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## Validation of the Affect Integration Inventory Short Form (AII-SF-42)

Ole André Solbakken\*, Jon T Monsen

*University of Oslo, Norway*

### ABSTRACT

Affect integration, denoting the capacity to utilize the motivational- and signal properties of affects, is essential to adaptive psychological functioning. Affect integration is commonly operationalized and assessed with the self-rated Affect Integration Inventory (AII). This study tested the concurrent and construct validity of a short-form version (AII-SF-42) against the long-form version in a non-clinical reference sample comprising 157 Norwegian respondents. We conducted analyses of reliability, standardized mean differences and associations between short- and long-forms, assessment of internal structure by confirmatory factor analyses, and assessment of external validity by tests of associations with emotion regulation, alexithymia, psychiatric symptoms, and interpersonal problems. Results demonstrated high reliability and validity for the AII-SF-42, including high internal consistency and correspondence with long-form scores, a theoretically consistent factor structure organized according to discrete affects, and theoretically consistent patterns of convergent and discriminant associations with external criteria, including distinct sinusoidal patterns of relationships between AII-SF-42 affect scores and specific interpersonal problem types. Overall, findings indicate that the AII-SF-42 is a viable alternative to the AII in conditions where completion of longer instruments might be unfeasible. *Key words:* emotion, emotion regulation, Affect Integration Inventory, affect consciousness, alexithymia, interpersonal theory.

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### *Novelty and Significance*

*What is already known about the topic?*

- Affect integration, or the ability to utilize and deal effectively with emotions, is commonly measured by the observer rated Affect Consciousness Interview (ACI), or the self-reported Affect Integration Inventory (AII).
- These assessment procedures have been empirically validated in various settings and are used in a number of previous, ongoing, and planned studies.
- There is, however, a need for a briefer and more expedient assessment procedure for affect integration to be used in settings where limits on time- and questionnaire-length demand it. No such instrument has been available until now.

*What this paper adds?*

- The paper presents the first validation of the AII-SF-42, a brief version of the AII. Results show high reliability and validity for scores derived from the instrument.
- Findings included robust internal consistency and correspondence with long-form scores, a theoretically consistent factor structure organized according to discrete affects, and theoretically consistent patterns of convergent and discriminant associations with external criteria.
- The AII-SF-42 appears to be a useful alternative to the ACI/AII in conditions where completion of longer or more time-consuming instruments are unfeasible.

The ability to deal effectively with emotions, follow their guidance, harness their power, and channel their energy into healthy motivation, communication, and behavior is a central hallmark of well-adjusted individuals (Monsen & Monsen, 1999; Solbakken, Hansen, & Monsen, 2011). Conversely, failure in these areas can result in various forms of breakdown in cognitive, emotional, and relational functioning (Solbakken, Rauk, Solem, Lødrup, & Monsen, 2017). These processes are commonly referred to as affect

\* Correspondence: Ole André Solbakken, Department of Psychology, University of Oslo, Postboks 1094 Blindern, 0317 Oslo, Norway. E-mail: o.a.solbakken@psykologi.uio.no

integration (see e.g., Krystal, 1974; Monsen, Eilertsen, Melgård, & Ødegård, 1996; Solbakken, Hansen, & Monsen, 2011; Solbakken, Hansen, Havik, & Monsen, 2011; Stolorow, Brandschaft, & Atwood, 1995; Tomkins, 2008a,b) and may be defined as the functional incorporation of affect in cognitive, motivational, and behavioral processes. Affect integration thus indicates the availability of affect to inform, guide, energize, and propel the individual in her transactions with her surroundings (Solbakken, Hansen, & Monsen, 2011).

High levels of affect integration are characterized by high capacity for utilizing ones' affects for adaptive purposes at both deliberate, reflective and implicit, unreflective levels (Solbakken *et alia*, 2017). This capacity protects against the development of psychopathology by ensuring affectively informed responses to the varying circumstances facing the individual in the world (Monsen *et alia*, 1996; Monsen & Monsen, 1999; Solbakken, Hansen, & Monsen, 2011; Stolorow *et alia*, 1995; Tomkins 2008a,b).

The affect integration construct thus reflects both capacities for accessing and utilizing adaptive properties of affects for personal adjustment, i.e., emotion utilization (Izard, Stark, Trentacosta, & Schultz, 2008; Solbakken, 2011) and capacities for tolerating and regulating the impacts of affective activation, i.e., emotion regulation (Gross, 2007).

Several overlapping constructs exist, such as alexithymia (Bagby, Parker & Taylor, 1994; Lesser, 1981), *Levels of Emotional Awareness* (LEAS; Lane, Quinlan, Schwartz, Walker & Zeitlin, 1990), mentalized affectivity (Fonagy, Gergely, Jurist and Target, 2002; Jurist, 2005), emotion regulation (Gross, 2007), and emotional intelligence (Salovey & Mayer, 1990). None of these constructs systematically differentiate between affect or emotion categories in their theoretical underpinnings or assessment procedures. This is what primarily sets the affect integration construct apart: systematic operationalization differentiating between several discrete affect categories (Choi-Kain & Gunderson, 2008; Solbakken, Hansen, Havik & Monsen, 2012). We believe such differentiation to be necessary for a sufficiently nuanced understanding of the diverse signal- and motivational properties associated with various affect states and their effects upon the individual (Tomkins, 2008a; Izard, 2007, 2009; Damasio, 1999; 2004; LeDoux, 1996; Solbakken *et alia*, 2011).

Affect integration has usually been operationalized and assessed by the observer-rated, semi-structured *Affect Consciousness Interview* (ACI, Monsen, Monsen, Solbakken, & Hansen 2008) and more recently by the self-rated *Affect Integration Inventory* (AII, Solbakken & Monsen, 2013; Solbakken *et alia*, 2017). A number of inquiries have confirmed the usefulness of the construct so operationalized (e.g., Choi-Kain & Gunderson, 2008; Falkenström, Solbakken, Möller, Lech, Sandell, & Holmqvist, 2014; Gude, Monsen & Hoffart, 2001; Holmqvist, 2008; Johansen, Normann-Eide, Normann-Eide, & Wilberg, 2013; Lech, Andersson, & Holmqvist, 2008; Monsen, Eilertsen, Melgård & Ødegård, 1996; Monsen & Monsen, 1999; Normann-Eide, Johansen, Normann-Eide, Egeland, & Wilberg, 2013; Solbakken *et alia*, 2011, 2012; Solbakken *et alia*, 2017; Taarvig, Solbakken, Grova & Monsen, 2015; Taarvig & Solbakken, 2018; Waller & Scheidt, 2004).

