradburn (1969) scales, we therefore retested the proposed model excluding them from the analysis. Without the Bradburn scales, no additional modifications were required to the model. The fit indices improved slightly: χ^2 (17, $n = 897$) of 33.27 ($p = 0.01$), GFI (0.99), CFI (0.99), and RMSEA (0.03), and all paths but one (well-being index, $p = 0.06$) were again significant at the 0.05 level or below. This time, the variance in common between the three latent constructs (positive and negative affect = 0.04, cognition and positive affect = 0.32, and cognition and negative affect = 0.27) was less than the average variance explained across the indicators for each construct (cognition, mean = 0.55; positive affect, mean = 0.47; negative affect, mean = 0.61), providing confirmation of discriminant validity at the scale level (Fornell and Larcker, 1981).

As with the item-level data, we respecified the model with a one- and two-factor structure, but model fit was significantly reduced (see Table VIII). The intercorrelated three-factor solution provided the best fit, supporting the “tripartite” theory of subjective well-being.

TABLE VIII
Fit indices for scale-level covariance structure models (student sample 1, $n = 897$)

	One-factor model		Two-factor model		Three-factor model	
	With Bradburn	Without Bradburn	With Bradburn	Without Bradburn	With Bradburn	Without Bradburn
χ^2/df	345.71/33 = 10.48	349.56/20 = 17.48	331.60/32 = 10.36	359.22/19 = 18.91	64.31/30 = 2.14	33.27/17 = 1.96
Goodness of fit index (GFI)	0.92	0.90	0.93	0.90	0.99	0.99
Comparative fit index (CFI)	0.92	0.88	0.93	0.90	0.99	0.99
Root mean squared error of approximation (RMSEA)	0.10	0.14	0.10	0.14	0.04	0.03
Akaike's information criterion (AIC)	389.71	381.56	377.60	393.22	114.31	71.27

TABLE IX

Factor loadings for scale-level covariance structure models, student sample 1
($n = 897$)

	With Bradburn	Without Bradburn
<i>One-factor model</i>		
Subjective well-being		
NLS happiness	0.59	0.58
Delighted-terrible scale	0.69	0.70
Satisfaction with life scale	0.76	0.77
Well-being index	0.87	0.87
Short-term positive affect	0.34	0.36
High positive affect	0.44	0.45
Bradburn positive affect	0.51	
Short-term negative affect	-0.39	-0.38
High negative affect	-0.49	-0.48
Bradburn negative affect	-0.35	
<i>Two-factor model</i>		
Cognition		
NLS happiness	0.58	0.57
Delighted-terrible scale	0.70	0.70
Satisfaction with life scale	0.77	0.78
Well-being index	0.88	0.87
Affect		
Short-term positive affect	0.35	0.24
High positive affect	0.43	0.27
Bradburn positive affect	0.52	
Short-term negative affect	-0.48	-0.67
High negative affect	-0.59	-0.81
Bradburn negative affect	-0.42	
<i>Three-factor model</i>		
Cognition		
NLS happiness	0.58	0.57
Delighted-terrible scale	0.70	0.70
Satisfaction with life scale	0.77	0.78
Well-being index	0.88	0.88
Positive affect		
Short-term positive affect	0.40	0.59
High positive affect	0.52	0.77
Bradburn positive affect	0.62	
Negative affect		
Short-term negative affect	0.69	0.68
High negative affect	0.84	0.87
Bradburn negative affect	0.40	

TABLE X
Correlations between well-being dimensions and higher order factor loadings

Model	Student sample 1 ^a (Item, <i>n</i> = 880)	Student sample 2 ^a (Item, <i>n</i> = 731)	U.S. sample ^a (Item, <i>n</i> = 1799)	Student sample 1 ^{a,b} (Scale, <i>n</i> = 897)
Two-factor				
	Cognition & affect	-0.41	0.83	0.60
Three-factor				
	Cognition & positive affect	0.45	0.69	0.57
	Cognition & negative affect	-0.38	-0.60	-0.52
	Positive & negative affect	-0.23	-0.30	-0.21
Higher-order factor ^c				
	Subjective well-being & cognition	0.77	0.41	0.46
	Subjective well-being & positive affect	0.33	0.19	0.23
	Subjective well-being & negative affect	-0.30	-0.14	-0.18

^aTo get the higher-order models to converge, one of the regression coefficients for each first-order latent variable was scaled to 1.00.

^bScale level results are from the model without the Bradburn affect scales.

^cThe three-factor correlated model and the higher order model containing three first-order factors are mathematically equivalent and will therefore yield the same fit statistics.

Higher-Order Factor Structure

As a supplementary analysis, we respecified each of the intercorrelated three-factor models (item level: student sample 1, student sample 2, U.S. sample; scale level: student sample 1) with subjective well-being as a higher order factor predicting the three first-order factors of cognition, positive affect, and negative affect. Specifying a higher order factor forces LISREL to convert the correlation between factors into factor loadings, but otherwise the models are mathematically equivalent. A second-order factor with three first-order factors is by definition just identified; as a result, the fit statistics reflect the first-order structure only (and therefore do not change). In order for the fit indices to reflect both model levels, an additional constraint would need to be placed on the relationship between the latent variables (Rindskopf and Rose, 1988). We knew of no theory or pre-existing studies that would justify such a constraint, and therefore provide the just-identified model results for illustrative purposes only (see Table X). The signs and patterns of relationships between the latent variables are remarkably consistent across all samples and levels of analyses, with one exception. In the two-factor model, the correlation between cognition and affect is negative in the item-level student samples, but positive in the U.S. sample and the scale level results for student sample 1.

DISCUSSION

To our knowledge, this was the first study to test empirically the construct validity of subjective well-being at both the item and scale levels of analysis. In addition, we were able to test the discriminant and convergent validity of the subjective well-being dimensions more comprehensively than had been possible in the past, using both correlation analysis and factor analysis. Previous studies have relied upon smaller samples, which prevented full multivariate analysis of the depth used here. At the item level, the proposed three-factor structure provided the best fit to the data across two student samples ($n = 880$ and $n = 731$) and a nationally representative U.S. sample ($n = 1799$). These results were consistent across

different measures for both cognition (satisfaction with life scale [student samples] and happiness and life satisfaction items [U.S. sample]) and affect (high positive and negative affect scales [student samples] and the Bradburn affect scale [U.S. sample]), as well as across different time periods (the representative U.S. sample predated the student data by 10 years). Further, the consistency between the student and the U.S. sample results, in spite of using different measures, confirms that students are a reasonable sample in which to study subjective well-being.

The scale-level results also confirmed the three-factor structure of subjective well-being. These findings are significant because aggregate-level data have several potential psychometric advantages over item-level data, including: higher reliability, higher communality, larger ratio of common-to-unique factor variance, and decreased likelihood of distributional violations (Little et al., 2002, p. 154). Additionally, Little et al. (2002, p. 155) note that models based on scale-level data: (1) tend to be more parsimonious (i.e., fewer estimated parameters); (2) are less likely to have correlated residuals or cross-loadings; and (3) tend to have reduced sources of sampling error (MacCallum, et al., 1999).

In summary, we found that a three-factor model showed better fit than a one- or two-factor model. Diener and colleagues have argued repeatedly that subjective well-being should be measured through three separate components. Our research provides empirical support for the view that these three components are separate and independent from one another, using larger samples and stronger statistical tests than have been feasible with earlier data sets. Our research also provides empirical support for the view that cognitive and affective measures differ significantly from one another, as the life satisfaction factor was consistently independent from the two affect factors. If we had found evidence of a strong one-factor solution, this might have indicated that a measure of life satisfaction/happiness could encapsulate the emotional tone of the two affective measures – and that perhaps one measure would have been sufficient to measure subjective well-being. Instead, our results indicate that future studies of subjective well-being should include both a cognitively oriented scale and an affect scale that measures positive and negative affect independently.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Additional studies will be necessary to determine whether our scale-level results generalize to nonstudent samples and over non-self-report measures of well-being. We elected to utilize a student sample because the homogeneity of the population provided a more stringent test of discriminant validity. Using self-report data allowed us to compare our results directly with existing literature, which has relied primarily on self-report assessment. We felt that the benefits of these choices outweighed the potential disadvantages.

Based on our results, certain scales may prove more useful than others in future research endeavors. Among the cognitive measures, the well-being index (Campbell et al., 1976) and satisfaction with life scale (i.e., the two multi-item scales; Diener et al., 1985) demonstrated high reliability and the strongest factor loadings. With respect to affect, either the PANAS or the high positive and negative affect dimension scales created by Huelsman et al. (1998) appeared to function adequately. Although the PANAS loadings were somewhat lower, it is important to note that we used the short-term mood version, which tends to be more responsive to recent life events than long-term affect (Diener, 1994). The Bradburn (1969) scale displayed relatively weaker psychometric properties.

Future research should also take changes in well-being over time into consideration. Our study was cross-sectional in nature; we could not examine the interrelationships of the three domains across various time periods, nor could we determine the presence of any causal relationships between cognition and affect, within the subjective well-being construct. Speaking with reference to the broader field of cognitive psychology, Simon (1982, p. 337) has noted that there are "two-directional causal paths between affect and cognition." The notion of causal interrelationships between the dimensions of subjective well-being could have significant implications for the field that are as yet largely unexplored.

Our study supports the prevailing theory that subjective well-being consists of three interrelated yet distinct components: cognitive evaluation (happiness/satisfaction), positive affect, and negative affect. Previously, researchers have measured well-being interchangeably using either satisfaction/happiness or affect scales. Our analyses,

however, suggest that cognitive and affective measures of well-being are not equivalent, and that measuring one without the other may ignore significant interactions between the two, potentially skewing the results. For example, how would we rate the subjective well-being of an individual who expressed high life satisfaction but low positive affect and high negative affect? Alternatively, how would we rate the subjective well-being of an individual who expressed low life satisfaction but high positive affect and low negative affect? Furthermore, other constructs (e.g., personality) tend to relate differently to each of the three well-being dimensions, such that important relationships might be overlooked if satisfaction/happiness, positive affect, and negative affect are not considered simultaneously.

