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Development of an Implicit Overall Well-Being Measure Using the Implicit Association Test

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Usually, well-being has been measured by means of questionnaires or scales. Although most of these methods have a high level of reliability and validity, they present some limitations. In order to try to improve well-being assessment, in the present work, the authors propose a new complementary instrument: The Implicit Overall Well-Being Measure (IOWBM). The Implicit Association Test (IAT) was adapted to measure well-being by assessing associations of the self with well-being-related words. In the first study, the IOWBM showed good internal consistency and adequate temporal reliability. In the second study, it presented weak correlations with explicit well-being measures. The third study examined the validity of the measure, analyzing the effect of traumatic memories on implicit well-being. The results showed that people who remember a traumatic event presented low levels of implicit well-being compared with people in the control condition.
Keywords: well-being, implicit measurement, instrumental study, experiment.

El procedimiento más empleado para la evaluación del bienestar consiste en la utilización de cuestionarios de auto-informe. A pesar de que la mayor parte de estos instrumentos poseen un alto grado de fiabilidad y validez, presentan también algunas limitaciones. Por ello, para intentar complementarlos, en esta investigación se propone, mediante la adaptación del *Implicit Association Test* (IAT), un nuevo instrumento: la Medida Implícita de Bienestar General (MIBG), que proporciona una evaluación indirecta del bienestar mediante la medición de las asociaciones del *Yo* (vs. *No-Yo*) con las categorías *Bienestar* (vs. *Malestar*). En el primer estudio, la MIBG mostró una buena consistencia interna y una aceptable fiabilidad temporal. En el segundo estudio presentó débiles correlaciones con las medidas explícitas de bienestar. Para profundizar en la validez de esta medida se desarrolló un tercer estudio experimental que analizó la eficacia de la MIBG para recoger el efecto que tiene recordar un acontecimiento traumático sobre las medidas implícitas del bienestar, comprobando que, frente al grupo control, los participantes que recordaron un acontecimiento traumático mostraron implícitamente menores niveles de bienestar.
Palabras clave: bienestar, medición implícita, estudio instrumental, experimento.

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As the study of well-being has developed in Psychology, the field has witnessed the appearance of two different (although partially overlapping) paradigms of its empirical approach. Each one was supported by a world model and a subject model. The first would be classified under what we generally call hedonism (Kahneman, Diener, & Schwarz, 1999) and upholds that well-being is nothing more than pleasure or happiness. Although there are many ways to assess pleasure or displeasure, most investigators of this trend have used the construct *subjective well-being* (SWB) to measure it (Diener & Lucas, 1999). SWB has two main components: people's emotional responses, also called affects, and life satisfaction. The second tradition considers that the development of human potential must be added to the dimension of happiness. This second viewpoint has been called eudaemonism (Waterman, 1993) and its study has led to the construct of *psychological well-being*. Although both traditions have followed different paths, current studies (e.g. Keyes, Shmotkin, & Ryff, 2002) have concluded that both constructs are conceptually related, as they present a high estimated intercorrelation (r = .84), which justifies the extraction of a second-order factor called *general well-being*.

For both traditions, the easiest way to obtain information about people's well-being has consisted of asking the interested parties directly, and, for this purpose, one of the most common procedures has been to explicitly request people to fill in a questionnaire. The self-report has been a massive, quick, and economic way to obtain information, with the peculiarity that most well-being questionnaires reveal a high degree of reliability and validity, even in different cultures (see Blanco & Díaz, 2005; Díaz, Rodríguez-Carvajal, Blanco, Moreno, Gallardo, & Valle, 2006; Díaz, Blanco, Horcajo, & Valle, 2007; Javad Liaghatdar, Jafari, Reza Abedi, & Samiee, 2008). Therefore, these instruments are usually the most frequently used in research of well-being.

Despite the above-mentioned advantages, these measurement procedures also have some limitations that should be taken into account:(a) the existence of certain limits to introspection and, consequently, the sensitivity of self-report measurements to individual differences in self-awareness, and (b) the existence of the so-called response factors, according to which, people may "mask" or even conceal their opinions even though they know exactly what they are (Greenwald & Banaji, 1995; Greenwald, Banaji, Rudman, Farnham, Nosek, & Mellott, 2002).

Regarding the limits of introspection, evidence was found that shows that people differ in their capacity to be aware of their opinions and other internal states (Nisbett & Wilson, 1977). Moreover, it has also been shown that people process information about themselves and their environment not only explicitly (conscious or controlled), but also implicitly (unconscious or automatic) (Epstein, 1994; Wilson, Lindsley, & Schooler, 2000). Therefore, independently of a person's motivation or will to carry out a task as correctly as possible, there are cognitive and affective processes that operate outside of awareness and that the person cannot access introspectively.

Response factors, on the other hand, refer to individuals' capacity and conscious will regarding control and correction of the opinions they are asked to express explicitly, for example, in a questionnaire. Assuming that individuals are aware and capable of indicating their position or opinion on the dimension to be assessed, there are diverse factors such as demand characteristics (Orne, 1962), evaluation apprehension (Rosenberg, 1969), impression management (Tedeschi, Schlenker, & Bonoma, 1971), faking (Cronbach, 1990), social desirability (Edwards, 1957), or judgment correction (Wegener & Petty, 1997), which can mask self-report responses.

Therefore, interest in the so-called indirect measure procedures has increased considerably in recent years in order to complement the information provided by other measurement instruments such as the self-report (see Fazio & Olson, 2003, for a complete review). Currently, the most well-known and frequently used indirect measure instrument is probably the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). The utility of the IAT is mainly due to its apparent resistance to self-presentation "biases" (Banse, Seise, & Zerbes, 2001; Egloff & Schmukle, 2002; Kim & Greenwald, 1998), its independence of people's capacity to access introspectively the constructs being measured (Greenwald et al., 2002) and, especially, the ease with which it can be adapted to measure a broad array of important associations and constructs (Greenwald, Nosek, & Banaji, 2003).

