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ON THE DIMENSIONALITY AND CONSTRUCT VALIDITY OF THE AFFECT INTENSITY MEASURE

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We propose and find a six-factor structure for the Affect Intensity Measure (AIM). The factors are labeled general (i.e., non-valenced) affect intensity, negative affectivity, guilt, threat to self-identity, serenity, and positive affectivity. Construct validity was established a) internally with regard to convergent and discriminant validity of measures of the six dimensions of the AIM and b) externally for discriminant validity between measures of the need for cognition and the six AIM dimensions and for criterion-related validity between measures of empathy and the six AIM dimensions. All the above analyses were done separately for women (N = 413) and men (N = 333). Further analyses established the invariance of the factor structure, factor loadings, error variances, and factor variance-covariance matrix for men and women. Finally, women were found to experience affect more intensely than men on all six dimensions of the AIM.

Key words: Affect intensity; Emotion; Dimensionality of the Affective Intensity Measure; Construct validity of the Affective Intensity Measure.

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INTRODUCTION

Affect intensity has been defined as "stable individual differences in the strength with which individuals experience their emotions…regardless of their specific content or hedonic tone" (Larsen & Diener, 1987, p. 2). Larsen (1984) developed a 40 item Affect Intensity Measure (AIM) to capture this sense of affect intensity, and on the basis of item generation and pruning processes, where exploratory factor analysis was used to establish factor structure, concluded that one major dimension underlies responses to the AIM. Most research to date has treated the AIM as a single dimensional scale, and quite a bit of research exists validating the scale in this sense (e.g., Larsen & Diener, 1987; Larsen, Diener, & Cropanzano, 1987; Larsen, Diener, & Emmons, 1986).

Over the years, researchers have begun to question whether the AIM is unidimensional, a development fostered by the advent of confirmatory factor analysis. For example, Weinfurt, Bryant, and Yarnold (1994) found that a single factor model fit the AIM very poorly. After attempting to specify and fit three, four, and five factor models, Weinfurt et al. discovered that the best fitting model achieved a "mediocre fit" (i.e., GFI = .80) and implied that attempts to find a better fitting model would be "futile." They nevertheless speculated that a four-factor might be ex-

plored, but recommended that researchers should "…aim toward developing a better conceptual framework for understanding the nature of affective experience" (Weinfurt et al., 1994, p. 314).

Bryant, Yarnold, and Grimm (1996) also analyzed the AIM and were able to achieve "satisfactory" model fits for a four-factor model in two samples (GFIs = .83 and .85, respectively). On the basis of relatively high correlations between two of the factors (ϕ = .92 and .91 in the two samples), Bryant et al. combined the implicated factors to arrive at a three-factor model, where the factors were termed positive affectivity, negative affectivity, and negative reactivity. However to achieve a satisfactory model, Bryant et al. deleted 13 items from the AIM, thus resulting in a scale difficult to compare to past research using the full scale. We further point out that, of the 13 deleted items, 11 were reverse coded, which constituted all the reverse coded items in the full scale. This perhaps suggests that at least some respondents failed to read items carefully, contributing to the relatively poor model fits and the need to delete items.

Jones, Leen-Feldner, Olatunji, Reardon, and Hawks (2009) recently replicated the findings by Bryant et al. (1996) and found a better fitting three-factor model (RMSEA = .077 and CFI = .94). However, their findings are based on the same 27 items selected from among the original 40 item scale as investigated by Bryant et al. Thus the full AIM was not validated, and the same issue of inclusion of subjects who may not have read items carefully makes conclusions as to validity of the sub-scale problematic and its generalizability questionable.

Consistent with appraisal theories of emotions (e.g., Lazarus, 1991), we believe that felt affect intensity might well exhibit a multidimensional structure. Further, the dimensions involved are likely to correspond with those found in basic research (e.g., Shaver, Schwartz, Kirson, & O'Connor, 1987), although as is common in survey research, some subdimensions within positive affect and within negative affect may be highly correlated and load on common factors (e.g., Bagozzi, 1991; Bagozzi, Wong, & Yi, 1999).

Based on the aforementioned studies and classic research on emotions (e.g., Frijda, 1986; Oatley & Jenkins, 1996), the two authors of this article independently performed content analyses of the 40 items of the AIM. Except for one item (item 11), the authors agreed on the placement of items on the six factors shown in Table 1 (one author coded item 11 onto the guilt factor, the other author put it on negative affectivity; the empirical analyses supported the latter categorization).

We term factor 1, general affective intensity, where items 6 and 15 are the indicators. Notice (see Table 1) that these two items reflect affect intensity in a non-valenced sense (i.e., "My emotions tend to be more intense than those of most people" and "My friends might say I am emotional"). The studies by Weinfurt et al. (1994), Bryant et al. (1996), and Jones et al. (2009) each had items 6 and 15 loading on a negative intensity factor (along with items 30, 34, 36, and 39). We think that including items 6 and 15 on a negative intensity factor, or on any valenced factor for that matter, makes little conceptual sense, and probably accounts for the difference between the negative intensity factor found by the aforementioned authors and our negative affectivity factor (see factor 2 in Table 1, items 11, 26, 28, 30, 31, and 34).