This has implications for theory as well as measurement because it means that subjective well-being is a multidimensional construct far more complex than previously suggested by cognitive (or affective) measures alone. If life satisfaction is part of an overall well-being construct, then it follows that domain satisfaction measures (e.g., job satisfaction) may likewise form part of a more comprehensive “domain well-being” construct, that takes both cognition and affect into consideration. The failure to take affect into account may be responsible, at least in part, for the conflicting results in studies of the relationship between job satisfaction and job performance (e.g., Judge et al., 2001). In summary, while we support the call for greater focus on “positive psychology,” such research can be properly undertaken only when an appropriate measurement strategy has been developed, including both cognitive and affective measures.

ACKNOWLEDGEMENT

We would like to express our appreciation to Timothy Baldwin for his assistance in the preparation of this manuscript, and to the thoughtful editor and reviewers who helped us improve this manuscript even further. Research support was provided by the Coleman Chair Fund.

NOTES

¹ We are indebted to an anonymous reviewer for suggesting this analysis.

REFERENCES

- Akaike, H.: 1987, 'Factor analysis and the AIC', *Psychometrika* 52, pp. 317–332.
- Andrews, F. M. and R. Crandall: 1976, 'The validity of measures of self-reported well-being', *Social Indicators Research* 3, pp. 1–19.
- Andrews, F. M. and A. C. McKennell: 1980, 'Measures of self-reported well-being: Their affective, cognitive, and other components', *Social Indicators Research* 8, pp. 127–155.
- Andrews, F. M. and J. P. Robinson: 1991, 'Measures of subjective well being', in J. P. Robinson, P. R. Shaver and L. S. Wrightsman (eds.), *Measures of Personality and Social Psychological Attitudes Vol. 1* (San Diego: Academic Press), pp. 61–114.
- Andrews, F. M. and S. B. Withey: 1976, *Social Indicators of Well-being: Americans' Perceptions of Life Quality* (New York: Plenum Press).
- Benin, M. H., W. A. Stock and M. A. Okun: 1988, 'Positive and negative affect: A maximum-likelihood approach', *Social Indicators Research* 20, pp. 165–175.
- Bentler, P. M.: 1990, 'Comparative fit indexes in structural models', *Psychological Bulletin* 107, pp. 238–246.
- Bradburn, N. M.: 1969, *The Structure of Psychological Well-being* (Chicago: Aldine).
- Brown, M. W. and R. Cudeck: 1993, 'Alternative ways of assessing model fit', in K. A. Bollen and J. S. Long (eds.), *Testing Structural Equation Models* (Newbury Park, California: Sage), pp. 136–162.
- Burke, M. J., A. P. Brief, J. M. George, L. Roberson and J. Webster: 1989, 'Measuring affect at work: Confirmatory analyses of competing structures with conceptual linkage to cortical regulatory systems', *Journal of Personality and Social Psychology* 57, pp. 1091–1102.
- Byrne, B. M.: 1998, *Structural Equation Modeling with LISREL, PRELIS, and SIMPLIS: Basic Concepts, Applications, and Programming* (Mahway, N.J.: Lawrence Erlbaum Associates).
- Campbell, A., P. E. Converse and W. L. Rodgers: 1976, *The Quality of American life: Perceptions, Evaluations, and Satisfaction* (New York: Russell Sage Foundation).
- Clark, L. A. and D. Watson: 1988, 'Mood and the mundane: Relations between daily life events and self-reported mood', *Journal of Personality and Social Psychology* 54(2), pp. 296–308.
- Clore, G. L., A. Ortony and M. A. Foss: 1987, 'The psychological foundations of the affective lexicon', *Journal of Personality and Social Psychology* 53, pp. 751–766.
- Crooker, K. J. and J. P. Near: 1998, 'Happiness and satisfaction: Measures of affect and cognition', *Social Indicators Research* 44, pp. 195–224.
- Diener, E.: 1994, 'Assessing subjective well-being: Progress and opportunities', *Social Indicators Research* 31, pp. 103–157.
- Diener, E. and R. A. Emmons: 1985, 'The independence of positive and negative affect', *Journal of Personality and Social Psychology* 47(5), pp. 1105–1117.
- Diener, E., R. A. Emmons, R. J. Larsen and S. Griffin: 1985a, 'The Satisfaction with Life Scale', *Journal of Personality Assessment* 49(1), pp. 71–75.
- Diener, E. and A. Iran-Nejad: 1986, 'The relationship in experience between various types of affect', *Journal of Personality and Social Psychology* 50(5), pp. 1031–1038.

- Diener, E., R. J. Larsen, S. Levine and R. A. Emmons: 1985b, 'Intensity and frequency: Dimensions underlying positive and negative affect', *Journal of Personality and Social Psychology* 48(5), pp. 1253–1265.
- Diener, E. and R. E. Lucas: 2000, 'Subjective emotional well-being', in M. Lewis and J. M. Haviland (eds.), *Handbook of Emotions*, 2nd ed. (New York: Guilford), pp. 325–337.
- Diener, E., E. Sandvik, W. Pavot and D. Gallagher: 1991, 'Response artifacts in the measurement of subjective well-being', *Social Indicators Research* 24, pp. 35–56.
- Diener, E., H. Smith and F. Fujita: 1995, 'The personality structure of affect', *Journal of Personality and Social Psychology* 69(1), pp. 130–141.
- Diener, E., E. Suh and S. Oishi: 1997, 'Recent findings on subjective well being', *Indian Journal of Clinical Psychology* 24, pp. 25–41.
- Fordyce, M. W.: 1988, 'A review of research on the Happiness Measures: A sixty second index of happiness and mental health', *Social Indicators Research* 20, pp. 355–381.
- Fornell, C. and D. F. Larcker: 1981, 'Evaluating structural equation models with unobservable variables and measurement error', *Journal of Marketing Research* 18, pp. 39–50.
- Green, D. P., S. L. Goldman and P. Salovey: 1993, 'Measurement error masks bipolarity in affect ratings', *Journal of Personality and Social Psychology* 64(6), pp. 1029–1041.
- Gurin, G., J. Veroff and S. Feld: 1960, *American's View of their Mental Health* (New York: Basic).
- Horley, J. and B. R. Little: 1985, 'Affective and cognitive components of global subjective well-being measures', *Social Indicators Research* 17 pp. 189–197.
- Huelsman, T. J., R. C. Jr. Nemanick and D. C. Munz: 1998, 'Scales to measure four dimensions of dispositional mood: Positive energy, tiredness, negative activation, and relaxation', *Educational and Psychological Measurement* 58(5), pp. 804–819.
- Joreskog, K. G. and D. Sorbom: 1984, *LISREL-VI User's Guide* 3rd ed., (Morgantown, IN: Scientific Software).
- Judge, T. A., C. J. Thoresen, J. E. Bono and G. K. Patton: 2001, 'The job satisfaction-job performance relationship: A qualitative and quantitative review', *Psychological Bulletin* 127, pp. 376–407.
- Kline, R. B.: 1998, *Structural Equation Modeling* (New York: The Guilford Press).
- Larsen, R. J., E. Diener and R. A. Emmons: 1985, 'An evaluation of subjective well-being measures', *Social Indicators Research* 17, pp. 1–17.
- Little, T. D., W. A. Cunningham, G. Shahar and K. F. Widaman: 2002, 'To parcel or not to parcel: Exploring the question, weighing the merits', *Structural Equation Modeling* 9(2), pp. 151–173.
- Lucas, R. E., E. Diener and E. Suh: 1996, 'Discriminant validity of well-being measures', *Journal of Personality and Social Psychology* 71(3), pp. 616–628.
- Luthans, F.: 2002, 'Positive organizational behavior: Developing and managing psychological strengths', *Academy of Management Executive* 16, pp. 57–75.
- MacCallum, R. C., K. F. Widaman, S. Zhang and S. Hong: 1999, 'Sample size in factor analysis', *Psychological Methods* 4, pp. 84–99.
- Nowlis, V.: 1965, 'Research with the mood adjective check list', in S. S. Thomkins and C. E. Izard (eds.), *Affect, Cognition, and Personality* (New York: Springer), pp. 352–389.
- Nunnally, J. C.: 1967, *Psychometric Theory* (New York: McGraw-Hill).

- Oishi, S., E. F. Diener, R. E. Lucas and E. M. Suh: 1999, 'Cross-cultural variations in predictors of life satisfaction: Perspectives from needs and values', *Personality and Social Psychology Bulletin* 25(8), pp. 980–990.
- Organ, D. W. and J. P. Near: 1985, 'Cognition versus affect in measures of job satisfaction', *International Journal of Psychology* 20, pp. 241–253.
- Pavot, W. and E. Diener: 1993, 'The affective and cognitive context of self-reported measures of subjective well-being', *Social Indicators Research* 28, pp. 1–20.
- Pavot, W., E. Diener, C. R. Colvin and E. Sandvik: 1991, 'Further validation of the Satisfaction with Life Scale: Evidence for the cross-method convergence of well-being measures', *Journal of Personality Assessment* 57(1), pp. 149–161.
- Podsakoff, P. M. and D. W. Organ: 1986, 'Self-reports in organizational research: Problems and prospects', *Journal of Management* 12(4), pp. 531–544.
- Rain, J. S., I. M. Lane and D. D. Steiner: 1991, 'A current look at the job satisfaction/life satisfaction relationship', *Human Relations* 44, pp. 287–307.
- Rice, R. W., J. P. Near and R. G. Hunt: 1980, 'The job satisfaction-life satisfaction relationship: a review of empirical research', *Basic and Applied Social Psychology* 1, pp. 37–64.
- Rindskopf, D. and T. Rose: 1988, 'Some theory and applications of confirmatory second-order factor analysis', *Multivariate Behavioral Research* 23, pp. 51–67.
- Sandvik, E., E. Diener and L. Seidlitz: 1993, 'Subjective well-being: the convergence and stability of self-report and non-self-report measures', *Journal of Personality* 61(3), pp. 317–342.
- Simon, H. A.: 1982, 'Comments', in M. S. Clark and S. T. Fiske (eds.), *Affect and cognition: The Seventeenth Annual Carnegie Symposium on Cognition* (Hillsdale, NJ: Lawrence Erlbaum), pp. 333–342.
- Thayer, R. E.: 1986, 'Activation-deactivation adjective check list: Current overview and structural analysis', *Psychological Reports* 58, pp. 607–614.
- Veenhoven, R.: 1986, *Happiness in Nations: Subjective Appreciation of Life in 56 Nations, 1946–1992* (Rotterdam: RISBO).
- Warr, P., J. Barter and G. Brownbridge: 1983, 'On the independence of positive and negative affect', *Journal of Personality and Social Psychology* 44, pp. 644–651.
- Watson, D.: 1988, 'Intraindividual and interindividual analyses of positive and negative affect: Their relation to health complaints, perceived stress, and daily activities', *Journal of Personality and Social Psychology* 54(6), pp. 1020–1030.
- Watson, D., L. A. Clark and A. Tellegen: 1988, 'Development and validation of brief measures of positive and negative affect: the PANAS scales', *Journal of Personality and Social Psychology* 54(6), pp. 1063–1070.
- Watson, D. and A. Tellegen: 1985, 'Towards a consensual structure of mood', *Psychological Bulletin* 98(2), pp. 219–235.
- World Values Study Group: 1999, *World Values Survey, 1981–1984 and 1990–1993* [Computer file], 2nd ICSPR version (Ann Arbor: MI: Institute for Social Research, producer, Ann Arbor, MI: Inter-university Consortium for Political and Social Research, distributor).
- Zajonc, R. B.: 1980, 'Feeling and thinking: Preferences need no inferences', *American Psychologist* 35(2), pp. 151–175.
- Zajonc, R. B., P. Pietromonaco and J. Bargh: 1982, 'Independence and interaction of affect and cognition', in M. S. Clark and S. T. Fiske (eds.), *Affect and Cognition: The Seventeenth Annual Carnegie Symposium on Cognition* (Hillsdale, NJ: Lawrence Erlbaum), pp. 211–228.