The IAT has been proposed as a valid and reliable measurement instrument and an important complement to traditional self-report measures. In the ten years that have gone by since its publication, the IAT has been used to measure numerous psychological phenomena such as, for example, *anxiety* (Egloff & Schmukle, 2002), *dysfunctional beliefs* (De Jong, Pasman, Kindt, & van den Hout, 2001), *phobias* and their *psychological intervention* (Teachman, Gregg,, & Woody, 2001; Teachman & Woody, 2003), *attitudes* (Briñol, Horcajo, De la Corte, Valle, Gallardo, & Díaz, 2004; Greenwald et al., 1998), *stereotypes* (Nosek, Banaji, & Greenwald, 2002), *self-esteem* (Bosson, Swann, & Pennebaker, 2000), *self-concept* (Asendorpf, Banse, & Mücke, 2002), *close relationships* (Banse, 1999), or *life satisfaction* (Kim, 2004), which is one of the components of subjective well-being.

The common procedure includes the development of semantic categorization tests that measure the relative associative strength between a first pair of concepts (e.g., *anxiety* and *calm*) and a second pair of concepts (e.g., *me* and *others*). Participants have to classify as quickly as possible the stimuli that appear in the center of the screen (for example, words that are semantically associated with one of the four concepts) into two different response categories (on the left and right sides of the screen), each one of which includes,

in the critical tasks where response latency is recorded, one concept from each pair (see Greenwald et al., 1998). The concepts mentioned in this example have been used to measure anxiety in a clinical application of the IAT as a diagnostic measurement (Egloff & Schmukle, 2002).

The IAT begins by presenting on the computer screen the two concepts of the first pair, one on each side of the screen (e.g., *anxiety* on the left and *calm* on the right). In this case, the words that are presented in the center of the screen are related to *anxiety* or to *calm*, and the participant has to classify these words as a function of their semantic relation. Next, the other two concepts from the second pair are presented (e.g., *Me* on the left and *Others* on the right) and, again, the words are classified as a function of their semantic relation with one or the other concept. These first tasks are carried out to familiarize the participants with classification tasks, concepts, and the words related to each concept. Subsequently, the critical tasks are performed, while the reaction times are recorded. In these tasks, the four concepts are combined so that two are presented on each side of the screen (e.g., *anxiety* and *Me* on the left, and *calm* and *Others* on the right). In this case, if the word presented in the center of the screen is related to one of the two categories or concepts on the left, the individual has to classify it on that side; contrariwise, if the word presented in the center is related to one of the two categories or concepts on the right, it is classified on the right side. Then, the IAT allows presenting the diverse combinations of the concepts and counterbalancing both their order and the place where each concept is presented.

Following the basic tenets of associative learning theories, the IAT is based on the assumption that it should be easier and, therefore, faster to perform the same behavioral response (press a computer key) when two concepts that are strongly associated share a same response category (*anxiety* and *Me* on the same side, in the case of anxious people). But, in this example, if two weakly associated concepts share the same response category (*calm* and *Me* on the same side of the screen), or two strongly associated concepts have different response categories (*anxiety* on the left side of the screen and *Me* on the right), then the behavioral response would be more difficult and, consequently, slower. Thus, people's response latencies to each stimulus in the diverse combinations of pairs of concepts allow us to measure the relative strength of the associations between the concepts and, consequently, to infer, in this example, anxiety compared to calm associated with oneself in clinical cases. The difference in response latencies to these pairings has shown that it effectively predicts behavioral anxiety responses in an anxiogenic situation (see Egloff & Schmukle, 2002).

During the last few years, a lot of studies has been developed aimed at testing the psychometric properties of the IAT (see Greenwald & Nosek, 2001; Greenwald, Poehlman, Uhlmann, & Banaji, in press; Nosek, Greenwald, & Banaji, 2005, 2006). Most of these studies indicate that the IAT shows good internal consistency, with Cronbach alpha values near .80 (Banse et al., 2001; Bosson et al., 2000; Egloff & Schmukle, 2002; Greenwald et al., 1998). Regarding its temporal stability, the results are more disparate and depend on the construct measured. The test-retest correlation of the IAT for assessing attitudes has varied between .32 for measures with a 28-day interval (Cunningham, Preacher, & Banaji, 2001), and .65 for measures with only a 1-day interval (Dasgupta & Greenwald, 2001). In the IATs adapted to assess self-esteem, the correlation for a time interval of 31 days was .69 (Bosson et al., 2000) and .52 for an 8-day interval (Greenwald & Farnham, 2000). In the IATs for assessing anxiety, the test-retest correlation was .57 for an interval of one week (Egloff & Schmukle, 2002). Lastly, in the IAT used to measure life satisfaction, the correlation was .41 for a 3-week interval (Kim, 2004).

Regarding validity of the IAT, the study of the relation between the IAT measures and self-report measures of the same construct is an aspect that has awakened much scientific interest (for an exhaustive review, see Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). Many studies have found that, despite controlling the response factors, IAT measures of various constructs have very little or no relation to the parallel self-report measures of the same construct. For example, the correlation between the "explicit" and "implicit" measures of self-esteem was .21 ($p > .05$) (Bosson et al., 2000) and .17 ($p > .05$) (Greenwald & Farnham, 2000). The correlation between the IAT of anxiety and self-reports of anxiety was .24 ($p = .14$) (Egloff & Schmukle, 2002). Lastly, the correlation between the IAT measure of life satisfaction and the explicit scale of life satisfaction was .07 ($p > .05$) (Kim, 2004).

Basically, two groups of theories have been proposed to explain these results. The first group defends the existence of a single mental representation that can be measured immediately after automatic activation (*implicit*) or deliberate processing (*explicit*) (Fazio, 1990); divergences would indicate lack of validity of the instruments or the above-mentioned limitations of self-awareness and the response factors. A second set of theories proposes that implicit and explicit measures reflect different mental representations or operations; implicit measures allow access to a cognitive domain that is not accessed by self-report measures and, more important, they allow us to predict different behaviors (Asendorpf et al., 2002; Wilson et al., 2000).