The AII is a 112-item self-rated instrument that assesses capacity for experience and expression of nine discrete affect states and constitutes a readily accessible and psychometrically sound method for assessing affect integration (Solbakken *et alia*, 2017). However, a measure with 112 items is too lengthy in many cases, particularly in studies that compile many questionnaires in extensive test-batteries. The need for a brief version of the AII has therefore been voiced.

Accordingly, we developed the 42-item form of the AII, dubbed the *Affect Integration Inventory-Short Form 42* (AII-SF-42; Solbakken & Monsen, 2016). The present article constitutes the first study of the construct validity of the AII-SF-42. We hope it will lay the grounds for increased proliferation of the affect integration construct in novel research settings by making the empirical examination of affect integration more accessible and achievable for interested researchers and clinicians worldwide.

This paper presents a test of the usefulness of a new short-form assessment instrument that measures the capacity for affect integration, the AII-SF-42. We examine the reliability and validity of the AII-SF-42 in a sample of 157 non-clinical respondents. The study includes a systematic examination of differences in the magnitude of scores from short- and long-forms of the AII, estimates of internal consistency reliability, the examination of internal structure by confirmatory factor analyses, testing of short-form/long-form associations, and exploration of convergent and discriminant validity in terms of relationships to several theoretically related external criteria. We finally test the specific utility of systematically differentiating among discrete affects by examining the presence of distinct, theoretically hypothesized patterns of relationships between the integration of specific affects and corresponding types of interpersonal problems.

For examining the structural properties of scores from the AII-SF-42 and its correspondence with the full-length AII, we analyze internal consistency reliability, standardized mean differences in magnitude, and short-form/full-form correlations for corresponding scale scores. We then test whether scores from the AII-SF-42 have a theoretically feasible factorial structure through confirmatory factor analyses (CFA). We examine the internal organization of AII-SF-42 scores in terms of three competing theoretical models. These are: (a) a general factor model, assuming that the variation in AII-SF-42 scores is best represented by one overarching general factor. In terms of affect differentiation, this model is theoretically consistent with that underlying most other constructs within the same functional domain, such as alexithymia, emotion regulation, LEAS, emotional intelligence, etc. Essentially, it postulates that variations across affects are inconsequential; (b) an integrative function- or aspect model, assuming that variation in AII-SF-42 scores is best represented by two different, but correlated factors. One is referring to the experience of affect, the other referring to the expression of affect. In terms of functional differentiation, this model is consistent with that underlying both alexithymia (differentiating difficulties identifying feelings from difficulties describing feelings) and emotion regulation (differentiating cognitive reappraisal from expression suppression). As in the previous model, variation across affects is regarded as trivial; and (c) a discrete affect model, assuming that different affects constitute the most basic organizing principle underlying AII-SF-42 scores. This model postulates that scores are best represented by nine distinct, but interrelated factors, each corresponding to a discrete affect or emotion category. As we have seen, this model is at odds with that underlying the majority of constructs mapping a similar functional domain.

We hypothesize, first, that scores from the AII-SF-42 will be highly similar in magnitude to those from the full-length version of the AII, as indicated by small or insubstantial standardized mean differences in scores between the two (Cohen's  $d$ ; Cohen, 1988). Second, we hypothesize correlations between corresponding scale scores on the short-form and full-form versions to be very large and close to perfect ( $r \approx .90$ ). Third, we hypothesize that the discrete affect model will be identified as the best fitting representation of the internal structure of AII-SF-42 scores.

We examine correlations with several relevant external criteria for testing the convergent and discriminant validity of scores from the AII-SF-42. As a test of directly criterion-related convergent and discriminant validity, we explore associations between AII-SF-42 scores and scores on emotion regulation and alexithymia. We then explore associations with other external criteria theoretically presumed to be associated with AII-SF-42 scores: psychological symptoms, social role-dysfunction, and general relational dysfunction/interpersonal problems. Finally, we test specific hypotheses about systematic patterns of associations between the integration of discrete affects on the AII-SF-42 and specific types of interpersonal problems as operationalized by interpersonal theory (Horowitz, Alden, Wiggins, & Pincus, 2000; Solbakken *et alia*, 2011, 2012; Solbakken *et alia*, 2017).

We expect predictable and differentiated associations between AII-SF-42 scores and emotion regulation strategies. Specifically, we postulate that AII-SF-42 scores will be less strongly associated with reappraisal (ERQ-R) than with expression suppression (ERQ-E). This is because ERQ-R involves intentional suppression of the activation of emotion by reinterpreting feelings and their elicitors. To a certain extent, this strategy may theoretically be associated with the capacity for handling emotion successfully so that we would expect a positive correlation with affect integration. However, this correlation is likely to be relatively small, since a central element of high affect integration is the acceptance of emotional activation and the ability to reflect upon its meaning, rather than its suppression through willful control (Solbakken *et alia*, 2017). On the subscale level, we expect the capacity for experiencing on the AII-SF-42 to be more strongly related to ERQ-R than the capacity for expression, since ERQ-R denotes a strategy for experiential emotion regulation, rather than a strategy for dealing with the expression of emotion.

In contrast, we expect strong negative associations between affect integration on all levels and ERQ-E. The ERQ-E and capacity for expression, as measured by the AII-SF-42, similarly refer to and operationalize variations in emotion expression. On the subscale level, we, therefore, expect capacity for expression on the AII-SF-42 to be more strongly related to ERQ-E than the capacity for experiencing.

We expect strong negative associations between AII-SF-42 scores on all levels and alexithymia. These two constructs overlap substantially in their content domains, and both operationalize trait-like or characterological capacities for experiencing and expressing emotion. On the subscale level, we expect a differentiated pattern of associations between AII-SF-42 scores and the three alexithymia subscales; difficulty identifying feelings (DIF), difficulty describing feelings (DDF), and externally oriented thinking (EOT). As EOT has little direct conceptual overlap with affect integration, we expect only small or moderate associations between this subscale and AII-SF-42 scores. On the other hand, for DIF and DDF, we expect strong negative correlations with AII-SF-42 scores on all levels.