Zevon, M. A. and A. Tellegen: 1982, 'The structure of mood change: An idiographic/nomothetic analysis', *Journal of Personality and Social Psychology* 43(1), pp. 111–122.

Indiana University
E-mail: marthaud@indiana.edu

Marne L. Arthaud-Day

Miami University of Ohio
E-mail: rodejc@muohio.edu

Joseph C. Rode

Indiana University
E-mail: chmooney@indiana.edu

Christine H. Mooney

Kelley School of Business
Indiana University
1309 East 10th Street
Bloomington, IN 47405-1701
Email: near@indiana.edu

Janet P. Near



Cognitive, affective and contextual predictors of subjective wellbeing

Iolanda Costa Galinha · José Luís Pais-Ribeiro

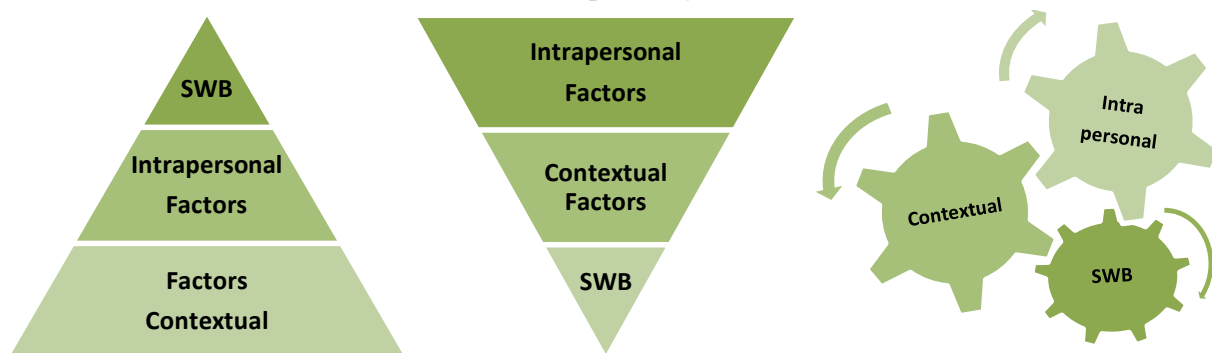
Abstract: The article analyses the prediction of cognitive, affective and contextual factors to Subjective Wellbeing (SWB). Four different components of SWB were used in order to identify its different predictors. A sample of 303 adult students was collected and reassessed over a two-month interval. Seven instruments were used to measure: Global Subjective Wellbeing; Satisfaction with Life in Domains; Positive and Negative State Affect; Positive and Negative Trait Affect; Standards of Comparison; Depression, Anxiety and Stress; Life Events; and Socio-Demographic variables. Results indicated that Global SWB is predicted by Satisfaction with Life in Domains, and Positive and Negative State Affect. The cognitive dimension of SWB is predicted by Depression, Comparison Standards, State and Trait Affect, and several contextual variables. The affective dimension of SWB is predicted by Trait Affect, Depression, Anxiety, and the contextual variable of educational status. Results also indicated that intrapersonal variables are the main predictors of SWB, however contextual variables are also significant predictors. Each component of SWB (global, cognitive & affective) shows different predictors, stressing the importance of analysing and reporting separately the results of each component. Among the predictors of SWB over a two-month interval, state affective variables and contextual variables lose prediction power, while trait affective and cognitive variables gain prediction power.

Keywords: subjective wellbeing; satisfaction with life; positive and negative affect; predictors

1. Introduction

One of the main goals of scientific research in the field of Subjective Wellbeing (SWB) has been to identify the main predictors of human happiness. In the preceding decades, researchers have tried to address the question regarding the main associates of SWB through different approaches: *bottom up* (emphasising the importance of contextual factors), *top down* (emphasising the importance of intrapersonal factors), and *integrative* (emphasising the dynamic contribution of intrapersonal & contextual factors, see Figure 1).

Figure 1. Representation of *bottom up*, *top down* and *integrative* theoretical models of SWB, respectively



However, most studies have not analysed the impact of the different factors combined, and therefore have not determined the relative contribution of each factor to SWB. Researchers defended the importance of analysing several predictors of SWB together, in order to identify the contribution of each above and beyond the others (Diener & Biswas-Diener, 2000). In this study we contribute to the literature by identifying the relative contribution of several cognitive, affective and contextual factors to SWB. The aim of the present study is to identify which perspective – *bottom up*, *top down* or *integrative* – is best supported.

Secondly, several studies on the associates of SWB have used only one measure of SWB, sometimes representing only one dimension of the concept (i.e., cognitive or affective). Several authors have suggested that different measures of SWB have different predictors, and have defended the importance of using several measures of SWB in order to fully understand the phenomenon (Diener, 2000; 2006; Schwarz & Strack, 1999; Sirgy, 2002). In this study we use several measures of SWB – global, specific, cognitive and affective – and identify the main predictors of each measure.

Thirdly, most studies on the predictors of SWB are cross-sectional. Longitudinal studies are rare (Diener & Ryan, 2009) and are most frequently developed in six-month. Some studies have shown differences in the impact of the predictors of SWB in a present context, as well as within a six-month interval. Some studies indicate that contextual factors may be better predictors of SWB in the present, while intrapersonal trait factors may be important predictors of medium- and long-term SWB (Suh, Diener & Fujita, 1996). Could these differences be observed in shorter temporal intervals? In this study we contribute to the literature with data about the factors that best predict SWB in the present, and the factors that best predict SWB over a short-term interval of two months.

Subjective Wellbeing is accepted to be a broad concept, to have a cognitive and an affective dimension, separated and moderately correlated. The construct includes variables such as Satisfaction with Life as a Whole or in Specific Domains, and Positive Affect and Negative Affect (Arthaud-Day, Rode, Mooney & Near, 2005; Diener & Ryan, 2009; Galinha & Pais-Ribeiro, 2008). The concept of SWB can be assessed through different dimensions – cognitive and affective – and different levels of analysis – global and specific – depending on the instruments used; see Table 1 (Diener, 2006; Sirgy, 2002).

Table 1: Levels of analysis of Subjective Wellbeing

	Cognitive	Affective
Global	Global Life Satisfaction	Global Happiness
Specific	Satisfaction with Life in Domains	Positive State Affect Negative State Affect

The study of the associates of SWB has been developed in three major stages with different characteristics and objectives (Diener & Biswas-Diener, 2000). A *bottom up* perspective influenced the first stage of studies on SWB. These studies mainly analysed the impact of contextual factors in the SWB of individuals. The main purpose of this stage was to identify the Socio-Demographic characteristics of happy people. From the *bottom up* perspective there is a major influence of external life circumstances (e.g. material conditions; life events; socio-political contexts) on the subjective experience of individuals. According to this perspective, adverse circumstances affect SWB (Brief, Butcher, George, & Link, 1993; Feist, Bodner, Jacobs, Miles, & Tan, 1995). However, one of the main findings of this phase was that contextual factors are not the most powerful in explaining the variability of SWB. In most studies, contextual factors such as Socio-Demographic variables and Life Events show only weak or short-term impacts in SWB. Some exceptions are also reported indicating that in some circumstances, contextual factors may have a strong and long-term impact on the SWB of individuals: a) when life conditions decline below a minimum level of satisfaction of human needs (Veenhoven, 1996); b) when some Life Events such as marriage and long-term unemployment are experienced (Helliwell, Barrington-Leigh, Harris, & Huang, 2009; Lucas, Clark, Georgellis, & Diener, 2004); and c) when systematic differences in SWB are observed between poor and rich countries, showing the poorer countries as the least happy in the world (Farid & Lazarus, 2008; Inglehart & Klingemann, 2000).

In the second stage of research about the predictors of SWB there was a development of theoretical models and an emphasis on analysing the contribution of intrapersonal factors to SWB, such as temperament, social comparison, the goal-achievement gap and adaptation (Diener & Biswas-Diener, 2000). A *top down* perspective influenced the studies of SWB in this stage. Studies tested the hypothesis that the intrapersonal (affective & cognitive) characteristics of individuals determine their SWB (Brief et al., 1993; Feist et al., 1995). Theories postulated that two persons in the same circumstances can evaluate their SWB in different ways. Results indicated that intrapersonal variables are stronger determinants of SWB than contextual factors (see Diener & Ryan, 2009; Diener, Suh, Lucas, & Smith, 1999 for a review). The *top down* perspective received support from empirical studies throughout the last few decades, placing personality and positive predisposition as main predictors of SWB (see Lucas, 2008 for a review).