Goals of the present investigation

Despite the fact that a large proportion of research in the last two decades is related to the study of automatic (implicit) information processing (Bargh, 1997; Devine, 1989; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Greenwald et al., 2002) and that, although many authors have suggested the need to develop measures of well-being that are not based on self-reports to overcome their limitations (limits of

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introspection and response factors; see Diener, Lucas, & Oishi, 2002), to our knowledge, no implicit measure of general well-being has been developed. Therefore, the first goal of this investigation was the development of a new measurement of well-being, the Implicit Overall Well-Being Measure (IOWBM). For this purpose, we used the Implicit Association Test (IAT). Our second goal in this article is to study the psychometric properties of this new instrument, with special emphasis on its convergent validity, comparing explicit measures of well-being with the measures obtained using the IOWBM (Study 2). Lastly, in order to study in detail the validity of the IOWBM, we will carry out an experimental study to analyze its efficacy to detect the effect of recalling a traumatic event on the implicit malleability of well-being. Our hypothesis is that the participants who recall a traumatic event will show less implicit well-being in comparison to the participants of the control condition.

Study 1

Method

Participants

In this study, 93 Psychology students from the Universidad Autónoma de Madrid participated as volunteers, without receiving any kind of reward. The sample comprised 80 women (86%) and 13 men (14%). Participants' mean age was 20 years (*SD* = 4), with ages ranging between 18 and 47 years.

Procedure

The participants were scheduled in laboratory cabins whose computers were equipped with Windows XP operative system. All the people were informed that the data of the study were confidential and anonymous, and that, if they agreed to participate, they could interrupt the experiment if they considered it appropriate. All the people agreed to participate in the experiment, signing their informed consent. After assigning them a personal identification number, they performed the IOWBM. Lastly, they were scheduled to come back to the same laboratory one month later to perform the IOWBM a second time.

Implicit Overall Well-Being Measure (IOWBM). Using the same procedure as the one employed for the development of various implicit measures (Banse et al., 2001; Egloff & Schmukle, 2002; Greenwald & Farnham, 2000), we adapted the IAT to obtain an implicit measure of overall well-being. For this purpose, the categorization of words in the categories *Me* and *Not-me* was combined with the classification of items in the categories *Well-being* and *Distress*. Despite the proposal of authors like Greenwald and Farnham (2000) or Egloff and Schmukle (2002), who endorse the use of the categories *Me* and *Others*, we chose the categories *Me* and *Not-me*, mainly because, as indicated in Karpinski's (2004) interesting study, the use of the category *Others* without further specification, connotes an implicit negative valence and this can affect the combined categorization task. As a solution, for example, Jordan, Spencer, Zanna, Hoshino-Browne, & Correl (2003) proposed the use of the categories *Me* and *Not-me*, obtaining excellent results (see also Olson & Fazio, 2005). We used a computer procedure that allowed us to adapt the IAT to each participant (see Greenwald et al., 2002) to select the words that the subjects should code in these two categories (*Me* vs. *Not-me*). Each person generated their own list of eight words that were identified with them (e.g., their name) and a list of eight words with which they were not associated, by selecting each word from among 10 different options (e.g., another name of the same gender).

To select the items from the categories of *Well-being* and *Distress* was used the following procedure: Firstly, three expert researchers in the study of well-being and quality of life generated, separately, a list of 30 words associated with the category *Well-being* and another list of 30 words associated with the category *Distress*. The initial Kappa index of agreement for each of the lists was .64 for the well-being list and .61 for the distress list. In order to reach a single common list, the three researchers met and drew up, through discussion and consensus, a final list of 30 items for each category. For the final selection, a pilot study was carried out in which 63 psychology students indicated the extent to which each of the first 30 words (*Well-being* category list) was associated with the well-being category, in their opinion. The participants answered this question on a 5-point Likert-type response format with scores ranging between 1 (*not at all*) and 5 (*completely associated*). The same procedure was used for *Distress* category. As a function of the results obtained, we selected the 10 items from each list that showed a higher association with its category: happiness, prosperity, joy, satisfaction, hope, progress, development, support, friendship, affection (for the well-being category) and unhappiness, isolation, sadness, hate, loneliness, retrocession, sorrow, rejection, animosity, and grief (for the distress category).

The IOWBM comprises a main sequence of five blocks (see Figure 1) that constitute the central nucleus employed in most of the adaptations of the IAT (IAT-Anxiety: Egloff & Schmukle, 2002; IAT-Self-esteem: Greenwald & Farnham, 2000; IAT-Life satisfaction: Kim, 2004). To control the effect of the presentation order found in various studies (see Greenwald et al., 1998; Greenwald et al., 2003), four more blocks were added to these five blocks to counterbalance the presentation order of the target categories of our study (well-being and distress).

The first blocks are to practice and are administered so that the participants will learn the contrasts between the different categories separately. Later, the critical blocks are presented; in these blocks, the target categories (*Well-*

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being and *Distress*) are presented together with the concepts *Me* and *Not-me*, with which they are expected to be more or less associated. During these latter tasks (Blocks 3, 5, 7, and 9), reaction times are recorded (see Figure 1).

The IOWBM began by presenting a semantic classification task that allowed subjects to practice the contrast between the categories *Me* and *Not-me* (Block 1: 20 stimuli). In the next block (Block 2), the other two categories (*Well-being* and *Distress*) were presented so that the participants could practice the contrast between them (20 stimuli). In Block 3, the first measurement of the response latencies was taken. Specifically, we measured the association of *Me* and *Well-being* when they appeared on the left of the screen in comparison to the association of *Not-me* and *Distress*, which appeared on the right side. In this case, a practice trial was also performed, in which 20 stimuli were presented and afterwards, the same task was repeated with 40 stimuli, which led to the first measurement of the associations studied. Subsequently, the IAT presented the categories *Well-being* and *Distress* on the opposite side from where they had appeared before. This Block 4 was used to learn and practice the change in the location of these categories on the computer screen (20 stimuli). And, once again, the four categories were presented (Block 5). As with Block 3, a practice trial was first performed (20 stimuli) and then, the task that led to the second measurement of the response latencies (40 stimuli). In this Block 5, we measured the associative strength of *Me* and *Distress* when they appeared on the left of the screen in comparison to the association of *Not-me* and *Well-being*, which appeared on the right side (i.e., the opposite contrast to Block 3). Lastly, in successive blocks, we proceeded to counterbalance the presentation order of the *Well-being* and *Distress* categories on the same side as the *Me* category (first, we measured the association between *Me* and *Distress*, Block 7), and we also counterbalanced the side on which the *Well-being* and *Distress* pairings appeared with the *Me* category (now *Me* and *Distress* appear together on the right. See Figure 1).