Our third factor, guilt, has three items (4, 25, 36; Table 1). As each of these items contains the word, guilt, in its phrasing, we categorized them onto a single factor. Weinfurt et al. (1994), Bryant et al. (1996), and Jones et al. (2009) all put items 4 and 25 on a negativity factor and item 36 on the negative intensity factor, which we think lacks logical support and is inconsistent.

TABLE 1
The six factor Affect Intensity Measure with item numbers form Larsen's (1984) scale

General (i.e., non-valenced) Affect Intensity
6. My emotions tend to be more intense than those of most people.
15. My friends might say I'm emotional.
Negative Affectivity
11. Sad movies deeply touch me.
26. I can remain calm even on the most trying days.
28. When I get angry, it's easy for me to still be rational and not over react.
30. When I do feel anxiety, it is normally very strong.
31. My negative moods are mild in intensity.
34. My friends would probably say I'm a tense or "high-strung" person.
Guilt
4. I feel pretty bad when I tell a lie.
25. When I do something wrong I have strong feelings of shame and guilt.
36. When I feel guilty, this emotion is quite strong.
Threat to Self-Identity (existential angst)
13. When I talk in front of a group for the first time, my voice gets shaky and my heart races.
17. The sight of someone who is hurt badly affects me strongly.
21. Seeing a picture of some violent car accident in a newspaper makes me feel sick to my stomach.
39. When I am nervous, I get shaky all over.
Serenity
12. When I'm happy, it's a feeling of being untroubled and content rather than being zestful and aroused.
16. The memories I like the most are of those times when I felt content and peaceful rather than zestful and enthusiastic.
19. "Calm and cool" could easily describe me.
24. When I succeed at something, my reaction is calm contentment.
29. When I know I have done something very well, I feel relaxed and content rather than excited and elated.
33. When I feel happiness, it is a quiet type of contentment.
37. I would characterize my happy moods as closer to contentment than to joy.
40. When I am happy, the feeling is more like contentment and inner calm than one of exhilaration and excitement.
Positive Affectivity
1. When I accomplish something difficult, I feel delighted or elated.
2. When I feel happy, it is a strong type of exuberance.
3. I enjoy being with other people very much.
5. When I solve a small personal problem, I feel euphoric.
7. My happy moods are so strong that I feel like I'm "in heaven".
8. I get overly enthusiastic.
9. If I complete a task I thought was impossible, I am ecstatic.
10. My heart races at the anticipation of some exciting event.
14. When something good happens, I am usually much more jubilant than others.
18. When I'm feeling well, it's easy for me to go from being in a good mood to being really joyful.
20. When I'm happy, I feel like I'm bursting with joy.
22. When I'm happy, I feel very energetic.
23. When I receive an award, I become overjoyed.
27. When things are going good, I feel "on top of the world".
32. When I am excited over something, I want to share my feelings with everyone.
35. When I'm happy, I bubble over with energy.
38. When someone compliments me, I get so happy I could "burst".

Our fourth factor, threat to self-identity, has four items: 13, 17, 21, and 39. Each of these items reflects an instance of existential angst. The first three items were included on the negative reactivity factor by Weinfurt et al. (1994), Bryant et al. (1996), and Jones et al. (2009), whereas item 39 was put on the negative intensity factor by all three groups of researchers. As the latter factor incongruously included items 6 and 15 by those researchers, and at the same time the other four items on the factor (30, 34, 36, 39) seem not to cohere together well semantically (hence our inclusion of these items on three factors see Table 1), we argue that the placement of items 13, 17, 21, and 39 on a threat to self-identity factor makes more sense.

Factor 5 is termed, serenity, and encompasses items 12, 16, 19, 24, 29, 33, 37, and 40 (see Table 1). This factor is essentially the same as the serenity factor found by Weinfurt et al. (1994) except that our factor has an additional item, 29 ("When I know I have done something very well, I feel relaxed and content rather than excited and elated"). We argue that "relaxed and content" not only fit the meaning of serenity well but overlap explicitly with the remaining items: item 12 ("untroubled and content"), item 16 ("content and peaceful"), item 19 ("calm and cool"), item 24 ("calm contentment"), item 33 ("quite type of contentment"), item 37 ("contentment"), and item 30 ("contentment and inner calm").

Factor 6, positive affectivity, has 17 items (Table 1). These items are exactly the same as those employed by Weinfurt et al. (1994) on their positive affectivity factor, and includes all 15 items used by Bryant et al. (1996) and Jones et al. (2009) but includes two additional ones (items 3 and 32) that they deleted. The latter two items were reverse coded items. We retain them on the positive activity factor.