Headey and Wearing (1992), however, questioned the validity of both *bottom up* and *top down* models *per se* and pointed out limitations in both. They suggested that both contextual and intrapersonal factors have an impact on SWB. Nevertheless, after a period of time the impact of contextual factors (e.g. Life Events) on SWB decreases and individuals return to their original level of SWB, as determined by intrapersonal factors (e.g. personality). Classical and current studies support this rationale and show that through the effect of time, people adapt to

the impact of major Life Events and Socio-Demographic changes (Bonanno, Moskowitz, Papa, & Folkman, 2005; Lowenstein & Frederick, 1999; Silver & Wortman, 1980). Suh, Diener and Fujita (1996) concluded that life events and personality differ in the duration of their effects on SWB. Life events produce a short-term effect (three to six months on average) and personality produces a long-term effect (at least two years) in the variability of SWB. However, as stated before, recent studies suggest that some Life Events (e.g., death of a spouse) produce permanent changes that have a long-term impact on the SWB of individuals and some authors have defended the view that the set point theory may have to be revised (Headey, 2008). Finally, Feist et al. (1995) tested both *top down* and *bottom up* models of SWB in a structural equation modelling analysis and concluded that both contributed to explain SWB, but that neither was shown to have a significantly better fit than the other.

In the third stage of research on the predictors of SWB there was a trend of integrating several lines of research into holistic models as a way of understanding the dynamic interaction between several factors of SWB. The *integrative* perspective defends that SWB is influenced by multiple variables – the individual's emotional state, past events, the expectations of the future and social comparisons – in a dynamic interaction (Suh, Diener, Oishi, & Triandis, 1998; Schwarz & Strack, 1999). In this stage, the main objectives of studies consist of understanding the psychological processes inherent to the different measures of SWB (Diener & Biswas-Diener, 2000). Several authors have defended the importance of using separate measures of the cognitive, as well as the affective, dimensions of SWB in order to identify different predictors of SWB (Diener, 2000; 2006). Other authors have defended the importance of using separate measures of the positive and negative affective components of SWB because they are independent and yield different relationships with several variables (Diener, 2000; 2006; Fredrickson, 2006). Others yet have defended the importance of analysing several levels of measures of SWB – global and specific – in order to identify SWB's different predictors (Schwarz & Strack, 1999; Sirgy, 2002).

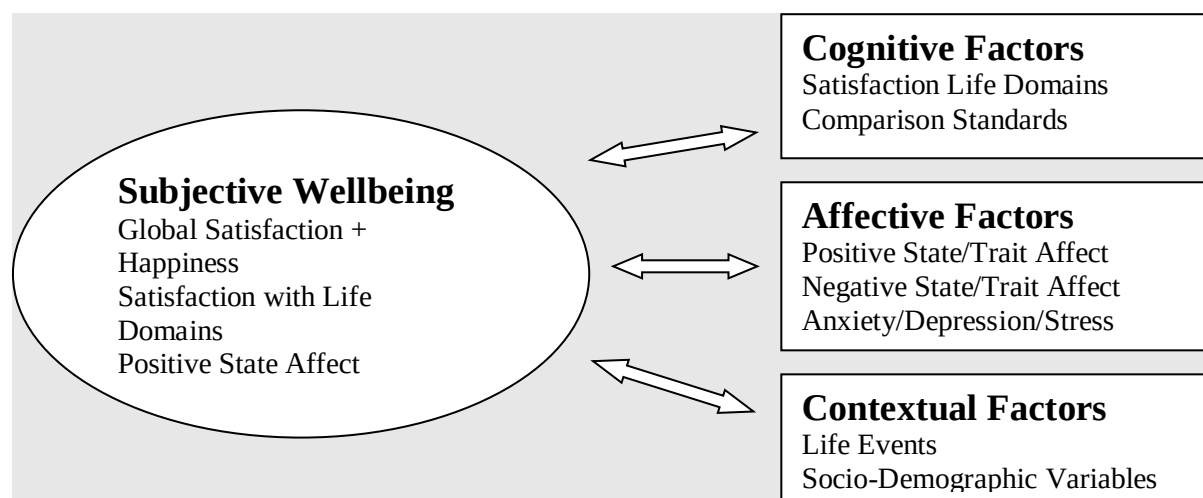
A few empirical studies show that the different components of SWB have different associates (Jones, Rapport, Hanks, Lichtenberg, & Telmet, 2003; Jovanovic, 2011); that the cognitive dimension of SWB is more closely associated with the contextual variables, and that the affective dimension is more closely associated with personality variables (Schimmack, Schupp & Wagner, 2008). Positive and Negative Affect show distinct yet complementary functions. High Negative Affect is associated with the restriction and focus of thoughts and actions; while, Positive Affect is associated with the broadening of thoughts and actions, allowing the building of long-term personal resources and it also optimizes health (Folkman & Moskowitz, 2000; Fredrickson, 2006; Fredrickson & Branigan, 2005).

Empirical studies on the predictors of the different levels of measurement of SWB (global or specific) show that global measures correlate less with contextual factors than with specific measures - such as Satisfaction of Life in Domains (Diener, 1999). Global measures of SWB show more stability over time and specific measures are more diagnostic, providing understanding about the causes of total SWB (Sirgy, 2002; Diener, 2006). Global measures of SWB require the demanding task of considering satisfaction with several aspects of life resumed in one answer. Because this is a complex task, people may choose to answer in a simpler way, based on their affective state at the moment they are answering the questionnaire. Thus, Satisfaction with Life as a Whole would be more influenced by the affective state of the individual, while Satisfaction with Life in Domains reports would be more influenced by intra- and inter-individual comparisons (Schwarz & Strack, 1999).

The results of Diener, Napa-Scollon, Oishi, Dzokoto and Suh (2000), using both specific and global measures of SWB, reflected mainly *bottom up* and *top down* influences, respectively. Examining the factors that are associated with the different levels of measurement of SWB, the authors found that global measures of SWB are more influenced by intrapersonal characteristics, such as individual predisposition. According to Diener and Biswas-Diener (2000), these findings can bring a new understanding of the processes inherent to the variability of SWB. Using several levels of self-reporting measures of SWB simultaneously, we can better understand these processes.

In this study we have three main objectives. The first objective is to analyse the relative contribution of several factors to SWB: intrapersonal (cognitive & affective) and contextual (see Figure 1).

Figure 1: Representation of the relationships between Subjective Wellbeing measures and cognitive, affective and contextual variables



We want to answer the question: which factors contribute above and beyond the other factors to the variability of SWB? We expect that in a conjoint analysis, the intrapersonal factors are the best predictors of SWB. Would the contextual factors show a significant contribution to SWB?

The second objective of the study is to analyse the best predictors of the different measures of SWB – global and specific. We want to answer the question: Do global and specific measures of SWB have different predictors? According to the previous literature, global measures are best predicted by affective factors, while specific measures may reflect actual experiences of individuals and be more diagnostic about the causes of SWB.

The third objective of the study is to analyse the effect of time in the contribution of intrapersonal and contextual factors to SWB. Which variables in the present best predict SWB in the near future? Previous studies indicate that contextual variables lose prediction power over time, while personality variables gain prediction power within a six-month interval. Can we observe the same pattern in a shorter time interval?

2. Method

2.1 Participants

We administered the questionnaires to 303 Portuguese adults (professional trainees 39.2%, university students 60.8%) and repeated the application over a two-month interval. At time II, 245 questionnaires were collected, with a retention rate of 80.9%. The participants were

between 20 and 58 years old; 81.1% were young adults (20 to 40 years old) and 67% were women. In terms of years of education, 25.5% of the participants completed 4 to 9 years of education, 22.5% completed 10 to 12 years, and 42.2% completed 13 to 17 years. The participants in the study volunteered, were not paid, and were informed of the confidentiality and anonymity of their answers in accordance with the ethical standards of the American Psychological Association (APA).

2.2 Materials

2.2.1 Global subjective wellbeing

Global Subjective Wellbeing was measured by Global Happiness and Global Satisfaction single items. We selected the Global Happiness item used by the Gallup Organization of the American Institute for Public Opinion – “In general, how happy would you say you are?” For the Global Satisfaction item, we selected the item used in the Eurobarometer: “On the whole, how satisfied are you with your life?”. We opted for a seven-point scale in order to discriminate minor differences in the levels of Subjective Wellbeing, from: (1) “Extremely Unhappy/Dissatisfied”; to (7) “Extremely Happy/Satisfied” (Andrews & Robinson, 1991). Global Happiness and Global Satisfaction are considered two different measures of Global SWB. Although Happiness and Satisfaction represent, respectively, a more affective or cognitive dimension, in fact, neither of the two are pure markers of each dimension (Andrews & Robinson, 1991). However, the Principal Components Analysis showed that the two items were measuring the same construct; therefore we decided to use the mean of both indicators as a measure of Global SWB (see Table 2). In this study, Global Happiness mean was 5.06 ($SD = .97$) and Global Satisfaction mean was 4.82 ($SD = 1.03$). The two items together yielded a *Chronbach's alpha* of .80. The test-retest correlation of Global SWB over a two-month interval was moderate (.54).

2.2.2 Satisfaction with life in domains

Satisfaction with Life in Domains was measured by the Quality of Life Index (Ferrans & Powers, 1985). The Quality of Life Index is a specific multi-item cognitive measure of SWB that measures the satisfaction and importance of 31 life domains (e.g. family, work, health, financial conditions), using a six-point scale: (1) “Very Dissatisfied” to (6) “Very Satisfied”; (1) “Very Unimportant” to (6) “Very Important”. We used a narrow (at present) time reference. Results reflect the overall quality of life, considering satisfaction and the importance attributed to each life domain in four subscales: health and functioning; family; social and economic; and psychological and spiritual. Previous studies have supported the psychometric qualities of this scale: construct validity (Ferrans & Powers, 1985); convergent validity with other Life Satisfaction Scales (Anderson & Ferrans, 1997); and internal consistency with a Cronbach's alpha between .89 and .95 (Canaval, Gonzalez, Martinez-Schallmoser, Tovar, & Valencia, 2000). In our study, we used the global indicator of quality of life, a variable which is computed by summing all the items of the scale in a total score. The internal consistency of the total scale was .91 (time I) and .93 (time II). The test-retest correlation over a two-month interval was moderate (.65).