Thus, we obtained two measures of the response latencies for the *Me* and *Well-being* categories when they appeared together on the same side, and another two measures of the response latencies for the *Me* and *Distress* categories when they appeared together on the same side. The response latencies were treated following the procedure proposed by Greenwald et al. (1998). Specifically, to reduce the skewness associated with the response latency data, all the scores were logarithmically transformed. Likewise, to calculate each participant's values in the IOWBM, we used the same formula proposed by Greenwald et al. and used by other investigators in the area of clinical psychology (Egloff & Schmukle, 2002): For each participant, the mean of the response latencies for the pairing of *Me and Well-being* (or *Not-me and Distress*) was subtracted from the mean of the response latencies of the pairing of *Me and Distress* (or *Not-me and Well-being*). Thus, values higher of this index revealed a higher relative association between *Me* and *Well-being*. That is, if a person has associated *Me* more strongly with *Well-being* than with *Distress*, the categorization task is easier and, therefore, faster if the categories *Me* and *Well-being* share the same response key because they are presented on the same side of the screen. In this way, we obtained a relative implicit measurement of overall well-being.

Results

IOWBM.

First, we calculated the normality of the scores obtained in the four measurement blocks (3, 5, 7, and 9) by means of the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov *Z* statistic had values between .73 and 1.11 (*p*-values between .17 and .85), which did not allow us to reject the hypothesis of normality. Consistently with the positive hedonic bias, at both moments of measurement (in the first experimental session [1] and one month later [2]), the participants responded significantly faster when the categories *Me* + *Well-being* and *Not-me* + *Distress* (Blocks 3 and 9) were presented together (M_1 = 807.54, M_2 = 705.41) than when the categories *Me* + *Distress* and *Not-me* + *Well-being* (Blocks 5 and 7) were on the same side (M_1 = 1177.33, M_2 = 1104.3), as displayed in Table 1.

Table 1
Descriptive Statistics and Difference of Means of the IOWBM

	M	*SD*	M_b-M_a	*df*	*t*	*p*
Me-Well-being and Not-me-Distress (1)	807.54	144.34	369.79	99	18.72	.001
Me-Distress and Not-me-Well-being (1)	1177.33	270.58				
Me-Well-being and Not-me-Distress (2)	705.41	101.01	398.62	78	16.99	.001
Me-Distress and Not-me-Well-being (2)	1104.03	203.60				

Note. All scores are presented in ms. Moment of measuring is shown in parenthesis.
1 = first moment of measurement, 2 = second moment of measurement. Ma refers to the mean reaction time in the combination Me-Well-being and Not Me-Distress. Mb refers to the mean reaction time in the combination Me-Distress and Not Me-Well-being. The results of the difference of means (Mb-Ma) at the two moments of measurement are shown in the table.

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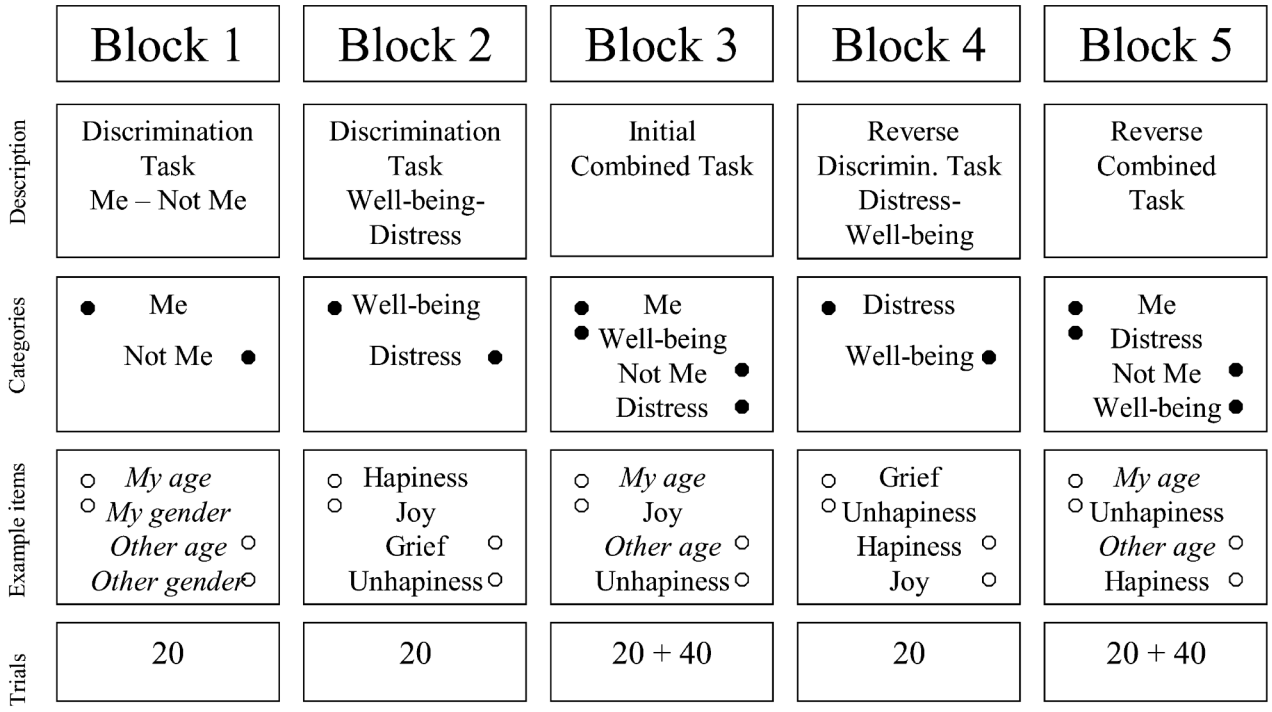