Furthermore, since DIF operationalizes difficulties in awareness and identification of emotion, we postulate a stronger association with the capacity to affect experiencing subscale of the AII-SF-42 than with affect expression capacity. Conversely, we postulate that DDF is more strongly related to capacity for affect expression than to capacity to affect experiencing since DDF primarily reflects problems with verbal expressions of emotion.

We expect strong negative associations between AII-SF-42 scores on all levels and psychological distress/symptoms/dysfunction, as measured by the OQ-45.2. On a

subscale level, we expect capacity for affect experiencing to be more strongly related to the OQ-45.2 scores than the capacity for affect expression since the capacity for adaptively experiencing affects presumably is a precondition for healthy psychological functioning. Expressing affect, on the other hand, is probably less crucial, as long as the capacity to affect experiencing is sufficient (Solbakken *et alia*, 2017). We also postulate that social role or work-related dysfunction will be less strongly correlated with AII-SF-42 scores than the other distress/dysfunction scores of the OQ-45.2, as problems in work and social role functioning are likely influenced by several issues beyond one's handling of emotions.

We expect strong negative associations between AII-SF-42 scores and interpersonal problems in general. As a further test of convergent and discriminant validity, we hypothesize systematic patterns of relationships between the integration of discrete affects on the AII-SF-42 and specific types of interpersonal problems (Solbakken *et alia*, 2017). As the subscales of the IIP-64 are organized in a circular order constituting the interpersonal circumplex (Horowitz *et alia*, 2000), this measure is especially well suited for testing convergent and discriminant validity. The circular organization of the IIP-64 lets us predict specific associations between discrete affect-scores and interpersonal problem types, by way of hypothesized, distinct sinusoidal correlation patterns with the eight IIP-octant scales peaking in separate and theoretically expected octants (Solbakken *et alia*, 2012; Solbakken *et alia*, 2017). Consequently, we anticipate the following (see Figure 1 for graphical presentation): (a) problems with Tenderness, Sadness, and Guilt (all typically interfering with the capacity for bonding and attachment) will have a sinusoidal correlation pattern peaking in the cold-detached (DE) octant; (b) problems with Anger (typically interfering with self-assertion and agency) will have a sinusoidal correlation pattern peaking in the non-assertive (HI) octant; (c) problems with Jealousy (typically interfering with trust and tolerance of interdependence on significant others) will have a sinusoidal correlation pattern peaking in the vindictive (BC) octant; and (d) problems with Interest, Joy, Shame, and Fear (all of which typically interfere with both closeness/bonding and assertive behavior and combinations of the two) will have sinusoidal correlation patterns peaking in the socially avoidant (FG) octant.

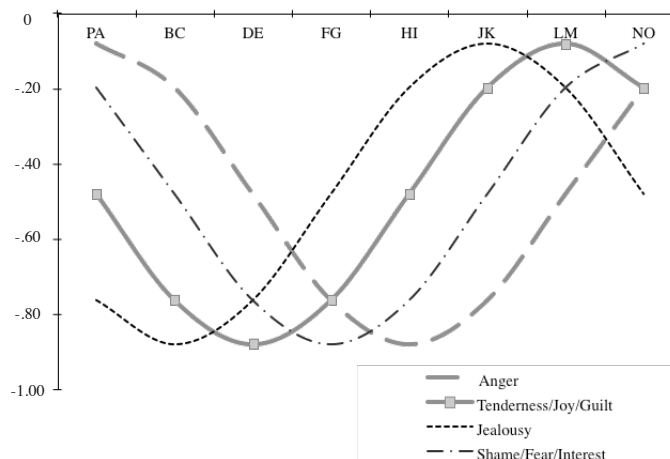


Figure 1. Predicted patterns of correlations between discrete affect scores from the AII-42-SF and IIP-64 subscales.

## METHOD

### *Participants*

A total of 157 participants completed a questionnaire comprising several psychological measures. Females made up 70.7% of the sample, while males constituted 29.3%. The mean age was 27 years, with a range of 16-90. Respondents reported an average of 14.4 years of education, including primary, secondary, high school, and college/university levels. The majority of respondents were students.

### *Instruments*

*The Affect Integration Inventory Short and Full Forms (AII-SF-42/AII, Solbakken & Monsen, 2013, 2016).* The AII is a self-report instrument for the assessment of affect integration. It is comprised of 112 items selected to assess the integration of nine discrete affect states: 1) Interest/Excitement; 2) Enjoyment/Joy; 3) Fear/Panic; 4) Anger/Rage; 5) Shame/Humiliation; 6) Sadness/Despair; 7) Jealousy/Possessiveness; 8) Guilt/Remorse; and 9) Tenderness/Care. Across these affects, subsets of items tap capacity for adaptive experience and capacity for adaptive expression, respectively. In total, 82 items reflect the capacity for experience, while 30 items reflect the capacity for expression. Each item is rated on a 10-point Likert scale ranging from “doesn’t fit at all” (0) to “fits perfectly” (10). High scores reflect higher levels of affect integration. The AII produces scores on three different levels: 1) Mean across all items (global affect integration). 2) Mean capacity for experience across affects (affect experience) and mean capacity for expression across affects (affect expression). 3). Mean integration score for each discrete affect (e.g., integration of tenderness/care, anger/rage, enjoyment/joy, etc.). The AII-SF-42 was developed based on the original AII through a four-step procedure. First, a set of conceptual preconditions for the organization of the short form was specified. These were: a) that all affects measured by the AII would be represented; b) That the conceptual distinction between indicators of capacity for experience and capacity for expression would be retained within each affect category; and c) That only the most common characteristic style of integration within each affect category would be retained (the full form of the AII taps the separate characteristic styles of “lacking access to” and “driven by” across affects). Next, items within each affect category (as specified in precondition a) were organized and ranked according to strength of association with the mean score across all items for that respective affect. We then selected items for the short-form by taking simultaneous account of rank-order of association and conceptual preconditions b) and c) above. Thus, we chose the items having the largest correlations with the overall affect score, so that at least two items represented capacity of experience and capacity for expression respectively within the dominant style of integration for each affect. Next, we computed sets with a varying number of items (starting with four) for each affect and correlated those with their full-scale equivalents. The set with the lowest number of items attaining a correlation  $\leq .85$  with the corresponding full-scale was chosen in each case. This yielded three scales with four items and six scales with five items each.