2.2.3 Positive and negative state affect

Positive and Negative State Affect was measured by the Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988, Portuguese version from Galinha & Pais-Ribeiro,

2005). The PANAS asks how the individual feels, in the present, regarding ten positive and ten negative specific emotions using a five-point scale, from: (1) "Very slightly or not at all" to (5) "Extremely". The PANAS is one of the most widely used affect scales and was validated in several countries, showing high stability and internal consistency (Watson et al., 1988). However, studies are not consensual about the PANAS' factor-structure and about the relationship between the PA and NA. Some results have indicated a two-factor structure of PANAS (Crawford & Henry, 2004) and others indicated a three-factor structure (Gaudreau, Sanchez & Blondin, 2006). Some results have indicated an independent relationship between PA and NA (Crocker, 1997) and others indicated a correlated relationship (Green & Salovey, 1999). Anyway, the authors of the scale have also found small significant correlations between PA and NA and proposed that PA and NA are tendencially, although not absolutely, independent (Watson et al., 1988). The Portuguese validation revealed good internal consistency with a *Cronbach's alpha* of .86 for Positive Affect, and .89 for Negative Affect, and showed the tendency for independence between the two scales ($r = -.10$, $p = .05$). In the present study, the scale showed good internal consistency with a Cronbach's alpha of .87 and .88 for Negative State Affect (time I & time II). *Cronbach's alpha* for Positive state Affect was .82 and .89 (time I and time II). The test-retest correlation over a two-month interval was moderate being .64 for Positive Affect, and .52 for Negative Affect.

2.2.4 Positive and negative trait affect

We also used the PANAS as a Trait Affect measure, with a different time instruction: "Indicate to what extent you generally feel this way, that is, how you feel on average?". The authors of the scale stated that the stability coefficients of the general version of the PANAS are sufficient to be able to use it as a trait affect measure (Watson, et al, 1988; Watson & Clark, 1997). In the present study the scale showed good internal consistency, with a Cronbach's alpha of .88 and .91 for Negative Trait Affect (time I & time II), and .82 and .86 for Positive Trait Affect.(time I & time II). The test-retest correlation over a two-month interval for Positive trait Affect (.65) and for Negative trait Affect (.63) was moderate.

2.2.5 Standards of comparison

Standards of Comparison (Telic, Social and Temporal Comparison) was measured by three global items extracted from the Satisfaction and Happiness Questionnaire (SHQ) (Michalos, 1980). The SHQ evaluates the Satisfaction and Standards of Comparison of 12 specific domains of life. The three Standards of Comparison items evaluate the goal-achievement gap (telic comparison), peers' comparison (social comparison), and the previous best comparison (temporal comparison). The items ask, "Considering your life as a whole, how would you evaluate it, comparing it with: a) your goals and ambitions?; b) the average of the people of your age?; c) the best moment of your life in the past?". Answer options are on a five-point scale from (1) "Far below.."; to (5) "Far above .."; with an extra option, (6) "No opinion". The arithmetic mean of these three global comparison items constitutes the Standards of Comparison variable used in this study. We could not find psychometric studies of the Satisfaction and Happiness Questionnaire. In our study this variable showed a weak internal consistency with a Cronbach's alpha of .59 (time I) and .68 (time II). The test-retest correlation over a two-month interval was moderate (.56).

2.2.6 Anxiety, depression and stress

Anxiety, Depression and Stress was measured by Escala de Ansiedade, Depressão e Stress – ADS 21 (Pais-Ribeiro, Honrado, & Leal, 2004), the Portuguese version of the Depression Anxiety and Stress Scale - 21 (DASS-21; Lovibond & Lovibond, 1995). The DASS-21 was developed according to the tripartite model of Anxiety and Depression (Clark & Watson, 1991). Each variable is measured using seven items. Respondents are asked, “In what way did each sentence apply to you during the past month”, and used a four-point scale to respond: (0) “Did not apply to me at all” to (3) “Applied to me very much, or most of the time”. The internal consistency (*Cronbach’s alpha*) of the Portuguese version was $\alpha = .85$ for the sub-scale of Depression, $\alpha = .74$ for the sub-scale of Anxiety and $\alpha = .81$ for the sub-scale of Stress (Pais-Ribeiro, et al., 2004). In our study the scale had good internal consistency; between $\alpha = .81$ and $\alpha = .90$ across the three subscales in both data sets. The test-retest correlation over a two-month interval was moderate for Depression (.53), Anxiety (.60) and Stress (.48).

2.2.7 Life events balance

Life Events Balance (i.e. the difference between positive and negative life events) was measured by the Inventory EVE (Ferrerri, Vacher, Tawil, & Alby, 1987). The EVE questionnaire includes a list of 32 events grouped in five categories of life domains: family; professional; social; marital (relationships); and health. Each category of events has an additional item (other); the individual may fill out an item that is not contemplated in the list. The list proposes to evaluate the events that normatively occur in the life cycle of an adult, excluding catastrophic events, daily hassles or events that might be confused with symptoms. The impact of the events is evaluated by the individuals according to their personal vulnerability to the events. In our study we used a different response scale; a four-point scale: (1) “Very positive impact”; to (4) “Very negative impact”. We summed all the events that were considered to have a positive impact into one score, and all the events that were considered to have a negative impact into another score. Then we subtracted the second score from the first and obtained a Balance of the Life Events score. In our study, the mean of the Balance of Life Events was $M = 0$ ($SE = .17$); the maximum negative value was -8 and the maximum positive was 8. The median was $Mdn = 0$ and the mode was 1. The skewness of the distribution was .01, $SE = .14$ and the kurtosis was -.08, $SE = .28$, indicating normality in the distribution of the results.

2.2.8 Socio-demographic variables

A group of socio-demographic variables was included to characterize the individuals in our sample and to identify their objective life circumstances: gender; age; years of education; years of professional training; marital status; employment status; nationality; household income; household members; leisure time; and religious activities time. We also assessed health status by questioning individuals about chronic diseases diagnosed, physical impairment and health perception.

2.3 Procedure

With the institutions’ and the teachers’ permission, we approached participants in classrooms at the end of lessons. We invited the students to participate in a study about peoples’ emotions. The students who volunteered answered the questionnaires in the classroom. The researcher was present to answer any questions and supplied an e-mail address for further contact. In order to match the questionnaires from time I and time II, we requested participants write a

password on a separate sheet. Time II data collection was carried out two months later, at which point participants answered questionnaires that were matched to the previous ones through the passwords they supplied.

3. Results

3.1 Preliminary analysis

We began our data analysis by performing a principal components analysis (PCA), with Direct Oblimin rotation because it is expected that the factors are correlated. We did not define a number of components to extract but retained all factors whose eigenvalues were superior to 1. Results separated three components: a) one negative affective (including Negative State and Negative Trait Affect, Anxiety, Stress and Depression); b) one positive affective (including Positive State and Positive Trait Affect); and c) one cognitive (including Global Satisfaction with life, Global Happiness, Satisfaction with Life in Domains, and Social Comparison). Results indicated good main and secondary loadings, indicating good convergent and discriminant validity between the variables in the study; see Table 2.

Table 2: Principal components analysis with direct oblimin rotation of the cognitive and affective measures of the study

	Components		
	1	2	3
Global Happiness (a)	.02	.82	.07
Global Satisfaction (c)	-.04	.86	.06
Satisfaction with Life in Domains (c)	-.18	.69	-.13
State Positive Affect (a)	.05	.06	-.87
State Negative Affect (a)	.74	-.21	-.16
Trait Positive Affect (a)	-.05	-.03	-.90
Trait Negative Affect (a)	.68	-.14	.02
Standards of Comparison (c)	.07	.70	-.14
Depression (a)	.68	-.20	.21
Anxiety (a)	.93	.18	.02
Stress (a)	.91	.09	-.01

Note: (a) affective measures; (c) cognitive measures. Factor loadings >.40 are in boldface.

The Keiser-Meyer-Olkin test yielded a .82 value, indicating that the partial correlations among variables are strong enough to provide an adequate PCA. The Bartlett's Test of Sphericity yielded a $\chi^2_{255}=1210.18$ $p < .0001$, indicating that the correlation matrix is not an identity matrix and that the factor model is appropriate.

In the next step we performed a correlation analysis between the variables in the study and obtained low to moderate correlations, indicating discriminant validity and avoiding the problem of multicollinearity. The highest correlation found was .61, not surprisingly between State Affect and Trait Affect variables. The Socio-Demographic variables were subjected to dummy variable coding as described by Tabachnick and Fidel (2001).

3.1.1 Predictors of SWB

We performed a regression analysis using the stepwise method. Each of the SWB variables in the study was introduced as a dependent variable (Global Subjective Wellbeing; Satisfaction with Life in Domains; Positive State Affect; Negative State Affect). As independent variables, we introduced intrapersonal cognitive variables (such as Satisfaction with Life in Domains, Standards of Comparison), intrapersonal affective variables (such as Positive and Negative State Affect, Positive and Negative Trait Affect, Depression, Anxiety, Stress) and contextual variables (such as Life Events Balance, Socio-Demographic variables).

The predictors of Global SWB were Satisfaction with Life in Domains, Negative State Affect and Positive State Affect, explaining 34% of Global SWB variance (Table 3). Thus, the predictors of Global SWB were intrapersonal factors (cognitive & affective). Excluded were all contextual factors, affective trait and mood variables.

Table 3: Regression analysis (stepwise) for the predictors of global subjective wellbeing

	Model 3 B^I	$SE\ B$	95% CI
Constant	2.96***	.48	[2.01, 3.91]
Satisfaction With Life in Domains	.10***	.02	[-.06, .13]
Negative State Affect	-.31**	.12	[-.54, -.08]
Positive State Affect	.17*	.09	[-.01, .34]
R^2	.35		
F	25.24***		
ΔR^2	.34		

Note. CI = confidence interval. * $p < .05$. ** $p < .01$. *** $p < .001$. ^IBeta unstandardized coefficients of the last stepwise model of variables entered in the regression.