In the present research, we investigate the construct validity of the proposed six-factor AIM. We do this by use of the so-called partial disaggregation model where parcels of items are used as indicators (Bagozzi & Heatherton, 1994). This model was applied after we demonstrated by exploratory factor analysis that the 40 items from the AIM scale loaded highly on the proposed factors and did not load too highly on non-hypothesized factors (Bagozzi & Edwards, 1998). We first examined six-factor confirmatory factor analysis models separately for men and for women. Convergent and discriminant validity for the measures of the six-factor AIM were demonstrated within the scale for both men and women. Then we tested the convergent and criterion-related validity of the measures of the six-factor AIM, separately for men and women, by ascertaining the factor intercorrelations with the need for cognition scale (to establish discriminant validity) and the IRI empathy scale (to verify criterion-related validity). Next we tested for generalizability by establishing that the factor structure, factor loadings, error variances, and variance-covariance matrixes of latent variables were invariant for men and women. Finally the factor means were investigated for men and women to verify whether women experience emotions more intensely then men (e.g., Diener, Sandvik, & Larsen, 1985).

METHOD

Subjects and Procedures

Seven hundred and forty-six undergraduate psychology students (413 women, 333 men) participated in the study. Subjects filled out the questionnaires anonymously in groups of approximately 8-10 and received course credit for participating.

Measures

AIM

The intensity of emotions was measured with the self-report AIM which is a 40-item questionnaire that assesses the magnitude with which one experiences his or her emotions. Each item inquires about an individual's typical emotional reaction to everyday life events. Six point items are used to measure affect intensity, anchored by *never* and *always*. Larsen and Diener (1987) present evidence concerning internal consistency and test-retest reliability, as well as validity (see also Diener et al., 1985; Larsen et al., 1986). Table 1 summarized the items from Larsen's (1984) original scale, organized by the six factors found in the current study.

Need for Cognition

The need for cognition was measured with an 18-item scale developed by Cacioppo, Petty, and Kao (1984). The scale measures "the tendency for an individual to engage in and enjoy thinking" (Cacioppo & Petty, 1982, p. 116). Example items include: "I would prefer complex to simple problems," "I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something," and "I don't like to have the responsibility of handling a situation that requires a lot of thinking." Nine point Likert items were used to measure need for cognition, anchored by *very strong agreement* and *very strong disagreement*, with *neither agreement nor disagreement* in the middle.

Empathy

Empathy was measured with the 28-item Interpersonal Reactivity Index (IRI; Davis, 1980, 1983). The IRI taps four facets of empathy: perspective taking (the tendency to spontaneously adopt the psychological point of view of others), fantasy (the tendency to transpose oneself imaginatively into the feeling and actions of fictitious characters in books, movies, and plays), empathic concern ("other-oriented" feelings of sympathy for unfortunate others), and personal distress ("self-oriented" feelings of personal anxiety and unease in tense interpersonal settings). Five point items were used to measure empathy, anchored by *does not describe me well* and *describes me very well*.

Testing the Revised AIM

Confirmatory Factor Analysis

Figure 1 presents the confirmatory factor analysis (CFA) representation for the six-factor structure of affect intensity. In this model, the six factors are shown as ellipses and stand for latent variables. Each latent variable is connected to two boxes. The boxes represent aggregations of items corresponding to the measurement of the categories of emotions indicated. For example,

the indicators of positive affect intensity consist of the average of items, 5, 6, and 7 respectively, selected at random from the 17 items listed in Table 1 for this factor. This approach to measurement has been used before by researchers in such areas as the self-concept (e.g., Marsh & Hocevar, 1985) and negative affect (e.g., Bagozzi, 1993). Discussions of the general procedure and its assumptions and implications can be found in Bagozzi and Heatherton (1994), Bagozzi and Edwards (1998), and Hull, Lehn, and Tedlie (1991).