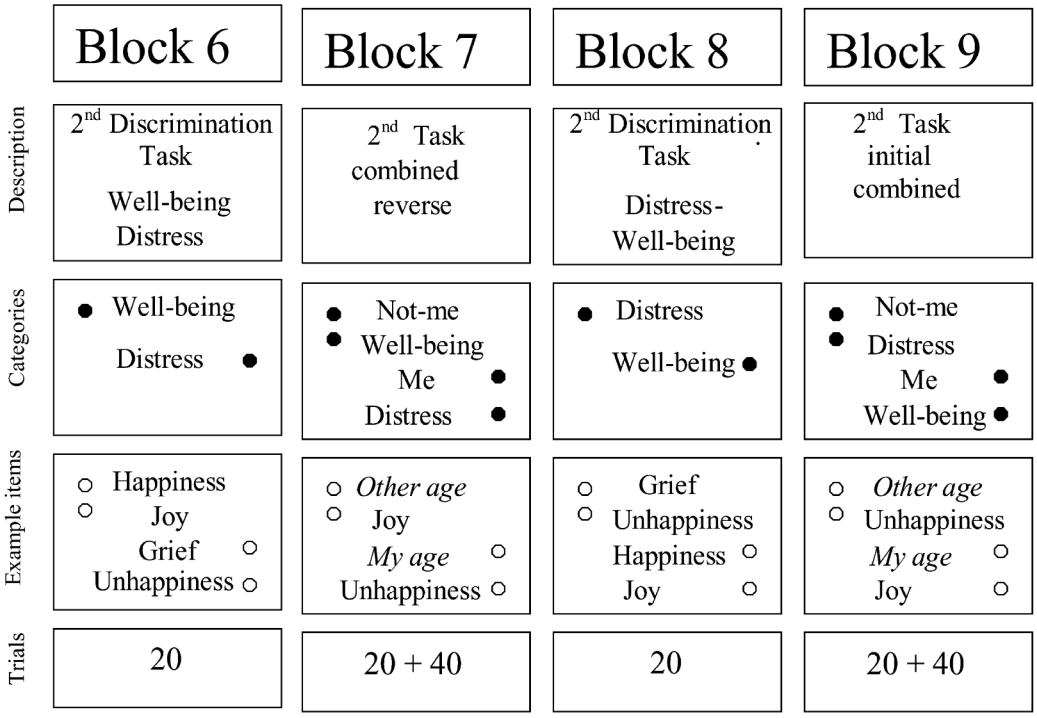

Figure 1. Blocks of the IAT for assessing overall well-being.
Note. The Blocks indicate each one of the different tasks included in the IAT. *Description* refers to the categories used in each task. In *Categories*, a black circle indicates on which side (left or right) of the screen each one of the categories used in each task was presented. In *Example Items*, some of the words that were classified in each one of the categories used for each task are displayed and a circle indicates on which side (left or right) they should be classified. Lastly, in *Trials*, the number of items (i.e., words to be classified) included in each task are indicated.

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To calculate internal consistency, we used a procedure similar to that used in other studies of measures based on the IAT (Banse et al., 2001; Bosson et al., 2000; Egloff & Schmukle, 2002; Kim, 2004). The IOWBM showed good internal consistency with values of Cronbach's alpha of .79 at the first measurement moment and of .74 at the second one. Lastly, the data obtained one month later showed that the stability (test-retest correlation) of the IOWBM was .50.

Study 2

Method

Participants

In this study, 90 Psychology students from the Universidad Autónoma de Madrid participated as volunteers, without receiving any kind of reward. The sample comprised 72 women (80 %) and 18 men (20 %). Participants' mean age was 20 years (*SD* = 4), with ages ranging between 18 and 36 years.

Procedure

All the participants were informed that the data of the study were confidential and anonymous, and that, if they agreed to participate, they could interrupt the experiment if they considered it appropriate. All the people agreed to participate in the experiment, signing their informed consent. After assigning them a personal identification number, they performed the IOWBM. Afterwards, they received a workbook that contained, in this order, the Social Well-being Scales, the Psychological Well-being Scales, and the Life Satisfaction Scale. The participants filled in the workbook without any time limit.

Measures

Implicit Overall Well-Being Measure (IOWBM). The same measurement as in the previous study was employed.

Explicit measures of well-being

Social Well-being. The participants completed Keyes' (1998) Social Well-being Scales, recently validated and translated to Spanish (Blanco & Díaz, 2005). This instrument is made up of five scales used to measure five factors (social integration, social acceptance, social contribution, social actualization, and social coherence). In various studies, the scales have shown good internal consistency with Cronbach alpha values between .83 and .69, and the five-dimension structure proposed has been verified by confirmatory factor analysis (Keyes, 1998; Blanco & Díaz, 2005). The participants responded to the items using a 5-point Likert-type response format with scores ranging between 1 (*totally disagree*) and 5 (*completely agree*). In our study, the scales revealed a similar reliability, with Cronbach alpha values near or higher than .70.

Psychological Well-being. The participants also completed the version proposed by Díaz et al. (2006) of the Psychological Well-being Scales (Ryff, 1989). This instrument has a total of six scales to measure six dimensions (autonomy, self-acceptance, positive relations, environmental mastery, purpose in life, and personal growth). This instruments has a total of 33 items (4 to 6 items per scale) which participants rate on a 6-point Likert-type response format with scores ranging between 1 (*totally disagree*) and 5 (*completely agree*). The factor validity of this instrument has been verified in several studies (Díaz et al., 2006). All the scales showed good internal consistency with alpha values higher than .70.