*The Emotion Regulation Questionnaire (ERQ, Gross & John, 2003).* The ERQ is a 10-item, self-report measure of habitual expressive suppression (four items) and reappraisal (six items) in relation to emotions. The ERQ uses a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Example questions include “I control my emotions by changing the way I think about the situation I’m in” (reappraisal) and “I control my emotions by not expressing them” (expressive suppression). The ERQ has demonstrated good psychometric properties. Expressive suppression has been consistently linked to increased depression, anxiety, symptoms of stress, and poorer well-being, while reappraisal correlates with more positive and less negative emotion, better interpersonal functioning, better social adjustment, and positive well-being (Gross

- & John, 2003; Spaapen, Waters, Brummer, Stopa, & Bucks, 2014). Cronbach's alpha in the study sample was .75 for reappraisal and .78 for expressive suppression.
- The Toronto Alexithymia Scale-20* (TAS-20, Bagby *et alia*, 1994). The TAS-20 is a widely studied self-report scale comprised of 20 items. Each item is rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Five items are reverse scored. There are three subscales scores and a total score derived from the instrument. The first subscale consists of seven items assessing the ability to identify feelings and distinguish them from the somatic sensations that accompany emotional arousal (DIF). Example items include "I am often confused about what emotion I am feeling" and "I have feelings that I can't quite identify". The second subscale consists of five items assessing the ability to describe feelings to other people (DDF). Example items include "I am able to describe my feelings easily" and "It is difficult for me to reveal my innermost feelings, even to close friends". The third subscale consists of eight items assessing externally oriented thinking (EOT). Example items include "I prefer to analyze problems rather than just describe them" and "Looking for hidden meanings in movies or plays distracts from their enjoyment". In the study sample, Cronbach's alpha for the total score of the TAS-20 was .84, for DIF it was .84, for DDF it was .72, and for EOT it was .67.
- The Outcome Questionnaire-45.2* (OQ-45, Lambert, Morton, Hatfield, Harmon, Hamilton, Reid, & Burlingame, 2004). The OQ-45 is a 45 item self-report instrument that measures psychological distress (overall and in three separate subdomains). It is rated on a 5-point Likert scale ranging from 0 (never) to 4 (almost always). Higher scores are indicative of greater levels of psychological distress. The OQ-45 is one of the most frequently used indicator of psychological distress, symptoms, and dysfunction in psychotherapy research. The sum of all items gives a total distress score (TD). There are three subscales: symptom distress (SD), which covers mainly depression, anxiety, and psychosomatic complaints (25 items); interpersonal relations (IR), which measures distress in both intimate and more peripheral relationships (11 items); and social role functioning (SR), which measures problems in everyday functioning in areas such as work, school and home (9 items) (Lambert *et alia*, 2004). Cronbach's alpha for the TD score was .95, for SD it was .93, for IR it was .79, and finally for SR it was .81.
- Inventory of Interpersonal Problems* (IIP-64, Horowitz *et alia*, 2000). The 64-item IIP-circumplex version assesses relational/interpersonal problems. The IIP-64 consists of two types of items. The first 39 begin with the phrase: "It is hard for me to..." The remaining 25 represent "Things that you do too much." Each item is rated on a five-point Likert scale ranging from "not at all" (0) to "very much" (4). The general factor of the IIP-64 has been consistently linked to symptom severity and negative affectivity (Tracey, Rounds & Gurtman, 1996). The second (Agency) and third (Communion) factors, yielding the IIP-64 circumplex structure, have shown good construct validity in terms of fit with a quasi-circumplex model and distinct convergent-discriminant association patterns with different forms of personality pathology, supporting the view that scores on the IIP-64 effectively represents its presumed distinctions of interpersonal functioning (Monsen, Hagtvedt, Havik & Eilertsen, 2006). The overall score of the IIP-64 is an indicator of general interpersonal problems (IIP-global). The IIP-64 also yields eight octant sum-scores indicating specific problems with being PA= domineering/controlling, BC= vindictive/self-centered, DE= cold/distant, FG= socially inhibited, HI= non-assertive, JK= overly accommodating, LM= self-sacrificing, and NO= intrusive/needy. Cronbach's alpha for the IIP-global in the study sample at intake was .94. For the eight octant scales, Cronbach's alpha ranged from .74 (intrusive/needy) to .97 (socially inhibited).

### Data Analysis

Analyses were conducted using the SPSS version 26 and its AMOS module for structural equation modeling. Various descriptive statistics were computed. Internal consistency reliability of scale scores was assessed with Cronbach's alpha. For testing the similarity of short-form and long-form scores, we computed standardized mean differences,



along with bivariate Pearson's *r* correlation coefficients. The factor structure of AII-SF-42 scores was assessed through CFA by SEM using AMOS. All SEM-computations were done with maximum likelihood estimation. Competing theoretical factor models were compared using common comparative fit indexes, i.e., *chi-square*, *AIC*, *BIC*, and *RMSEA*. Associations with external criteria were computed using bivariate Pearson's *r* correlations. Sinusoidal structure and fit of discrete affect association patterns with the interpersonal circumplex/IIP-subcales was assessed using Gurtman and Balakrishnan's (1998) structural summary method and corresponding Goodness of Fit index (*GoF*).

**RESULTS**

Descriptive statistics and internal consistency reliability for the AII-SF-42, along with standardized mean differences between the short- and full forms, are found in Table 1. Cronbach's alpha values were generally high, indicating good to excellent internal consistency for all scale scores. The median alpha value was .82, with estimates ranging from .69 to .92. Standardized mean differences between corresponding scores from short- and full forms of the AII were generally negligible or small with a median of 0.12, indicating very high correspondence in terms of scores' magnitudes.