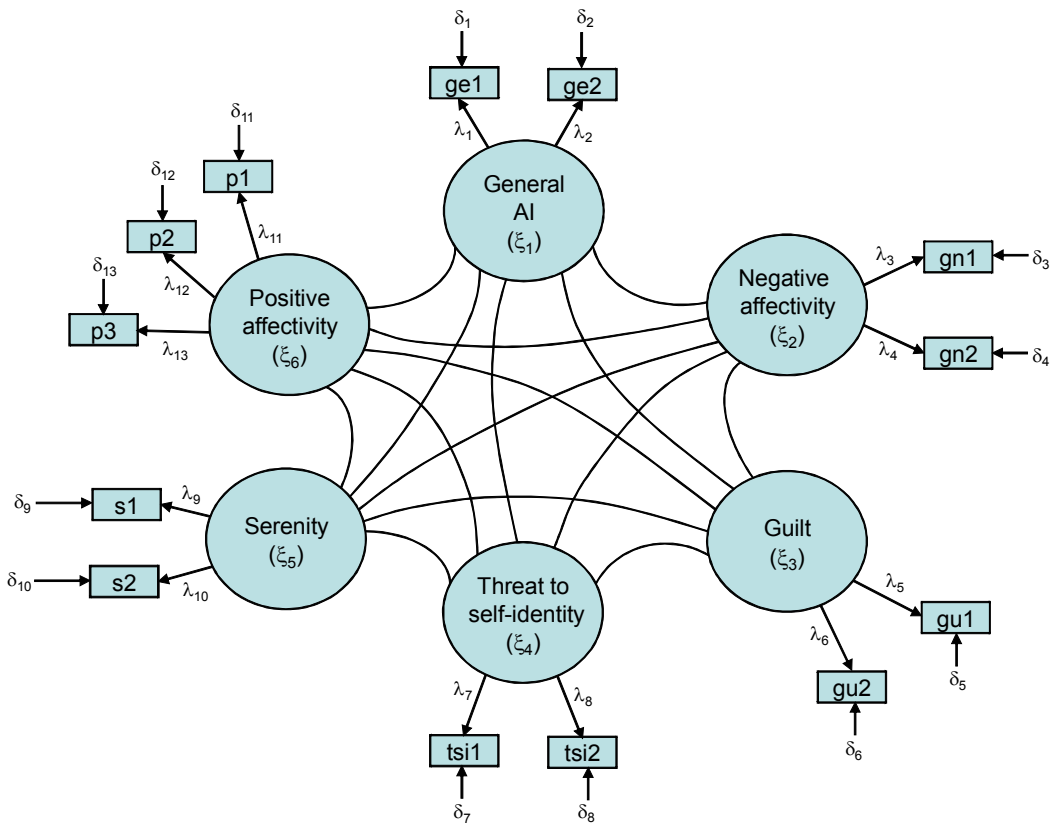

FIGURE 1
The structure of Affect Intensity (AI).

Each indicator in Figure 1 has two arrows terminating into it. The arrows from latent variables to indicators stand for sources of variation in the indicators that are due to the basic categories of emotions; the 13 λ_is adjacent to the arrows are factor loadings relating latent variables to indicators. The 13 short arrows with δ_is at their origins depict variation in the indicators due to error. Finally, the curved lines connecting pairs of latent variables stand for the correlations among the indicated factors and are designated ϕ_{ij}s. As a consequence of the estimation procedure used to infer values for the ϕ_{ij}s, the correlations are corrected for attenuation due to the unreliabilities in the indicators. With the variance of the factors standardized to 1.00, it is possible to examine the ϕ_{ij}s and their standard errors and determine whether the affect intensity factors are

distinct (i.e., achieve discriminant validity). Alternatively, chi-square difference tests can be used to compare models with ϕ_{ij}s free to models with ϕ_{ij}s fixed to unity.

To test for convergent validity of the measures of the revised AIM, it is necessary to examine the goodness-of-fit of the model in Figure 1 to the data and to inspect the factor loadings of measures on their respective factors. A satisfactory goodness-of-fit implies that the variance in the measures of the AIM can be explained by the six factors, except for measurement error. To the extent that the loadings are significant and high, convergent validity will be established. To the extent that the ϕ_{ij}s diverge from1.00, discriminant validity of the measures across the dimensions of the revised AIM will be established.

Estimation of Models and Assessment of Fit

The confirmatory factor analysis models were estimated by use of LISREL8 (Jöreskog & Sörbom, 1996). One measure of model fit that was used is the likelihood ration chi-square statistic, which can be used to test the null hypothesis that a specified model reproduces the population covariance matrix of the observed variables. By convention, an acceptable model is one where the *p* value is greater than or equal to .05. Reliance on the chi-square test as the sole measures of fit is not recommended because of its dependence on sample size. For example, in large samples even trivial deviations of a hypothesized model from a true model can lead to rejection of the hypothesized model; or for very small samples, large deviations of a hypothesized model may go undetected. Therefore, it is desirable to examine other measures of fit not as sensitive to sample size. Another limitation with the chi-square test is that it does not directly provide an indication of the degree of fit such as is available with indices normed from 0 to1.

An additional approach to the assessment of goodness-of-fit is to use an index that is based on the comparison of the fit of a hypothesized model to the fit of a baseline model, such as the null model, where the latter assumes that all variables are uncorrelated (i.e., only error variances are estimated). Such an approach is termed an *incremental fit index* in that a hypothesized model is compared with a more restricted, nested model. The best known index in this regard is the relative noncentrality index (RNI) developed by McDonald and Marsh (1990) or Bentler's (1990) equivalent comparative fit index (CFI):

$$\text{CFI} = \text{RNI} = \frac{\left(\chi_o^2 - df_o\right) - \left(\chi_f^2 - df_f\right)}{\chi_o^2 - df_o}$$

where χ_o^2 and χ_f^2 are for the null and focal models, respectively. The CFI is normed in the population and thus has values bounded by zero and 1. Equally important, the CFI provides an unbiased estimate of its corresponding population value, and therefore it should be independent of sample size. Monte Carlo studies show that the CFI performed well for sample sizes varying from 50 to 1,600, in the sense of producing unbiased estimates and estimates low in variability (e.g., Bentler, 1990).