The predictors of Satisfaction with Life in Domains – a cognitive and specific measure of SWB – were Depression, Standards of Comparison, Life Events Balance, Positive State Affect, Socio-Demographic variables (gender - being a man; income - reporting higher levels; education - reporting fewer years of education; living with children - reporting living with fewer children; health perception - reporting not being ill) and Negative Trait Affect, explaining 58% of SWB variance (Table 4). Thus, the predictors of the cognitive and specific measure of SWB were intrapersonal factors (affective & cognitive) and contextual factors (life events & life circumstances).

Table 4: Regression analysis (stepwise) for the predictors of satisfaction with life in domains

	Model 10 B	SE B	95% CI
Constant	17.40***	1.95	[13.54, 21.27]
Depression	-1.90***	.47	[-2.83, -.97]
Standards of Comparison	1.03***	.27	[.48, 1.58]
Life Events Balance	.20**	.07	[.05, .35]
Positive State Affect	.96**	.30	[.35, 1.56]
Health Perception	2.55**	.88	[.80, 4.28]
Gender	-1.29**	.41	[-2.09, -.47]
Income	.58**	.16	[.25, .90]
Years of Education	-.21**	.05	[-.32, -.08]
Negative Trait Affect	-.99*	.39	[-1.75, -.21]
Nr Children live with	-.61*	.26	[-1.12, -.09]
R ²	.61		
F	21.05***		
ΔR ²	.58		

Note. Dummy Variable Coding: Sex - 0 Female; 1 Male; Health Perception - 0 Ill; 1 Not ill. CI = confidence interval. * $p < .05$. ** $p < .01$. *** $p < .001$. ¹Beta unstandardized coefficients of the last stepwise model, of variables entered in the regression.

The predictors of the Positive State Affect – an affective and specific measure of SWB – were the Positive Trait Affect, one Socio-Demographic variable (educational status - being at university predicts lower Positive Affect than being in professional training) and Negative Trait Affect, explaining 42% of its variance (Table 5). The predictors of Positive Affect were intrapersonal affective factors and one contextual factor. Excluded were other contextual variables, cognitive, state affective and mood variables.

Table 5: Regression analysis (stepwise) for the predictors of positive state affect

	Model 3 B	SE B	95% CI
Constant	-.25	.48	[-1.19, .69]
Positive Trait Affect	1.02***	.11	[.80, 1.25]
Education Status	-.24**	.09	[-.42, -.07]
Negative Trait Affect	-.19*	.08	[-.35, -.04]
R ²	.43		
F	35.60***		
ΔR ²	.42		

Note. Dummy Variable Coding: Education Status - 0 Professional Trainee; 1 University Student. CI = confidence interval. * $p < .05$. ** $p < .01$. *** $p < .001$. ¹Beta unstandardized coefficients of the last stepwise model, of variables entered in the regression.

Negative State Affect – an affective and specific measure of SWB – was predicted by Depression, Negative Trait Affect, Anxiety, Positive State Affect and Satisfaction with Life in Domains, explaining 45% of its variance (Table 6). The predictors of Negative Affect were exclusively intrapersonal factors: affective and cognitive.

Table 6: Regression analysis (stepwise) for the predictors of Negative State Affect

	Model 5 B	SE B	95% CI
Constant	.86*	.34	[.18, 1.54]
Depression	.26**	.09	[.07, .45]
Negative Trait Affect	.25***	.07	[.12, .38]
Anxiety	.28**	.09	[.10, .46]
Positive State Affect	.12*	.05	[.02, .22]
Satisfaction with Life in Domains	-.02*	.01	[-.05, -.00]
R^2	.47		
F	24.59***		
ΔR^2	.45		

Note. CI = confidence interval. * $p < .05$. ** $p < .01$. *** $p < .001$. * $p < .05$. ** $p < .01$. *** $p < .001$. [†] Beta unstandardized coefficients of the last stepwise model, of variables entered in the regression.

Results suggest that SWB was mainly predicted by intrapersonal factors. Among the intrapersonal factors, the affective factors were the most important in predicting SWB: mood (particularly Depression); affective trait and affective state variables. However, contextual factors also significantly contribute to SWB, beyond the intrapersonal factors.

3.1.2 Predictors of global or specific measures of SWB

The main difference between the global and specific measures of SWB was that the global measure was firstly predicted by a cognitive factor while the specific measures were all firstly predicted by affective factors. Furthermore, specific measures were predicted by contextual factors, particularly the cognitive dimension, while the global measure was not predicted by contextual factors.

3.1.3 Predictors of SWB over a two-month interval

In order to identify which variables in the present are predictors of SWB two months later, a regression analysis was performed using the stepwise method. We introduced the cognitive, affective and contextual variables measured in time I as independent variables, and the four SWB variables, and the four SWB variables measured in time II as dependent variables.

Results indicated that the variables in time I that predicted Global SWB over a two-month interval were Satisfaction with Life in Domains, Standards of Comparison, and Negative Trait Affect, explaining 39% of its variance (Table 7).

Table 7: Regression analysis (stepwise) predicting global subjective wellbeing over a two-month interval

	Model 3 <i>B</i>	<i>SE B</i>	95% CI
Constant	3.37***	.51	[2.36, 4.39]
Satisfaction with Life in Domains	.06**	.02	[.02, .10]
Standards of Comparison	.28***	.07	[.14, .43]
Negative Trait Affect	-.27*	.10	[-.47, -.06]
<i>R</i> ²	.41		
<i>F</i>	25.71***		
ΔR^2	.39		

Note. CI = confidence interval. * $p < .05$. ** $p < .01$. *** $p < .001$. [†] $p < .05$. ** $p < .01$. *** $p < .001$. [†] Beta unstandardized coefficients of the last stepwise model, of variables entered in the regression.

The variables at time I that predicted Satisfaction with Life in Domains two months later were Depression, Standards of Comparison, Negative Trait Affect, health perception (the fact that the individual reports not feeling ill at the time), and nationality (being Portuguese instead of foreigner), explaining 38% of its variance (Table 8).

Table 8: Regression analysis (stepwise) predicting satisfaction with life in domains over a two-month interval

	Model 5 <i>B</i>	<i>SE B</i>	95% CI
Constant	17.07***	2.42	[12.26, 21.87]
Depression	-1.54*	.68	[-2.90, -.19]
Standards of Comparison	1.09**	.35	[.39, 1.79]
Negative Trait Affect	-1.80***	.50	[-2.78, -.81]
Health Perception	2.80*	1.19	[.44, 5.16]
Nationality	3.32*	1.43	[.50, 6.15]
<i>R</i> ²	.41		
<i>F</i>	15.57***		
ΔR^2	.39		

Note. Dummy Variable Coding: Nationality – 0 Foreigner; Portuguese; *Health Perception* – 0 Ill; 1 Not ill. * $p < .05$. ** $p < .01$. *** $p < .001$. [†] Beta unstandardized coefficients of the last stepwise model, of variables entered in the regression.

The predictors of the Positive State Affect, two months later, were Positive Trait Affect, Satisfaction with Life in Domains, and one Socio-Demographic variable (employment status: being unemployed was a predictor of lower Positive Affect), explaining 32% of its variance (Table 9).

Table 9: Regression analysis (stepwise) predicting positive state affect over a two-month interval

	Model 3 B	SE B	95% CI
Constant	-1.07	.57	[-2.20, .06]
Positive Trait Affect	.85***	.15	[.55, 1.15]
Satisfaction with Life in Domains	.06**	.02	[.02, .09]
Employment Status	-.29*	.13	[-.54, -.02]
R^2	.35		
F	19.91***		
ΔR^2	.33		

Note. Dummy Variable Coding: Employment Status – 0 Unemployed; 1 Employed. * $p < .05$. ** $p < .01$. *** $p < .001$. ¹Beta unstandardized coefficients of the last stepwise model, of variables entered in the regression.

Depression was the only predictor of Negative State Affect over a two-month interval (Model 1 $B=.49$, $SEB = .12$; $R^2 = .12$; $\Delta R^2 = .12$; $F= 16.08$; $p<.0001$), ICs [.25, .73], explaining 11% of the variance.

We observed that the first predictor of each SWB variable at time I was the same at time II (e.g. Satisfaction with Life in Domains was the first predictor of Global SWB at time I and at time II). However, among the secondary predictors we observed differences. Mood and affective trait variables showed higher predictive power of SWB over a two-month interval. The affective state variables were no longer among the predictors of SWB, and the contextual factors lost their prediction power, even more so, over a two-month interval.

4. Discussion

4.1 The main predictors of SWB

Our first objective was to identify the main predictors of SWB. To that end, we analysed the conjoint contribution of intrapersonal factors (cognitive & affective variables), and contextual factors (Life Events Balance & socio-demographic variables) in order to explain several components of SWB. The predictors of Global SWB were exclusively intrapersonal factors: Satisfaction with Life in Domains, Negative State Affect and Positive State Affect. Contextual variables and other affective variables, such as mood and trait affect, were not significant predictors of Global SWB. This result supports previous research which places intrapersonal factors among the main predictors of SWB.

Concerning the cognitive dimension of SWB, Depression was its first predictor, followed by Comparison Standards. Other researchers have found equivalent results, concluding that Satisfaction with Life: a) involves a cognitive process but also an affective process (Veenhoven, 1996); b) that it is a function of the comparison between life achievements and the personal standards of the individual (Schwarz & Strack, 1999); and c) that it is promoted by the individuals mainly to prevent Depression (Sirgy, 2002). Among the predictors of this dimension of SWB, we observed mood, cognitive variables, affective state and trait variables and a significant contribution of several contextual variables. This measure of SWB showed more contextual influences than any other measure, confirming previous results that contextual variables are associated more with Satisfaction with Life when measured in Domains rather than through global measures (Diener, 1999; Schimmack, Schupp & Wagner, 2008; Sirgy, 2002).

We agree that several components of SWB correlate in different ways with contextual variables (Schwarz & Strack, 1999).

Concerning the *affective dimensions of SWB*, results showed a main association with affective trait and mood variables. The contribution of affective trait factors to the affective dimension of SWB is not surprising, since, in our study, state and trait affect were measured with the same instrument (PANAS), using a different temporal frame (Watson et al., 1988). However, we also observed the contribution of Depression, a mood factor, in predicting Negative State Affect. Several previous studies showed the important contribution of Depression to SWB variables (Cummins, Gullone & Lau, 2002; Diener & Seligman, 2002), strongly suggesting that SWB is an indicator of the absence of Depression. In our results, Depression was also the first predictor of the cognitive dimension of SWB, constituting one of the main predictors of the SWB variables in our study. Only one contextual variable was predictive of Positive State Affect and none was predictive of Negative State Affect.