Correlations between the short and full forms of the AII can be found in Table 2. As can be seen on the diagonal, correlation coefficients ranged from .97 to .86 with

Table 1. Descriptive statistics, internal consistency reliability, and standardized mean difference from full-scale scores for the various AII-SF-42 scale scores.

| AII-SF variable           | <i>M</i>   | <i>SD</i> | <i>Range</i> | <i>α</i>    | <i>d</i> |      |
|---------------------------|------------|-----------|--------------|-------------|----------|------|
| Global Affect Integration | 5.90       | 1.13      | 2.65 – 8.27  | .92         | .17      |      |
| Experience                | 6.04       | 1.21      | 2.04 – 8.52  | .87         | .28      |      |
| Expression                | 5.68       | 1.18      | 2.53 – 8.26  | .84         | .01      |      |
| Specific affects          | Interest   | 6.41      | 1.67         | 1.00 – 9.00 | .86      | .21  |
|                           | Joy        | 6.44      | 1.88         | 1.00 – 9.00 | .86      | .10  |
|                           | Tenderness | 6.43      | 1.74         | 1.75 – 9.00 | .82      | .12  |
|                           | Fear       | 4.76      | 1.65         | 1.20 – 8.40 | .68      | -.23 |
|                           | Anger      | 5.82      | 1.46         | 1.80 – 9.00 | .82      | .12  |
|                           | Shame      | 5.28      | 1.67         | 0.80 – 8.50 | .69      | .10  |
|                           | Sadness    | 6.00      | 1.60         | 1.80 – 9.00 | .74      | .36  |
|                           | Jealousy   | 5.90      | 2.11         | 0.00 – 9.00 | .77      | .12  |
|                           | Guilt      | 6.12      | 1.52         | 1.40 – 9.00 | .71      | .21  |

Notes: *M*= mean, *SD*= Standard Deviation, *α*= Cronbach's alpha, *d*= Standardized Mean Difference between short form and long form raw scores using pooled *SD*s across short- and full form scales

Table 2. Correlations between short-form and long-form AII-scales.

| AII-42                    | AII-112      |              |              |         |              |              |              |              |              |              |              |              |              |
|---------------------------|--------------|--------------|--------------|---------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                           | Global AI    | Experience   | Expression   | Sadness | Anger        | Tenderness   | Guilt        | Fear         | Shame        | Interest     | Joy          | Jealousy     |              |
| Global Affect Integration | <b>.97**</b> | .91**        | .90**        | .72**   | .63**        | .76**        | .64**        | .71**        | .72**        | .76**        | .85**        | .45**        |              |
| Experience                | .94**        | <b>.94**</b> | .73**        | .64**   | .66**        | .67**        | .67**        | .75**        | .73**        | .73**        | .82**        | .41**        |              |
| Expression                | .86**        | .73**        | <b>.97**</b> | .73**   | .51**        | .74**        | .51**        | .56**        | .70**        | .70**        | .75**        | .39**        |              |
| Specific Affects          | Sadness      | .63**        | .51**        | .75**   | <b>.89**</b> | .36**        | .60**        | .35**        | .40**        | .51**        | .51**        | .56**        | .06          |
|                           | Anger        | .52**        | .52**        | .42**   | .33**        | <b>.88**</b> | .26**        | .43**        | .29**        | .31**        | .31**        | .37**        | .24**        |
|                           | Tenderness   | .72**        | .63**        | .77**   | .56**        | .36**        | <b>.95**</b> | .44**        | .42**        | .48**        | .55**        | .60**        | .21**        |
|                           | Guilt        | .64**        | .61**        | .57**   | .38**        | .44**        | .46**        | <b>.92**</b> | .47**        | .46**        | .42**        | .45**        | .20**        |
|                           | Fear         | .74**        | .73**        | .62**   | .61**        | .41**        | .53**        | .39**        | <b>.92**</b> | .57**        | .50**        | .60**        | .26**        |
|                           | Shame        | .62**        | .59**        | .57**   | .42**        | .38**        | .39**        | .42**        | .52**        | <b>.86**</b> | .37**        | .52v         | .24**        |
|                           | Interest     | .61**        | .53**        | .64**   | .45**        | .25**        | .46**        | .26**        | .39**        | .41**        | <b>.89**</b> | .68**        | .17**        |
|                           | Joy          | .77**        | .71**        | .74**   | .56**        | .39**        | .63**        | .41**        | .53**        | .50**        | .71**        | <b>.96**</b> | .20**        |
|                           | Jealousy     | .51**        | .54**        | .34**   | .18**        | .32**        | .29**        | .24**        | .29**        | .28**        | .28**        | .29**        | <b>.92**</b> |

Notes: Corresponding scale correlations marked in bold; \* = *p* < .05; \*\* = *p* < .01.

a median of .92, indicating very strong to excellent agreement between corresponding scales of the two versions.

Results of the *CFAs* comparing the three competing theoretical models of the factor structure of scores from the AII-SF-42 revealed that among the three competitors, the discrete affect integration model was clearly superior in terms of fit ( $\chi^2= 228.22$ ,  $AIC= 408.22$ ,  $BIC= 433.19$ ,  $RMSEA= 0.091$ ). Second best fit was found for the experience vs. expression model ( $\chi^2= 505.23$ ,  $AIC= 615.23$ ,  $BIC= 630.49$ ,  $RMSEA= 0.133$ ), followed by the general affect integration factor model as the least suitable ( $\chi^2= 513.54$ ,  $AIC= 621.54$ ,  $BIC= 636.51$ ,  $RMSEA= 0.134$ ).

Correlations between the affect integration scales, emotion regulation, and alexithymia are presented in Table 3. As can be seen, findings were in accordance with the hypotheses proposed for demonstrating the convergent and discriminant validity of scores from the AII-SF-42. As expected, we found AII-SF-42 scores to be less strongly correlated with the emotion regulating process of reappraisal than with the process of expression suppression. We also expected capacity for affect experience to be more strongly related to reappraisal than the capacity to affect expression, and the opposite to be true for expression suppression. This was indeed the pattern we found. Tests for the significance of differences in correlation magnitude were conducted and all hypothesized differences were statistically significant.