From an intuitive perspective, the CFI can be thought of as a measure of how much variation in measures is accounted for from a practical standpoint. A rough rule of thumb is that the CFI should be greater than or equal to about .95, where values less than .95 suggest that significant amounts of variance remain to be explained and values greater than or equal to .95 imply that further relaxation of parameter constraints are not warranted and might lead to over fitting.

Discriminant and Criterion Related Validity

To examine discriminant and criterion related validity, separate factors for need for cognition and empathy were added to the AIM model in Figure 1 to yield an eight factor confirmatory factor analysis model. The hypothesis for discriminant validity is that the six AIM factors will be uncorrelated with need for cognition. The hypothesis for criterion related validity is that the six AIM factors will be positively correlated with empathy.

Generalizability

To the extent that the structure of the revised AIM generalizes across men and women, the validity of the six dimensional representations will be enhanced. We examined generalizability in a hierarchical fashion beginning with the most basic sense and proceeding, where appropriate, to more complex cases. We first tested whether the same factor pattern (i.e., six intercorrelated factors as shown in Figure 1) existed for men and women. A failure to reject this hypothesis was followed by a test of the equality of factor loadings across gender. Equal factor loadings imply that the correspondence between factors and measures is the same for men and women. Given equal factor loadings, it is meaningful to test for the invariance of error variances. Next, we tested for the equality of factor variance and covariances. A failure to reject the hypothesis that factor loadings, error variances, and factor variances are invariant suggests that the measures are equally reliable for men and women. The greatest achievement of generalizability would occur when all parameters are invariant across gender. Total lack of generalizability would occur when the factor pattern matrices differ across gender. In between these extremes exist varying degrees of invariance. The aforementioned sequence of hypotheses were evaluated by use of chi-square difference tests. Byrne, Shavelson, and Muthén (1989) and Marsh (1994) discuss various issues concerning tests of invariance.

Structural Means

The tests of generalizability discussed above address the measurement properties of the six factor model of the revised AIM for men and women. It is also interesting to investigate differences in mean levels of the six factors across gender. To do this, we use the structured means procedure described by Jöreskog and Sörbom (1996).

RESULTS

Confirmatory Factor Analysis

Table 2 shows the findings for the CFA of the AIM for women. Under the null model, only error variances for measures are estimated. This model is of interest only so far as it provides a baseline in computation of the CFI and other indexes. The results for the single factor

TABLE 2
Findings for the structure of Affect Intensity (women)

Model	Goodness of fit	Factor loadings: General intensity	Negative affect	Guilt	Threat to self-identity	Serenity	Positive affect	Error variance
M_1: Null	$\chi^2(78, N = 413) = 2051.01$ $p \cong .00$							
M_2: Single factor	$\chi^2(65, N = 413) = 1037.62$ $p \cong .00$ CFI = .51							
M_3: Three factor	$\chi^2(62, N = 413) = 666.67$ $p \cong .00$ CFI = .69							
M_4: Six factor	$\chi^2(62, N = 413) = 666.67$ $p \cong .00$ CFI = .94	.74(.05)[a]	.00	.00	.00	.00	.00	.46(.05)
		.84(.05)	.00	.00	.00	.00	.00	.29(.05)
		.00	.65(.06)	.00	.00	.00	.00	.58(.06)
		.00	.71(.06)	.00	.00	.00	.00	.49(.06)
		.00	.00	.83(.06)	.00	.00	.00	.31(.08)
		.00	.00	.59(.06)	.00	.00	.00	.65(.06)
		.00	.00	.00	.66(.05)	.00	.00	.56(.05)
		.00	.00	.00	.83(.05)	.00	.00	.31(.06)
		.00	.00	.00	.00	.66(.06)	.00	.57(.06)
		.00	.00	.00	.00	.97(.07)	.00	.05(.11)
		.00	.00	.00	.00	.00	.80(.04)	.36(.03)
		.00	.00	.00	.00	.00	.88(.04)	.23(.03)
		.00	.00	.00	.00	.00	.87(.04)	.25(.03)
Factor correlations	General affect intensity	1.00						
	Negative affect	.61(.06)	1.00					
	Guilt	.44(.06)	.07(.07)	1.00				
	Threat to self-identity	.40(.06)	.38(.07)	.46(.06)	1.00			
	Serenity	.07(.06)	.26(.06)	–.12(.06)	.02(.06)	1.00		
	Positive affect	.42(.05)	.11(.06)	.37(.06)	.47(.05)	.30(.05)	1.00	