Satisfaction with Life. To measure satisfaction with life, we used the scale proposed by Diener, Emmons, Larsen, and Griffin (1985). This scale, made up of 5 items, has excellent psychometric properties and was validated in a sample of adolescents by Atienza, Pons, Balaguer, & García-Merita (2000), and later with a sample of pregnant and puerperal women (Cabañero, Richard, Cabrero, Orts, Reig, & Tosal, 2004). In our study, the scale presented good internal consistency (α = .80). The participants responded to the items using a 5-point Likert-type response format with scores ranging between 1 (*totally disagree*) and 5 (*completely agree*).

Results

The internal consistency of the IOWBM was similar to that of Study 1 (α = .73). In Table 2, we can observe the Pearson correlations between the IOWBM and the diverse well-being scales used in this study. Four of the explicit well-being scales revealed significant positive relations with the IOWBM. Specifically, the Personal Growth scale, which measures the persistence to develop one's potential, to continue to grow as a person, and to achieve one's highest personal capacities (Keyes et al., 2002); the Autonomy scale, which assesses people's capacity to sustain their own individuality in diverse social contexts and to resist social pressure (Ryff & Keyes, 1995); the Environmental Mastery scale, which measures the feeling of control of the world and personal skill to choose or create favorable environments to satisfy one's own desires and needs (scales of the measurement instrument of Psychological Well-being), and lastly, the Social Coherence scale, which assesses people's perception of understanding what is happening around them, giving meaning to social events.

Despite the correlations found with four of the psychological well-being scales, we considered that the validity of the IOWBM should be analyzed by means of a third study in which we would test the capacity of the instrument to detect *malleability* in people's well-being in

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Table 2
Correlations of Explicit Measures of Well-Being with the IOWBM

	IOWBM
Psychological Well-Being Scales	
Self-acceptance	.07
Positive relations	.02
Autonomy	.19*
Environmental Mastery	.19*
Personal Growth	.20*
Purpose in Life	–.05
Social Well-being Scales	
Social integration	–.01
Social acceptance	–.18
Social contribution	.06
Social actualization	–.06
Social coherence	.19*
Satisfaction with Life Scale	
Satisfaction	.03

* $p < .05$

response to an experimental treatment. Previous research has shown that diverse formulations of the IAT were sensitive to measures of other psychological constructs or in response to numerous experimental manipulations (e.g., Briñol, Horcajo, Becerra, Falces, & Sierra, 2002; 2003; Dasgupta & Greenwald, 2001; Olson & Fazio, 2001; see Blair, 2002; Fazio & Olson, 2003; Horcajo, 2005; Petty, Fazio & Briñol, 2008; for a review). The following study tested the hypothesis that the IOWBM can detect changes in people's overall well-being as the effect of recalling a traumatic event (see Vázquez, Pérez-Sales & Matt, 2006). With this main goal, we carried out the third study described in detail below.

Study 3

Method

Participants

In this study, 58 Psychology students from the Universidad Autónoma de Madrid participated as volunteers, without receiving any kind of reward. The sample comprised 39 women (67%) and 19 men (33%). Participants' mean age was 20 years (SD = 3), with ages ranging between 18 and 27 years.

Procedure

The study was presented as an investigation aimed at analyzing the influence of mood on short- and long-term memory. The participants were scheduled in laboratory cabins whose computers were equipped with Windows XP operative system. The participants were informed about the confidentiality of the experiment and about the possibility to hold up. All the people (except for two participants) agreed to participate in the experiment, signing their informed consent. Each participant was assigned randomly to one of the two experimental conditions: (a) condition of recall of traumatic events and (b) control condition. Lastly, all the participants completed the IOWBM.

Independent variables: Trauma-Control. In order to produce a change in the participants' subjective well-being, one half of the subjects were requested to recall the most traumatic experience they had had in their life and to describe it briefly. In the control condition, participants were requested to remember what they did last week and to write it down briefly. In both cases, participants were provided with a workbook in which to write these experiences.

Dependent variable: IOWBM. The same measurement as in Studies 1 and 2 was employed.

Results

Firstly, we calculated the normality of the implicit well-being scores of both conditions (trauma-control) by means of the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov Z statistic had values between .73 (p = .66, control) and .52 (p = .97, trauma). Taking into account these values and to reduce the skewness associated with the response latency data, all the scores were logarithmically transformed, according to the treatment proposed by Greenwald et al. (1998). Subsequent analysis confirmed the normality of the transformed scores (Control Z = .77, p = .66; Trauma Z = .63, p = .82). The test of variance homogeneity carried out by means of Levene's statistic on the transformed scores did not allow us to reject the hypothesis of equal variances (L = .15, p = .73).

IOWBM. The internal consistency of the IOWBM was similar to that of previous studies (α = .73). As expected, the ANOVA revealed an effect of recall of traumatic events on the IOWBM (data logarithmically transformed), $F(2, 33) = 8.08$, $p < .01$. Following the recommendations of Wilkinson and the Task Force (1999), we analyzed the effect size, calculating the value of Cohen's d, which was .77. According to Cohen's (1988) proposal, this effect size was relatively large ($d \geq 0.7$).

Discussion and Conclusions

The most frequently used well-being assessment instruments currently consist of the administration of self-report questionnaires. Despite their many advantages, this type of measure also presents some problems. Most noteworthy is the fact that people are not always aware of