Table 3. Associations between AII-SF-42 scores and emotion regulation strategies (ERQ) and alexithymia scores (TAS-20).

| AII-variables             |            | ERQ-R       | ERQ-E         | TAS-G         | TAS-DIF       | TAS-DDF       | TAS-EOT       |
|---------------------------|------------|-------------|---------------|---------------|---------------|---------------|---------------|
| Global Affect Integration |            | .09         | -.45**        | -.64**        | -.60**        | -.68**        | -.23**        |
| Experience                |            | <b>.16*</b> | <b>-.34**</b> | <b>-.57**</b> | <b>-.60**</b> | <b>-.57**</b> | <b>-.13</b>   |
| Expression                |            | <b>-.01</b> | <b>-.50**</b> | <b>-.65**</b> | <b>-.51**</b> | <b>-.71**</b> | <b>-.30**</b> |
| Specific affects          | Interest   | .05         | -.36**        | -.40**        | -.25**        | -.47**        | -.27**        |
|                           | Joy        | .13         | -.42**        | -.48**        | -.46**        | -.52**        | -.14          |
|                           | Tenderness | -.05        | -.45**        | -.47**        | -.32**        | -.51**        | -.30**        |
|                           | Fear       | .06         | -.30**        | -.54**        | -.56**        | -.58**        | -.09          |
|                           | Anger      | .03         | -.20*         | -.33**        | -.38**        | -.32**        | -.05          |
|                           | Shame      | .05         | -.18*         | -.35**        | -.38**        | -.44**        | -.01          |
|                           | Sadness    | -.10        | -.52**        | -.58**        | -.49**        | -.65**        | -.21**        |
|                           | Jealousy   | .09         | -.13          | -.28**        | -.30**        | -.23**        | -.12          |
| Guilt                     | .20*       | -.19*       | -.47**        | -.44**        | -.42**        | -.22*         |               |

Notes: ERQ-R= Reappraisal; ERQ-E= Expression suppression; TAS-G= global Alexithymia; TAS-DIF= Difficulty Identifying Feelings; TAS-DDF= Difficulty Describing Feelings; TAS-EOT= Externally Oriented Thinking; \* $p < .05$ ; \*\* $p < .01$ ; Hypothesized and obtained patterns of convergent/discriminant associations are marked in bold.

We expected and obtained strong negative associations between AII-SF-42 scores and overall alexithymia. On the subscale level, we expected and obtained a differentiated pattern of correlations with smaller associations between AII-SF-42 scales and Externally Oriented Thinking (EOT) than with the other alexithymia scales. For Difficulty Identifying Feelings (DIF), we expected and obtained a stronger association with capacity for affect experiencing than with capacity to affect expression. Conversely, we expected Difficulty Describing Feelings (DDF) to be more strongly related to affect expression capacity. Again, the findings supported our hypotheses. Tests for the significance of differences in correlation magnitude were conducted, and all hypothesized differences were statistically significant.

Correlations between the affect integration scales and various scales derived from the OQ-45.2, along with the global score of the IIP-64 are presented in Table 4. We expected and obtained strong negative associations between affect integration,

Table 4. Associations between AII-SF-42 scores, psychological distress indicators and general interpersonal problems.

| AII-variables             | OQ-TD         | OQ-SD         | OQ-IR         | OQ-SR         | IIP-G             |        |
|---------------------------|---------------|---------------|---------------|---------------|-------------------|--------|
| Global Affect Integration | -.65**        | -.63**        | -.64**        | -.42**        | -.69**            |        |
| Experience                | <b>-.70**</b> | <b>-.70**</b> | <b>-.67**</b> | <b>-.46**</b> | <b>-.67**</b>     |        |
| Expression                | <b>-.48**</b> | <b>-.45**</b> | <b>-.50**</b> | <b>-.32**</b> | <b>-.61**</b>     |        |
| Specific affects          | Interest      | -.29**        | -.29**        | -.27**        | -.18**            | -.41** |
|                           | Joy           | -.61**        | -.60**        | -.57**        | -.38**            | -.57** |
|                           | Tenderness    | -.37**        | -.34**        | -.45**        | -.22**            | -.48** |
|                           | Fear          | -.64**        | -.63**        | -.54**        | -.49**            | -.54** |
|                           | Anger         | -.31**        | -.31**        | -.31**        | -.17**            | -.39** |
|                           | Shame         | -.47**        | -.46**        | -.47**        | -.31**            | -.49** |
|                           | Sadness       | -.43**        | -.41**        | -.45**        | -.27**            | -.43** |
|                           | Jealousy      | -.28**        | -.25**        | -.30**        | -.20 <sup>†</sup> | -.37** |
|                           | Guilt         | -.43**        | -.41**        | -.45**        | -.27**            | -.45** |

Notes: OQ-TD= Total Psychological Distress; OQ-SD= Symptom Distress; OQ-IR= Interpersonal Distress; OQ-SR= Social Dysfunction; IIP-G= Global Interpersonal Problems; \* =  $p < .05$ ; \*\* =  $p < .01$ ; Hypothesized and obtained patterns of convergent/discriminant associations are marked in bold.

capacity for experience and capacity for expression, and psychological distress as measured by the OQ-45.2. On the subscale level, as we expected, capacity for affect experience was more strongly related to total psychological distress, symptom distress, interpersonal distress, and social dysfunction than was capacity for affect expression. Tests for the significance of differences in correlation magnitude were conducted, and all hypothesized differences were statistically significant. Finally, for overall levels of interpersonal problems as measured by the IIP-64, we expected and obtained strong negative associations with AII-scores on all levels.

As a further test of convergent and discriminant validity of AII-scores we postulated distinct sinusoidal patterns of associations between the integration of discrete affects and specific types of interpersonal problems peaking in separate octants of the IIP-64. The expected and obtained patterns of correlations are presented in Figure 2. The upper left panel recapitulates the predicted patterns. The upper right panel depicts obtained correlation patterns for the integration of jealousy, tenderness, and anger. The lower left panel depicts obtained correlation patterns for integration of shame, fear, and joy. Finally, the lower right panel depicts obtained correlation patterns for integrating interest, sadness, and guilt. As can be seen, results were generally consistent with our predictions: (a) problems with Tenderness, Sadness, and Guilt all had sinusoidal correlation patterns peaking in the cold-detached (DE) octant. All three correlation patterns had high Goodness of Fit (*GoF*; tenderness = .98, sadness = .91, and guilt = .97) with an optimal cosine curve function peaking in DE; (b) problems with Anger had a sinusoidal correlation pattern peaking in the non-assertive (HI) octant. *GoF* was high (.90) with an optimal cosine curve function peaking in HI; (c) problems with Jealousy had a sinusoidal correlation pattern peaking in the vindictive (BC) octant. *GoF* was high (.96) with an optimal cosine curve function peaking in BC; and (d) problems with Interest and Joy both had sinusoidal correlation patterns peaking in the socially inhibited (FG) octant. *GoF* was high (.96 in both cases). Problems with Shame was slightly rotated counterclockwise in interpersonal space and peaked between the FG and HI octants, still *GoF* with an optimal cosine curve function peaking in FG was high (.91). Finally, problems with Fear was rotated slightly clockwise in interpersonal space and had a sinusoidal correlation pattern peaking between the FG and DE octants. Again, *GoF* with an optimal cosine curve function peaking in FG was high (.98).