Note. [a]Standard errors in parentheses.

model reveal that we must reject the hypothesis that all measures load on one factor: $\chi^2(65, N = 413) = 1037.62$, $p \cong .00$, and CFI = .51). Thus the evidence suggests that the AIM is not unidimensional. For purposes of comparison, we examined a three factor model of the AIM wherein one factor corresponded to general intensity (items 6 and 15), a second factor reflected positive affect (items 1, 2, 3, 5, 7, 8, 10, 12, 14, 16, 18, 19, 20, 22, 23, 24, 27, 29, 32, 33, 35, 37, 38, and 40), and the third factor referred to negative affect (all the remaining items). While substantially better than the one factor model, this model also must be rejected: $\chi^2(62, N = 413) = 666.67$, $p \cong .00$, and CFI = .69. Finally, the six factor model in Figure 1 was tested and found to provide a satisfactory fit: $\chi^2(50, N = 413) = 177.35$, $p \cong .00$, and CFI = .94.

Under the six factor model, all factor loadings are generally high and error variances are generally low. The measures exhibit convergent validity for the six factors of the AIM. General affect intensity and negative affect correlate at a relatively high level. General affect intensity correlates at a moderate level with guilt, threat to self-identity, and positive affect. Guilt and threat to self-identity correlate at a moderate level, as do threat to self identity and positive affect. All other correlations range from nonsignificance to low levels. Overall the measures of the six dimensions of the revised AIM demonstrate discriminant validity.

Table 3 presents the findings for the CFA of the revised AIM for men. The results for the single factor model show that we must reject the hypothesis that all measures load on one factor: $\chi^2(65, N = 333) = 745.61$, $p \cong .00$, and CFI = .56. Likewise the three factor model must be rejected: $\chi^2(62, N = 333) = 501.42$, $p \cong .00$, and CFI = .72. The six factor model in Figure 1, in contrast, fits well: $\chi^2(50, N = 333) = 102.25$, $p \cong .00$, and CFI = .97. All factor loadings are generally high and error variances low. The one exception is the first measure of negative affect which shows a moderate factor loading ($\lambda = .49$) and corresponding relatively high error variance ($\theta = .76$). On balance, the measures show convergent validity for the six dimensions of the revised AIM. The pattern of correlations among factors for men is quite similar to that for women. General affect intensity and negative affect are highly correlated for men. Guilt and threat to self-identity are also highly correlated for men. Moderate correlations are found between: general affect intensity and positive and negative affect; threat to self-identity and positive affect; guilt and positive affect. The remaining correlations range form nonsignificance to low levels. Overall the measures of the six dimensions of the revised AIM illustrate discriminant validity amongst each other.

Discriminant and Criterion Related Validity of Revised AIM

In Table 4, discriminant validity between the six dimensions of the revised AIM and need for cognition is shown separately for women and men. The correlations for women show that need for cognition is nonsignificantly associated with general affect intensity ($\phi_{71} = .00$, s.e. = .05), serenity ($\phi_{75} = -.07$, s.e. = .05), and positive affect ($\phi_{76} = -.01$, s.e. = .05). Need for cognition is significantly correlated, but at low levels, with negative affect ($\phi_{72} = -.21$, s.e. = .06), guilt ($\phi_{73} = .10$, s.e. = .05), and threat to self-identity ($\phi_{74} = -.21$, s.e. = .05). The correlations for men show that need for cognition is nonsignificantly associated with general affect intensity ($\phi_{71} = .01$, s.e. = .06), negative affect ($\phi_{72} = -.10$, s.e. = .06), guilt ($\phi_{73} = .10$, s.e. = .06), serenity ($\phi_{75} = -.02$, s.e. = .06), and positive affect ($\phi_{76} = .06$, s.e. = .05). Need for cognition is significantly correlated, but at a very low level, with threat to self-identify ($\phi_{74} = -.12$, s.e. = .06).

TABLE 3
Findings for the structure of Affect Intensity (men)