Regarding the theoretical models of SWB, a broad examination of our results indicates that the main predictors of SWB were intrapersonal (cognitive and affective). As expected, the contextual factors were not the best predictors of SWB. The results support the *top down* theoretical models of SWB (Brief et al., 1993). However, the results also showed that the contextual variables significantly predicted SWB, particularly its cognitive dimension. Therefore, we cannot state that one of the models is better. Feist et al. (1995) also tested the *bottom up* and *top down* models and concluded that neither was better than the other.

To discuss the contribution of the contextual variables to SWB we must consider the characteristics of our sample. The sample in our study, as samples in most studies of SWB, has a medium socio-economic status, and is thus unlikely to experience deficits in basic human needs. As discussed in previous research (Inglehart & Klingemann, 2000; Veenhoven, 1996), these samples are not adequate to show the impact of the contextual variables on SWB. Contextual variables became very important to the SWB of individuals when basic needs are not fulfilled (Veenhoven, 1996). Considering these elements, we cannot state that contextual variables are not important predictors of SWB. We argue that our results preferably support the *integrative* theoretical model of SWB, because all orders of factors - cognitive, affective and contextual -, significantly contribute to SWB, supporting the multidimensionality of predictors, as argued by McCullough, Huebner, and Laughlin (2000). Furthermore, the *integrative* model presupposes that the contribution of the predictors to SWB is dynamic, depending on other factors such as the characteristics of the sample, the variables being assessed, and the time frame used.

4.2 The predictors of global and specific measures of SWB

Considering global SWB, measured by Global Happiness and Global Satisfaction, we expected that it would be firstly predicted by affective state or trait factors. According to Schwarz and Strack (1999), Global SWB measures are complex because they ask of the individual the task of evaluating every life domain and combine it in a global answer. Confronted with that demanding task, global measures of SWB may not reflect a systematic and accurate evaluation of all aspects of life. Rather, people may respond in accordance with their affective state in the moment of the assessment. In turn, specific measures are probably more influenced by intra and inter comparison processes, since they supply the information to be compared (e.g. specific life domains) as well as the evaluation criteria (e.g. response options). Results obtained by Diener et al. (2000) also showed that global measures of SWB tend to be predicted by broad

indicators and positive predisposition factors, while specific measures may reflect actual experiences and be more diagnostic on the causes of global SWB.

Our results only partially support previous research. In fact, the specific measures were more accurately predicted by the actual experiences of the individuals (such as Life Events and Socio-Demographic variables), while Global SWB was not predicted by contextual variables. This result supports previous findings that global measures reflect more *top down* influences while specific measures of SWB reflect more *bottom up* influences. Our results also show that Comparison Standards were a significant predictor of the specific measure of SWB, supporting the hypothesis that specific measures are more influenced by intra and inter comparison processes, and are more diagnostic, providing information about the causes of SWB (Diener et al., 2000; Schwarz & Strack, 1999).

However, our results do not support the hypothesis that global SWB is mainly influenced by the affective state and trait of the individuals. The affective variables did not prove to be the best predictors of the global SWB. In fact, Global SWB first predictor was a cognitive variable (Satisfaction with Life in Domains). We should note that the Global SWB questions were placed at the beginning of the questionnaire, so that the Satisfaction with Life in Domain questions would not influence the global answers. The differences between our results and the ones from Diener et al. (2000) may be explained by the different measures used in both studies. As global measures of SWB, Diener et al. (2000) employed three life satisfaction domains (e.g. education, recreation, and oneself), similar to the ones we used as specific measures. As global measures, we used Global Life Satisfaction and Global Happiness. As specific measures, Diener et al. (2000) used specific aspects of each life domain (e.g., satisfaction with books & with teachers), while we used 31 life satisfaction domains (e.g., education, recreation, oneself, income). We conclude that further study may be useful to understand the different dynamics of answering questions regarding global and specific measures of SWB.

4.3 Predictors of SWB over a two-month interval

An important result of our study relates to the effect of time in the prediction power of several factors in the SWB of individuals. We observe differences from the predictors of Global SWB between time I and time II of data collection. The predictors of Global SWB measured in time II were Satisfaction with Life in Domains, Comparison Standards and Negative Trait Affect. Over a two-month interval the affective state variables were no longer predictors of SWB and the cognitive and affective trait variables became more predictive of SWB in the future.

The first predictor of Satisfaction with Life in time II, as in time I, was Depression. However, state affective variables were no longer predictors of Satisfaction with Life in time II, trait affective variables maintained their predictive power and the contextual variables showed less predictive power. Results support the idea that contextual factors have a short-term effect, while trait variables have a long-term effect in SWB, as argued previously (Headey & Wearing, 1992; Suh, Diener & Fujita, 1996).

The predictors of Positive and Negative Affect at time II were mood and trait affective variables, although Satisfaction with Life in domains and employment were also predictors. Employment is, in fact, one of the contextual variables that shows a consistent and long-term association with SWB (Lucas, et al., 2004).

Concluding our discussion of the predictors of SWB over a two-month interval, we observed that affective state variables and contextual variables lost predictive power and that affective trait variables increased their predictive power. These results stress the importance of

analysing the predictors of SWB in different moments in time, because the factors that predict SWB in the present may not be relevant to predict SWB in the future.

One of the limitations of our study was the use of two instruments that were not previously validated in the Portuguese language, specifically, the measures of Satisfaction with Life in Domains and Social Comparison. At the time it was not possible to find parsimonious instruments validated in the Portuguese language to measure the above constructs; available instruments were too long for use in a global questionnaire such as this one. Therefore we opted for more parsimonious instruments, although not validated. Yet, as reported, the psychometric qualities of these instruments yielded adequate values of internal consistency, reliability and convergent and discriminant validity; except for a rather low Chronbach Alpha of the Social Comparison variable. Another limitation of the study is related to the gender and age bias of our sample, constituted mostly of women and young adults. Furthermore, we only sampled a two month interval period; results may not be generalized for longer periods of time.

Concluding our results, the intrapersonal factors (cognitive & affective) were the main predictors of SWB, particularly the affective, Depression, State and Trait Affect. Contextual variables such as Life Events Balance and socio-demographic variables also showed significant prediction of SWB, particularly of the cognitive dimension. The different dimensions and levels of measurement of SWB showed different predictors, indicating that they are distinct and that the findings for one may not generalize to the others (Diener, 2000; 2006; Schimmack, Schupp, & Wagner, 2008). For further study it would be important to include measures of the three dimensions of the concept: Satisfaction with Life, Positive Affect and Negative Affect. However, if that proves not possible, then it would be essential to clearly report which measures of SWB were used, and to what dimension the results refer.

Finally, our results also showed that time has an effect in the predictors of SWB. Even in a short temporal interval of two months, contextual and state affect variables lost predictive power, while trait affect variables gained predictive power. Considering our results, we agree with the *integrative* perspective which emphasises the contribution of multiple factors to SWB in a dynamic interaction. This means that depending on the characteristics of the samples, of the measures used and of the time frame in which measurement occurs, the contribution of each factor to SWB can change. Further study should continue to explore the relationships between these factors.

We consider these results important in understanding the processes and dynamics of SWB. By understanding the relationship between different predictors, different measures and the time variable, it is possible to better intervene and to more reasonably anticipate the results of intervention programs over time.

Acknowledgements

We are grateful for financial support from the Portuguese Foundation for the Sciences and Technologies BPD/26479/2006.

Authors

Iolanda Costa Galinha
Universidade Autónoma de Lisboa
iolandag@yahoo.com

José Luís Pais Ribeiro
Universidade do Porto.

jlpr@netcabo.pt

Publishing Timeline

Received 25 July 2011

Accepted 4 December 2011

Published 29 April 2012

References

- Anderson, J., & Ferrans, C. (1997). The quality of life of persons with chronic fatigue syndrome. *Journal of Nervous and Mental Disease*, 186, 359-367. <http://dx.doi.org/10.1097/00005053-199706000-00001>
- Andrews, F., & Robinson, J. (1991). Measures of subjective well being. In J. P. Robinson, P. R. Shaver, & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes* (pp. 61-67). San Diego: Academic Press.
- Arthaud-Day, M.L., Rode, J.C., Mooney, C.H. & Near, J.P. (2005). The subjective well-being construct: A test of its convergent, discriminant, and factorial validity. *Social Indicators Research*, 74, 445-476. <http://dx.doi.org/10.1007/s11205-004-8209-6>
- Bonanno, G. A., Moskowitz, J. T., Papa, A., & Folkman, S. (2005). Resilience to loss in bereaved spouses, bereaved parents, and bereaved gay men. *Journal of Personality and Social Psychology*, 88, 827-843. <http://dx.doi.org/10.1037/0022-3514.88.5.827>
- Brief, A., Butcher, A., George, J., & Link, K. (1993). Integrating bottom-up and top-down theories of subjective well-being: The case of health. *Journal of Personality and Social Psychology*, 64, 646-653. <http://dx.doi.org/10.1037/0022-3514.64.4.646>
- Canaval, G., Gonzalez, M., Martinez-Schallmoser, L., Tovar, M., & Valencia, C. (2000). Depresion postparto, apoyo social y calidad de vida en mujeres de Cali, Colombia. *Colombia Medica*, 31, 4-10.
- Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, 100, 316-336.
- Crawford, J., & Henry, J. (2004). The positive and negative affect schedule (PANAS): construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, 43, 245-265
- Crocker, P. (1997). A confirmatory factor analysis of the positive affect negative affect schedule with a youth sport sample. *Journal of Sport and Exercise Psychology*, 19, 91-97.
- Cummins, R., Gullone, E., & Lau, A. (2002). A model of subjective well-being homeostasis: The role of personality. In E. Gullone & R. A. Cummins (Eds.) *The universality of subjective well-being indicators* (pp. 7-46). The Netherlands: Kluwer Academic Publishers. http://dx.doi.org/10.1007/978-94-010-0271-4_3
- Diener, E. (1999). Introduction to the special section on the structure of emotion. *Journal of Personality and Social Psychology*, 76, 803-804. <http://dx.doi.org/10.1037/0022-3514.76.5.803>
- Diener, E. (2000). Subjective well-being: The science of happiness, and a proposal for a national index. *American Psychologist*, 55, 34-43. <http://dx.doi.org/10.1037/0003-066X.55.1.34>
- Diener, E. (2006). Guidelines for national indicators of subjective well-being and ill-being. *Applied Research in Quality of Life*, 1, 151-157. <http://dx.doi.org/10.1007/s11482-006-9007-x>
- Diener, E., & Biswas-Diener, R. (2000). New directions in subjective well-being research: The cutting edge. *Indian Journal of Clinical Psychology*, 27, 21-33.
- Diener, E., Napa-Scollon, C., Oishi, S., Dzokoto, V., & Suh, E. (2000). Positivity and the construction of life satisfaction judgments: Global happiness is not the sum of its parts. *Journal of Happiness Studies*, 1, 159-176. <http://dx.doi.org/10.1023/A:1010031813405>
- Diener, E., & Ryan, K. (2009). Subjective well-being: a general overview. *South African Journal of Psychology*, 39, 391-406.
- Diener, E., & Seligman, M. (2002). Very happy people. *Psychological Science*, 13, 81-84. <http://dx.doi.org/10.1111/1467-9280.00415>