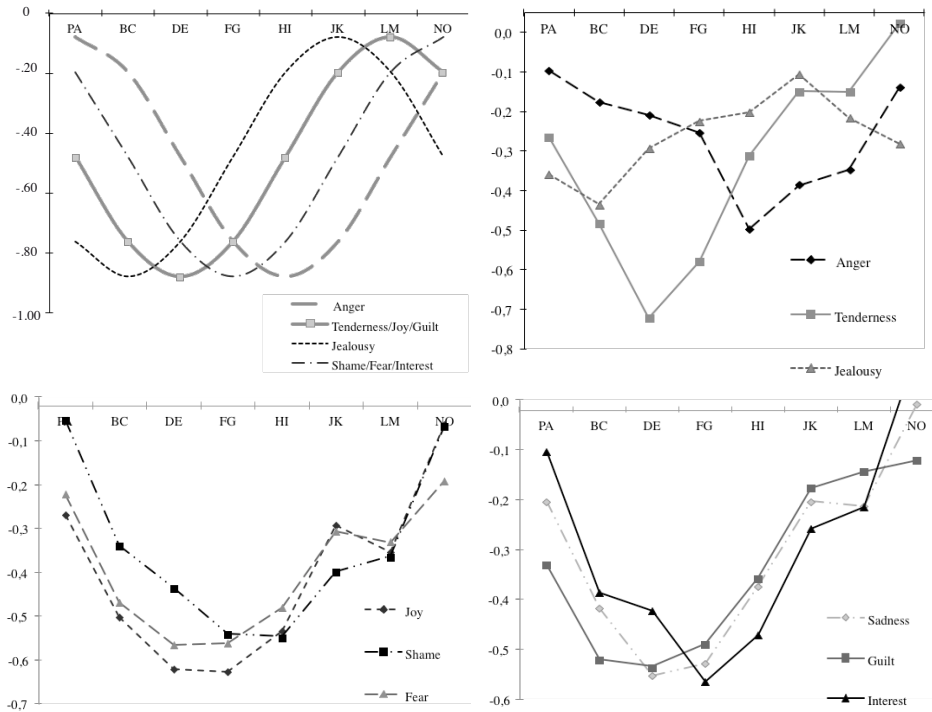


Figure 2. Predicted and obtained patterns of correlations between discrete affect scores from the AII-42-SF and IIP-64 subscales.

## DISCUSSION

The present study tested a short-form of a self-report instrument for assessing capacity to affect integration; the Affect Integration Inventory Short-Form-42 (AII-SF-42). The reliability and construct validity of the AII-SF-42 was tested through analyses of internal consistency of scales, standardized mean differences of scores and associations between short- and full-forms of the instrument, assessment of internal structure by confirmatory factor analyses, and examination of associations with various external criterion variables (emotion regulation, alexithymia, psychiatric symptoms, and interpersonal problems).

Results showed high reliability and validity for the AII-SF-42, including high internal consistency of scales, small and negligible deviations in magnitude from corresponding full-form scores, very strong and systematic short-form/full-form correlations, confirmation of theoretically specified factor structure, and demonstration of convergent/discriminant patterns of associations between scales on all levels and external criteria, including distinct and theoretically consistent sinusoidal patterns of relationships between AII-SF-42 affect scores and specific interpersonal problem types.

Internal consistency reliability was generally high for scores derived from the AII-SF-42, indicating that the sampling and clustering of items within the construct domain are sound. All scales derived from the instrument had alphas well above the traditional cut-off of .60 ordinarily deemed adequate. Comparing the obtained short-form reliabilities with values from the complete 112-item instrument reported by Solbakken *et alia* (2017), we note that the reductions in corresponding scale reliability are small despite removing 70 items in the construction of the short-form version. Interestingly, we also note that the Integration of Shame-scale of the AII-SF-42 outperforms its full-form counterpart.

Scores on the AII-SF-42 were generally very similar in magnitude to their full-scale counterparts. The most significant deviation was for Integration of Sadness, where the short form yielded scores .36 standard deviations higher than the full-form. This difference is conventionally categorized as small (Cohen, 1988), and we believe that this and other obtained differences in the magnitude of scores are probably trivial. As for short-form/full-form correlations of corresponding scales, these were all very high. Seven out of twelve scales had intercorrelations above .90, and the remaining scales all were equal to or exceeded .85. All in all, these correlations indicated near perfect or very strong agreement in the rank ordering of scores from the two versions of the instrument.

Confirmatory factor analyses demonstrated that the discrete affect model was superior to competing structural conceptualizations of affect integration. This finding is in line with previous research on the full-form of the AII and findings from the similarly structured, observer-rated ACI (Solbakken *et alia*, 2011, Solbakken *et alia*, 2017). Our results indicate that there are substantial and systematic variability and covariance within and between different categories of affect/emotion in terms of the organization and adaptiveness of an individuals' capacity for experience and expression.

Consequently, it is likely that the various phenomena related to what we term functional/dysfunctional affect integration, such as emotion regulation, alexithymia, mentalized affectivity, emotional awareness, emotion utilization, emotion knowledge, and the like, are in fact implicitly structured according to discrete affects or emotional states. Thus, the common tradition of lumping various affects together in a general category disguises systematic and potentially important variations. This is not in and of itself a major problem, since these general level scores are useful in many ways (and of course, also assessed in the AIS-SF-42). However, comprehensive scientific understanding of affect integrating and emotion regulatory processes probably will not be possible without such differentiation in the assessment.