Model	Goodness of fit	Factor loadings: General intensity	Negative affect	Guilt	Threat to self-identity	Serenity	Positive affect	Error variance
M_1: Null	$\chi^2(78, N = 333) = 1628.39$ $p \cong .00$							
M_2: Single factor	$\chi^2(65, N = 333) = 745.61$ $p \cong .00$ CFI = .56							
M_3: Three factor	$\chi^2(62, N = 333) = 501.42$ $p \cong .00$ CFI = .70							
M_4: Six factor	$\chi^2(62, N = 333) = 102.25$ $p \cong .00$ CFI = .97	.75(.06)[a]	.00	.00	.00	.00	.00	.44(.06)
		.68(.06)	.00	.00	.00	.00	.00	.54(.06)
		.00	.49(.07)	.00	.00	.00	.00	.76(.07)
		.00	.90(.09)	.00	.00	.00	.00	.20(.14)
		.00	.00	.72(.06)	.00	.00	.00	.48(.06)
		.00	.00	.83(.06)	.00	.00	.00	.31(.06)
		.00	.00	.00	.80(.06)	.00	.00	.36(.07)
		.00	.00	.00	.64(.06)	.00	.00	.59(.06)
		.00	.00	.00	.00	.70(.06)	.00	.51(.07)
		.00	.00	.00	.00	.97(.07)	.00	.06(.10)
		.00	.00	.00	.00	.00	.81(.05)	.34(.04)
		.00	.00	.00	.00	.00	.89(.05)	.21(.03)
		.00	.00	.00	.00	.00	.81(.05)	.35(.04)
Factor correlations	General affect intensity	1.00						
	Negative affect	.60(.07)	1.00					
	Guilt	.36(.07)	.16(.07)	1.00				
	Threat to self-identity	.38(.07)	.26(.07)	.66(.06)	1.00			
	Serenity	.15(.07)	.14(.06)	–.17(.06)	.06(.07)	1.00		
	Positive affect	.53(.06)	.26(.06)	.42(.06)	.50(.06)	.38(.06)	1.00	

Note. [a]Standard errors in parentheses.

Table 4 also shows the correlations for assessing criterion related validity between measures of dimensions of the revised AIM and empathy. The correlations for women reveal that empathy is relatively highly correlated with general affect intensity (ϕ_{71} = .48, s.e. = .04), guilt (ϕ_{73} = .45, s.e. = .05), threat to self-identity (ϕ_{74} = .52, s.e. = .04), and positive affect (ϕ_{76} = .41, s.e. = .04). Empathy is moderately correlated with negative affect (ϕ_{72} = .31, s.e. = .06), and lowly correlated with serenity (ϕ_{75} = .20, s.e. = .05). The correlations for men reveal that empathy is relatively highly correlated with general affect intensity (ϕ_{71} = .44, s.e. = .06), guilt (ϕ_{73} = .52, s.e. = .05), threat to self-identity (ϕ_{74} = .51, s.e. = .05), and positive affect (ϕ_{76} = .45, s.e. = .04). Empathy is lowly correlated with negative affect (ϕ_{72} = .24, s.e. = .06) and nonsignificantly associated with positive affect (ϕ_{75} = .10, s.e. = .06).

TABLE 4
Discriminant and criterion related validity for dimensions of Affect Intensity:
Correlations with need for Cognition and Empathy

	Women (N = 413)		Men (N = 333)	
Dimension	Need for Cognition	Empathy	Need for Cognition	Empathy
General	.00(.05)[a]	.48(.04)	.01(.06)	.44(.06)
Negative affect	–.21(.06)	.31(.06)	–.10(.06)	.24(.06)
Guilt	.10(.05)	.45(.05)	.10(.06)	.52(.05)
Threat to self-identity	–.21(.05)	.52(.04)	–.12(.06)	.51(.05)
Serenity	–.07(.05)	.20(.05)	–.02(.06)	.10(.06)
Positive affect	–.01(.05)	.41(.04)	.06(.05)	.45(.04)

Note. [a]Standard errors in parentheses.

Generalizability of Revised AIM

Table 5 summarizes the findings for the tests of generalizability of the revised AIM in terms of its structure and measurement properties. Under M_1 we see that the model hypothesizing the same factor pattern for women and men fits satisfactorily from a practical standpoint. The test for the invariance of all factor loadings across gender (M_2) suggests that the factor loadings are not equal. An inspection of the loadings pointed to the possibility that the loadings for general affect intensity and threat to self-identity may account for this result, although it should be reiterated that all loadings are relatively high in magnitude. When we performed a test of the equality of factor loadings for women and men for negative affect, guilt, serenity, and positive affect, we found that we could not reject the hypothesis of invariance (M_{2a}). Likewise, the further test of invariance for error variances showed that these parameters, too, are equal for women and men (M_3). Finally, the test of equality of the variances and covariances among the six dimensions of the revised AIM revealed that all six covariances and four variances are invariant across gender (M_4) for negative affect, guilt, serenity, and positive affect.