- Diener, E., Suh, E., Lucas, R., & Smith, H. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125, 276-302. <http://dx.doi.org/10.1037/0033-2909.125.2.276>
- Farid, M., & Lazarus, H. (2008). Subjective well-being in rich and poor countries. *Journal of Management Development*, 27, 1053-1065. <http://dx.doi.org/10.1108/02621710810916303>
- Feist, G. J., Bodner, T. E., Jacobs, J. F., Miles, M., & Tan, V. (1995). Integrating top-down and bottom-up structural models of subjective well-being: A longitudinal investigation. *Journal of Personality and Social Psychology*, 68(1), 138-150. <http://dx.doi.org/10.1037/0022-3514.68.1.138>
- Ferrans, C., & Powers, M. (1985). Quality of life index: Development and psychometric properties. *Advances in Nursing Science*, 8, 15-24.
- Ferreri, M., Vacher, J., Tawil, S., & Alby, M. (1987). Facteurs événementiels et dépression: le questionnaire EVE, une nouvelle approche de méthodologie prédictive. *Psychologie Médicale* 19, 2441-2448.
- Folkman, S. & Moskowitz, J. (2000). Positive affect and the other side of coping. *American Psychologist*, 55, 647-654. <http://dx.doi.org/10.1037/0003-066X.55.6.647>
- Fredrickson, B. L. (2006). The broaden-and-build theory of positive emotions. In M. Csikszentmihalyi & I. Csikszentmihalyi, (Eds.), *A life worth living: Contributions to positive psychology* (pp. 85-103). New York, NY US: Oxford University Press.
- Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, 19(3), 313-332. <http://dx.doi.org/10.1080/02699930441000238>
- Gaudreau, P., Sanchez, X., & Blondin, J. (2006). Positive and negative affective states in a performance-related setting testing the factorial structure of the PANAS across two samples of French-Canadian participants. *European Journal of Psychological Assessment*, 22, 240-249.
- Galinha, I., & Pais-Ribeiro, J. (2005). Contribuição para o estudo da versão portuguesa da Positive and Negative Affect Schedule (PANAS): II – Estudo Psicométrico. *Análise Psicológica*, 23, 219-227.
- Galinha, I. & Pais-Ribeiro, J. (2008). Structure and stability of subjective well-being: A structure equation modelling analysis. *Applied Research in Quality of Life*, 3, 293-314. <http://dx.doi.org/10.1007/s11482-009-9063-0>
- Green, D., & Salovey, P. (1999). In what sense are positive and negative affect independent? A reply to Tellegen, Watson, and Clark. *Psychological Science*, 10, 304-306.
- Headey, B. (2008). The set-point theory of well-being: negative results and consequent revisions. *Social Indicators Research*, 85(3), 389-403. <http://dx.doi.org/10.1007/s11205-007-9134-2>
- Headey, B., & Wearing, A. (1992). *Understanding happiness: A theory of subjective well being*. Melbourne: Longman Cheshire.
- Helliwell, J.F., Barrington-Leigh, C., Harris, A., & Huang, H. (2009). International evidence on the social context of well-being. In E. Diener, D. Kahneman, & J.F. Helliwell (Eds.), *International Differences in Well-Being*. Oxford, UK: Oxford University Press.
- Inglehart, R., & Klingemann, H. (2000). Genes, culture, democracy and happiness. In E. Diener & E. Suh (Eds.), *Subjective well-being across cultures* (pp. 165-183). Cambridge: MA, MIT Press.
- Jones, T. G., Rapport, L. J., Hanks, R. A., Lichtenberg, P. A., & Telmet, K. (2003). Cognitive and psychosocial predictors of subjective well-being in urban older adults. *The Clinical Neuropsychologist*, 17(1), 3-18. <http://dx.doi.org/10.1076/clin.17.1.3.15626>
- Jovanovic, V. (2011). Personality and subjective well-being: One neglected model of personality and two forgotten aspects of subjective well-being. *Personality And Individual Differences*, 50(5), 631-635. doi:10.1016/j.paid.2010.12.008
- Lovibond, P., & Lovibond, S. (1995). The structure of negative emotional states: Comparison of the depression anxiety stress scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, 33, 335-343. [http://dx.doi.org/10.1016/0005-7967\(94\)00075-U](http://dx.doi.org/10.1016/0005-7967(94)00075-U)
- Loewenstein, G., & Frederick, S. (1999). Hedonic adaptation: From the bright side to the dark side. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 61-84). New York, Russell Sage Foundation.
- Lucas, R. E. (2008). Personality and subjective well-being. In R. J. Larsen & M. Eid (Eds.), *The science of*

- subjective well-being* (pp. 171-194). New York: Guilford Press.
- Lucas, R. E., Clark, A. E., Georgellis, Y., & Diener, E. (2004). Unemployment alters the set point for life satisfaction. *Psychological Science*, 15, 8-13. <http://dx.doi.org/10.1111/j.0963-7214.2004.01501002.x>
- McCullough, G., Heubner, E., & Laughlin, J. (2000). Life events, self-concept, and adolescents' positive subjective well-being. *Psychology in the Schools*, 37, 281-291. [http://dx.doi.org/10.1002/\(SICI\)1520-6807\(200005\)37:3%3c281::AID-PITS8%3e3.0.CO;2-2](http://dx.doi.org/10.1002/(SICI)1520-6807(200005)37:3%3c281::AID-PITS8%3e3.0.CO;2-2)
- Michalos, A. (1980). Satisfaction and happiness. *Social Indicators Research*, 8, 385-422. <http://dx.doi.org/10.1007/BF00461152>
- Pais-Ribeiro, J., Honrado, A. & Leal, I., (2004). Contribuição para o Estudo da Adaptação Portuguesa das escalas de Anxiety, Depression e Stress (EADS) de 21 itens de Lovibond e Lovibond. *Psicologia, Saúde e Doenças*, 5, 229-239.
- Schimmack, U., Schupp, J., & Wagner, G. (2008). The influence of environment and personality on the affective and cognitive component of subjective well-being. *Social Indicators Research*, 89, 41-60. <http://dx.doi.org/10.1007/s11205-007-9230-3>
- Schwarz, N., & Strack, F. (1999). Reports of subjective well-being: Judgmental processes and their methodological implications. In Kahneman, D., Diener, E., & Schwarz, N. (Eds). *Well-Being: The foundations of hedonic psychology* (pp. 61-83). New York: Russel Sage Foundation.
- Silver, R., & Wortman, C. (1980). Coping with undesirable life events. In J. Garber & M. E. P. Seligman (Eds.), *Human helplessness: Theory and applications* (pp. 279-340). New York: Academic Press.
- Sirgy, M. (2002). *The psychology of quality of life*. Dordrecht: Kluwer Academic Publishers.
- Suh, E., Diener, E., & Fujita, F. (1996). Events and subjective well-being: Only recent events matter. *Journal of Personality and Social Psychology*, 70, 1091-1102. <http://dx.doi.org/10.1037/0022-3514.70.5.1091>
- Suh, E., Diener, E., Oishi, S., & Triandis, H. C. (1998). The shifting basis of life satisfaction judgments across cultures: Emotions versus norms. *Journal of Personality and Social Psychology*, 74, 482-493. <http://dx.doi.org/10.1037/0022-3514.74.2.482>
- Tabachnick, B. & Fidel, L. (2001). *Using Multivariate Statistics* (4th Edition). Boston, Allyn & Bacon.
- Veenhoven, R. (1996). The study of life satisfaction. In Saris, W.E., Veenhoven, R. Scherpenzeel, A. C. & Bunting, B. (Eds.). *A comparative study of satisfaction with life in Europe* (pp. 11-48). Eötvös: University Press.
- Watson, D., Clark, L. & Tellegen, A. (1988). Development and validation of brief measures of Positive and Negative Affect: the PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063-1070. <http://dx.doi.org/10.1037/0022-3514.54.6.1063>
- Watson, K., & Clark, L. (1997). Extroversion and its positive emotional core. In R. Hogan, J. Hohnson, & S. Briggs (Eds.). *Handbook of personality psychology* (pp. 767-793). San Diego: Academic Press.



**Superintendencia de
Industria y Comercio**

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT: 800.176.089-2

COMPROBANTE DE RECAUDO SISTEMA SIPI

Radicado: NC2021/0017697

Recibo: 25-218565

Fecha: 31/12/2025

CAROLINA MERCEDES DAZA MONTALVO

CC: 66.783.790

Pago PSE No: 1210360

CUS: 2050019374

Patente PCT

MEJORAMIENTOS EN O RELACIONADOS CON COMPUESTOS ORGÁNICOS

Detalle del pago

Id.	Rentístico	Concepto y Servicio	Cant.	Val. Unit.	Subtotal
1	50005-01-03	Modificaciones / Correcciones al registro Patente PCT (DESCUENTO INTERNET)	1	\$ 225,000	\$ 225,000
TOTAL					\$ 225,000