From this vantage point, the present study points toward a unique and highly differentiated affect system and the need for systematically differentiating between affect/emotion categories in relevant theory and research. Interestingly, our findings support the discrete, differential, or basic emotion approaches advocated by such researchers as Silvan Tomkins, Carroll Izard, Paul Ekman, and Jaak Panksepp, and more recently Cowen & Keltner (2017), and contrasts plainly with purely constructivist approaches that have received some renewed attention in recent years (Barett, 2017).

In sum, the AII-SF-42 ratings appear to reflect their conceptual basis well. Scores are represented by nine factors, each reflecting the functional integration of a discrete affect/emotion. The obtained factor structure appears consistent with the conceptual assumptions of the underlying affect integration construct, i.e., that different affects appear to have different motivational and signal properties and need to be differentiated in assessment.

Overall, the predicted relationships demonstrating convergent and discriminant validity of AII-SF-42 scores were supported by our data. It appears that affect integration, as assessed by the AII-SF-42, is systematically interrelated to other concepts measuring affective functioning such as alexithymia and emotion regulation. Distinguishing between capacity for experience and capacity for expression of emotion is supported by theoretically consistent patterns of convergent and discriminant associations with experiential and expressive domains of emotion regulation and alexithymia.

Also, as was expected, it appears that affect integration is more closely linked to those subdomains of alexithymia and emotion regulation, which specifically include indicators of capacity for differentiating, accepting, describing, and expressing emotions, than to externally oriented thinking and the strategy of reducing the impact of emotions by reappraising or reframing affect eliciting situations in a primarily positive manner. Our findings thus support the validity of the AII-SF-42, but also the ERQ and the TAS-20. Few earlier studies have demonstrated the convergent and discriminant validity of the subdomains of these measures this clearly (but see Solbakken *et alia*, 2017).

There were strong associations between affect integration on all levels and psychological distress. Our results demonstrate that the capacity for dealing effectively with emotion explains a substantial share of the variation in overall psychological distress, symptom severity, interpersonal distress, and social role dysfunction. Moreover, as was expected, levels of psychological distress seem to depend more on one's capacity for experiencing affects, than on one's capacity for expressing them. Our results are consistent with previous studies on the relationship between symptomatic distress and affect integration (e.g. Monsen *et alia*, 1996; Solbakken *et alia*, 2011).

Our data indicate that the capacity for experiencing and expressing affects is of central importance for relational functioning. AII-SF-42 scores on all levels were strongly associated with the overall level of interpersonal problems. In fact, 48 % of the variation in interpersonal problems was explained by levels of affect integration. Results thus indicate that affective functioning may be a principal factor underlying relational difficulties of the sort reported in the IIP-64.

Analyses of relationships between the integration of specific affects and the various types of interpersonal problems operationalized by the IIP-64 yielded noteworthy overlap between hypothesized and obtained association patterns. All association patterns had a good fit ( $GoF \geq .90$ ) with an optimal cosine curve peaking in the expected octants. Two of the affects (shame and fear) had peaks that were slightly rotated in interpersonal space compared to our hypotheses. The rest had peaks exactly as expected.

Overall, our findings offer strong support for the convergent and discriminant validity of discrete affect scores from the AII-SF-42. Convergent validity was demonstrated by correlation patterns peaking on predicted and separate octant scales of the IIP-64. Discriminant validity was shown by low associations with octants located opposite to the expected peaks and by the demonstration of sinusoidal correlation patterns with high GoF.

In addition to offering support for the construct validity of claims made from scores on the AII-42-SF, these findings lend further support to the theory of a differentiated affect system. The differentiated correlation patterns between the integration of various affects and interpersonal functioning indicate that the motivational and signal properties of these affects are systematically distinct and distinctly associated with different interpersonal behaviors. Problems with these affects systematically give rise to different interpersonal problems.

Some limitations should be noted, along with some recommendations for future studies in the field. One limitation is the relatively limited sample size. Even though adequate for the present purpose, robust establishment of reference sample norms would need a larger set of respondents. Also, the study lacks data on the temporal stability of scores from the AII-SF-42. Accordingly, it would be helpful if future studies collected data in which the measure is administered repeatedly to the same respondents to examine test-retest reliability. Another limitation is that even though the study demonstrates sound psychometric properties of the AII-SF-42 in non-clinical respondents, it is not necessarily so that these results generalize to other populations. Since affect integration is a clinically oriented construct, we must get data on how the AII-SF-42 works in clinical populations. Future studies should, therefore, examine the psychometric properties of the AII-SF-42 in diverse clinical populations. Studies should also examine the usefulness of the AII-SF-42 as an outcome measure in psychotherapy research and its potential as an instrument in the planning of psychotherapeutic interventions and treatment.

Overall, the present study indicates that scores from the AII-SF-42 are adequate in terms of reliability. Furthermore, their higher-order factor structure (in terms of the integration of discrete affects) appears to conform well to the theoretical model upon which the construct rests. Associations with external criteria indicate robust and theoretically predictable relationships both on global and specific levels. Systematic and differentiated patterns of convergent and discriminant relationships with external criteria were demonstrated for global affect integration, capacities for experience and expression of affect, and for the integration of discrete affects. Thus, there is preliminary, but seemingly solid support for the construct validity of the affect integration construct as it is operationalized in the AII-SF-42.

Our results are generally consistent with earlier findings and extend upon previous knowledge by demonstrating novel aspects of construct validity for the concept of affect integration. The results of this study bolster earlier conclusions from research on affect integration, indicating that research in the realm of the clinical and functional understanding of affect should include a more thorough differentiation of affect states than is ordinarily the case.

Perhaps, the most exciting conclusion to be drawn from the present study is that reliable and valid assessment of affect integration appears to be possible through a reasonably time-efficient self-report format. Previously, the potential proliferation of the affect integration construct has been reduced due to the demands for training necessary for mastering the ACI and the amount of time required for conducting and rating interviews. The present article constitutes the first empirical validation of the AII-SF-42. This measure appears to be a reliable and valid assessment of affect integration available to those who do not have time for extensive clinical interviewing and access to adequate interview training. Hopefully, the present paper will lay the grounds for many new studies and make the empirical examination of affect integration accessible for many new, interested researchers across the world.

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