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their internal states and, sometimes, even though they are fully aware of the aspects they are asked to reveal, they attempt to mask or conceal them in self-report measures. Therefore, many investigators have recommended the development of assessment tools of an indirect or implicit nature that would allow them to complement the former instruments (e.g., Greenwald & Banaji, 1995). The main goal of this investigation was to develop an implicit measurement of overall well-being (IOWBM) by means of a new adaptation of the IAT. The IOWBM, in general, has revealed good psychometric properties. In the diverse studies, the internal consistency (Cronbach's alpha) of the IOWBM has always been equal to or higher than .73. These values are similar to those of other adaptations of the IAT (Self-esteem: Bosson et al., 2000; Greenwald & Farnham, 2000; Anxiety: Egloff & Schmukle, 2002; Life satisfaction: Kim, 2004). Comparing to the explicit tests (Satisfaction with Life Scale, Psychological Well-being Scales, Social Well-being Scales), the IOWBM revealed a similar and even higher internal consistency than those presented by these scales (see Díaz et al., 2006; Blanco & Díaz, 2005). Analyzing test-retest reliability, the IOWBM had an acceptable level (r = .50), similar to that of other adaptations of the IAT, but slightly lower than that of the most frequently used questionnaires for the assessment of psychological well-being. However, it should be taken into account that, although there are several reasons for the lower temporal reliability of the IOWBM, rather than more measurement error, these differences are more likely due to the higher sensitivity of the IAT to contextual variability. Some investigations have shown that IAT measures of racial prejudice are very sensitive to subtle variations in the context in which a black person appears (Wittenbrink, Judd, & Park, 2001), or even to differences in the image that black people project in a certain context as a function of their clothing (Barden, Maddux, Petty, & Brewer, 2004). To test this hypothesis, future research could use multistate-multitrait structural equation models (Eid, 2000) that would allow splitting the total variance into variance due to error, to stable differences between people, and to context variance. Despite these considerations, it should be taken into account that the values of reliability or temporal stability of the IOWBM are higher than the temporal reliability of most of the adaptations of the IAT, either for the assessment of self-esteem, anxiety, or satisfaction with life (see Egloff & Schmukle, 2002; Greenwald & Farnham, 2000; Kim, 2004).

Another goal of this investigation was to analyze the relation between explicit and implicit measures of well-being (IOWBM). We selected the most frequently used scales, attempting to include all the theoretical approaches, as the IOWBM is a general measure. In fact, the factor analyses carried out on these explicit measures indicate the existence of two factors: hedonic well-being and eudaemonic well-being, which, as indicated, correspond to the two majority currents in the study of well-being (see Ryan & Deci, 2001). Within the broad spectrum of measures analyzed, the IOWBM has revealed significant positive relations with the Personal Growth scale, the Autonomy scale, the Environmental Mastery scale, and the Social Coherence scale. The Personal Growth scale measures a person's determination to develop personal capacities as much as possible (Keyes et al., 2002), one of the central dimensions from the theoretical viewpoint of the psychological well-being construct (Díaz et al., 2006), and it performs a global and cross-sectional assessment of this construct. On the other hand, the Autonomy scale, when assessing people's capacity to sustain their own individuality in different social contexts and to maintain their own convictions, is a key element in two theoretical constructs that are predominant in the study of well-being: hedonic well-being and eudaemonic well-being. The same thing is noted with the other two scales that correlate with the IOWBM. Both the scales of Environmental Mastery and of Social Coherence measure the perception of control, another key element both in hedonic and eudaemonic well-being. In fact, if a factor analysis is performed on all the well-being scales used in Study 2 (analysis of principal components, maximum likelihood estimation, direct oblimin rotation), these four scales are the only ones that present loadings higher than .30 in all the factors extracted. Other investigations have also obtained similar results (Keyes et al., 2002) and this indicates that the more general nature of these scales has probably affected their closer relation to the IOWBM (a measurement of general nature), because, as reported in various investigations, the greater the conceptual similarity of explicit and implicit concepts, the higher the correlations between them. In fact, a recent meta-analysis of the correlations between the IAT and self-report measures has shown that a lack of conceptual correspondence of the constructs studied in each kind of measurement can significantly reduce the relation between the measures (see Hofmann et al., 2005).

The measurement of overall well-being (IOWBM) proposed in the present work did not show significant relations with the rest of the scales employed, which is consistent with the results found in a large part of the investigations on the relation between explicit and implicit measures of the same construct (Self-esteem: Greenwald & Farnham, 2000; Anxiety: Egloff & Schmukle, 2002; Life Satisfaction: Kim, 2004). As mentioned above, in order to explain this phenomenon, some authors uphold that the implicit and explicit measures reflect different mental representations or operations (Wilson et al., 2000). In fact, in the study of attitudes, some investigations have found that people have explicit assessments (self-report measures) that are different from their implicit assessments (IAT) of the same object and these discrepancies predict people's information processing and behavior. Specifically, it seems that people with implicit-explicit discrepancies perform a greater and deeper processing of the information related to the discrepancy, most likely in

the attempt to resolve it (Briñol et al., 2004; Briñol, Petty, & Wheeler, 2006). In this vein, new possibilities emerge for the study of well-being, for example, future research should analyze whether people who display discrepancies between explicit and implicit assessments of their own well-being are processing to a greater extent the information from situations that affect their well-being (for example, a traumatic event). Future research should also study the possible consequences of this higher processing.

Another way to explain weak relation between the explicit and implicit measures of well-being lies in one of the advantages of the indirect or implicit measurement: participants' different capacity to voluntarily control or falsify the result of the explicit and implicit measurement instruments. In a review of the IAT, Nosek, Greenwald, and Banaji (2006) show that measures based on the IAT are much more difficult to falsify or modify intentionally than self-report measures. In fact, some investigations indicate that if subjects are provided with instructions on how the IAT works and how to intentionally control their measures, the correlation between the explicit and implicit measures is significantly stronger (Kim, 2003).

People have different reasons for trying to modify the results obtained in measures of well-being. Some of the most interesting and convincing have to do with *self-presentation* in the broadest sense: the individual's attempt to manipulate other people's opinions of them (e.g., impression management) and the attempt to control self-presentation. (Greenwald & Breckler, 1985). Regarding impression management, people generally try to transmit the best possible image to others and, for that purpose, they use the strategy of making their "public self" more similar to their ideal self-image (*self-construction*; Baumeister, 1982). According to the results of various investigations (Campbell, Converse, & Rodgers, 1976), happiness and well-being are usually key components of this ideal image. Therefore, in order to transmit a positive impression, people sometimes present themselves with a greater level of well-being than they really feel. Moreover, people are very motivated to become like their ideal self (Cohen, 1959) and one of the possible strategies to convince themselves is to convince others that they are really like their ideal self (Baumeister, 1982).