TABLE 5
Findings for multiple-group analyses of the structure of Affect Intensity:
Tests of invariance for women and men

Model		Goodness of fit	Test of Hypotheses
M_1:	Baseline	$\chi^2(100, N^W = 413, N^M = 333) = 279.59$ $p \cong .00$ CFI = .95	
M_2:	Invariance of factor loadings for all factors	$\chi^2(113, N^W = 413, N^M = 333) = 330.70$ $p \cong .00$ CFI = .94	M_2-M_1: $\chi^2(13) = 51.11$ $p < .001$
M_{2a}:	Invariance of factor loadings for negative affect, guilt, serenity, and positive affect	$\chi^2(109, N^W = 413, N^M = 333) = 295.38$ $p \cong .00$ CFI = .95	M_{2a}-M_1: $\chi^2(9) = 15.79$ $p > .05$
M_3:	Invariance of factor loadings and error variances for negative affect, guilt, serenity, and positive affect	$\chi^2(118, N^W = 413, N^M = 333) = 307.85$ $p \cong .00$ CFI = .95	M_3-M_{2a}: $\chi^2(18) = 12.47$ $p > .05$
M_4:	Invariance of factor loadings and error variances for negative affect, guilt, serenity, and positive affect, plus invariance of factor variance-covariance matrix	$\chi^2(133, N^W = 413, N^M = 333) = 324.96$ $p \cong .00$ CFI = .95	M_4-M_3: $\chi^2(28) = 17.11$ $p > .05$

Structured Means of the Revised AIM

Table 6 illustrates the difference in means for the six dimensions of the revised AIM across gender. It can be seen that women exhibit significantly higher levels of affect intensity than men on all six dimensions of the AIM.

TABLE 6
Structured means for dimensions of Affect Intensity[a]

Dimensions					
General	Negative affect	Guilt	Threat to self-identity	Serenity	Positive affect
.71	.57	1.11	.96	.44	.63
(.08)[b]	(.10)	(.10)	(.09)	(.08)	(.08)

Note. [a]Mean of men fixed to zero. [b]Standard errors in parentheses.

DISCUSSION

Our primary aim was to develop and test a multidimensional representation of the AIM and test its construct validity. The AIM was found to leave six distinct subdimensions: general or overall affect intensity, negative affectivity, guilt, threat to self-identity, serenity, and positive affectivity. Similar structures of affect intensity were found for men and women. Moreover, most parameter estimates for factor loadings, error variances, and factor variances and covariances generalized across gender. In addition to discriminant validity of measures across the six subdimensions of the AIM, we found discriminant validity between measures of the six AIM subdimensions and measures of need for cognition and criterion-related validity between measures of the six AIM subdimensions and measures of empathy. Finally, the results showed that women consistently exhibit greater intensity than men on all six subdimensions of the AIM, consistent with research done on an aggregation of all AIM items on a single construct (e.g., Diener et al., 1985).

We believe that the six factor model examined herein has advantages over other analyses done to date. First, both the original AIM and all subsequent studies included items 6 and 15, two non-valenced resourses, as either part of a singular scale (e.g., Larsen, 1984) or part of a negative intensity factor (e.g., Weinfurt et al., 1994). This seems to confound non-valenced, global reactions with the multi-valenced singular scale or affectivity, respectively. We found that the non-valenced items loaded on a distinct factor by themselves. This may be useful when studying the differential dependence on effect of separate dimensions of the AIM in substantive research.

We also found that three items measured a guilt factor that was distinct from other factors. Weinfurt et al. (1994), Bryant et al. (1996), and Jones et al. (2009) put two of these items (4 and 25) on a negativity factor and the third item (36) on a negative intensity factor. We argue that splitting up these negativity items is not justified conceptually, while allowing them to measure guilt makes more sense.

Our serenity factor is similar to the factor found by Weinfurt et al. (1994), with one exception. As argued earlier, we added item 29 because it shares meaning with the other items on the scale. Item 29 was discarded by Bryant et al. (1996) and Jones et al. (2009), which we suggest was an arbitrary decision probably resulting from bias in data the authors collected where all reverse coded items were deleted.

Our positive affectivity factor was identical with the same factor found by Weinfurt et al. (1994). Bryant et al. (1996) and Jones et al. (2009) had a similar factor except that they deleted items 3 and 32 for seemingly empirical reasons peculiar to their data.

Indeed Bryant et al. (1996) and Jones et al. (2009) deleted 13 items from the original AIM, making it difficult to compare the findings to past research using the full AIM. We think the difference between our negativity factor and the findings by Bryant et al. and Jones et al. stems from their arguably arbitrary deletion of items 26, 28, and 31, which we feel measure negativity and we included in order analyses.

Finally we found a threat to self-identity scale with items 13, 17, 21, and 39 loading highly on this factor. As argued above, the decision by Weinfurt et al. (1994), Bryant et al, (1996), and Jones et al. (2009) to put these items on two factors (negative reactivity and negative intensity) loses the meaning entailed by the content common to these four items.

Our analyses of the six factor model generally fit better than the models presented in Weinfurt et al. (1994), Bryant et al. (1996), and Jones et al. (2009). Moreover we performed more

thorough tests of contruct validity than done by these authors and found that the six factor scale achieved construct and criterion-related validity.

Our balance, the six factor AIM seems to be a useful representation of intensity of affect. It can be used as independent and dependent variables, and was shown to be useful as well to show gender differences in experienced affect, where women consistently exhibited greater levels of felt intensity than men on all six dimensions of the AIM.

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