In addition to the correlation between the IOWBM and the explicit measures, there is a lot of evidence of the convergent validity of this measurement instrument. In a recent investigation, Díaz, Horcajo, & Blanco (2009) have studied the structure of the explicit and implicit measures of psychological well-being by means of multistate-multitrait structural equation models and, for this purpose, they developed a new implicit measurement of well-being based on the interpretation of partially structured stimuli (Vargas, von Hippel, & Petty, 2004). Pearson's correlation between the IOWBM and the measurement based on partially structured stimuli was, in all the studies carried out, $r > .40$.

Another particularly interesting point is the presence of positive hedonic bias in the IOWBM. Several investigations on social cognition have indicated that healthy people, rather than making a faithful representation of reality, have a great capacity to distort it, appraising themselves as positively as possible, increasing their personal efficacy, and maintaining an optimistic view of the world (Taylor & Brown, 1988). In research on well-being, this need to feel good and happy has been called the positive hedonic bias. This bias is present in most scales that assess well-being: In the studies carried out with the IOWBM, people responded faster to categorization tasks when the categories *Me* and *Well-being* were presented together on the same side than when the *Me* and *Distress* categories were presented together. That is, in general, people associate the self (*Me*) more strongly with well-being than with distress; although this result must be interpreted with precaution because it could also be due to a stronger association between *Not-me* and distress than between *Not-me* and well-being, due to the *relative* nature of the IAT measures (i.e., an association between two categories should be understood in relation to another association between the other two categories). Nevertheless, these data also replicate those found in other adaptations of the IAT to measure self-esteem and satisfaction with life. In these cases, both the implicit and the explicit measures showed positive bias, both in self-assessment and in the assessment of one's own life (Bosson et al., 2000; Greenwald & Farnham, 2000; Kim, 2004). Moreover, the hypothesis of a stronger association between *Me* and well-being is compatible with recent investigations that show that positive information is processed faster than negative information (Unkelbach, Fiedler, Bayer, Stegmüller, & Danner, 2008), also due to the *density* hypothesis (greater similarity of positive stimuli), a posture that contradicts some classic approaches to social cognition that propose the opposite direction because of the higher adaptive priority of responding quickly to negative information.

In addition to positive hedonic bias, in some explicit measures of well-being (e.g., satisfaction with life), there is another effect of a longitudinal nature, known as "hedonic homeostasis." This effect is particularly relevant for the study of the influence of important life events on well-being (e.g., traumatic events) and it posits the existence of a well-being baseline (satisfaction with life) to which people return, due to homeostatic forces, after life events or circumstances have modified it (Fujita & Diener, 2005). Although there is firm evidence that certain events, such as, for example, changing one's civil status, can modify this stability at long term (Lucas, Clark, Georgellis, & Diener, 2003), the existence of this baseline seems to be confirmed (Fujita & Diener, 2005). However, given that most of the explicit measures have been constructed to minimize the effect of context, it would be interesting for future longitudinal research to verify the existence of this

homeostatic effect on implicit well-being, a measure that may be more sensitive to contextual variability, as it is based on the adaptation of the IAT.

Lastly, to analyze in more detail the validity of the IOWBM, another of the goals of this investigation consisted of testing the capacity of this instrument to detect changes in people's well-being. For this purpose, we analyzed the effect of recall of traumatic events on implicit measure of overall well-being. Implicit measures can be affected by pre-activation of associations of a personal or situational nature, as implicit representations reflect a combination of trait and state variance (Schmukle & Egloff, 2004). Therefore, the third study was based on with the assumption that activation of the memory of a traumatic event should be reflected in the implicit measures of well-being, with participants from the group of recall of traumatic events displaying lower implicit well-being than participants from the control group. The results of this third study allowed us to maintain our hypothesis. Specifically, we found that the experimental manipulation presumably reinforced the association between the *Me* and the *Distress* categories, with significant differences between the participants from the recall group and the control group: that is, the participants from the experimental condition reduced their mean response latency in the categorization task of this association. Moreover, in this study, we could also verify that the experimental manipulations did not affect the internal consistency of the IOWBM, as the Cronbach alpha value was similar to that found at the two measurement moments of the first study.

Notwithstanding the contributions of this investigation, there are some important limitations. Firstly, in the third study, we did not control the valence of the responses of the participants in the control condition, in which they were requested to remember and describe in writing what they had done last week. Although after analyzing all the narrations, we can ensure that none of the participants remembered any traumatic event, it seems that some of the recalled events did not have a neutral affective valence. Future research should try to control this factor.

Another limitation has to do with the type of sample used. The fact that the diverse studies were performed with university psychology students, to some extent, jeopardizes the generalization of the results. However, diverse adaptations of the IAT carried out to measure other constructs (e.g., the self-esteem IAT) have found similar results regarding psychometric properties when they were applied to university students and to the general population, and this study followed the same procedure for its adaptation. In any case, future research should use samples with more variability in the sociodemographic characteristics, and also verify whether gender, age, income, or educational level, among others, have the same effect on implicit and explicit well-being.

To conclude, the present work has presented the development of a new instrument, of a non-self-report nature, to measure overall well-being. By means of the adaptation of the IAT for the assessment of well-being, we generated a new measure, the Implicit Overall Well-being Measure (IOWBM), which has shown good psychometric properties in terms of reliability and validity. This new instrument constitutes an excellent complement to measure well-being and allows us to deal with the limitations that are sometimes present in self-report measures, thus contributing additional information. Chiefly, by means of this new instrument, we can access cognitive and affective processes that cannot be easily measured with the classic self-report measures. Moreover, in comparison to explicit measures of well-being, the IOWBM reduces the capacity of the people being assessed to control voluntarily or to falsify the result of the measurement, which leads to interesting applications in diverse contexts. For example, and taking into account the reiterated and well-documented strategy of faking and simulating of the symptoms of posttraumatic stress disorder (Young, 1995; Burkett & Whitley, 1998; McNally, 2003), the use of implicit measures to detect the psychological consequences of traumatic events and their level of truth or falseness could be of great utility in the future.

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