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The Inventory of Psychotic-Like Anomalous Self-Experiences (IPASE): Development and Validation

David C. Cicero, Aaron M. Neis, Mallory J. Klaunig, and Christi L. Trask
University of Hawai'i at Manoa

Anomalous self-experiences (ASEs) are among the first symptoms to appear in the prodrome, predict the development of psychosis over and above clinical symptoms, and are common in people with schizophrenia. Although there are well-validated phenomenological interviews for assessing ASEs, there are no self-report measures. The current research describes 4 studies designed to develop and validate a new scale to assess ASEs: the Inventory of Psychotic-Like Anomalous Self-Experiences (IPASE). In Study 1, an overinclusive item pool was generated based on phenomenological descriptions of ASEs, and items were kept or discarded based on factor loadings in an exploratory factor analysis. Five factors were extracted including disturbances in Cognition, Consciousness, Self-Awareness and Presence, Somatization, and Transitivism/Demarcation. The 5-factor structure was confirmed in Study 2, and the scale showed measurement invariance between sexes. IPASE scores were correlated with self-report and task measures of self-processing including self-concept clarity, self-consciousness, and self-esteem as well as measures of psychotic-like experiences. In Study 3, people with positive schizotypy had higher IPASE scores than a negative schizotypy and comparison group. In Study 4, people with schizophrenia had higher IPASE scores than healthy controls. Overall, the IPASE displayed strong psychometric qualities and is a brief alternative to resource-intensive phenomenological interviews in clinical, at-risk, and general population samples.

Keywords: schizotypy, self-concept clarity, factor analysis, scale development, schizophrenia

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Anomalous self-experiences (ASEs) are disturbances in the subjective experience of the self and are common in people with schizophrenia (Parnas & Henriksen, 2014). ASEs are heterogeneous, including several different experiences related to the self as an actor and an object of introspection (Parnas et al., 2005). ASEs have a long history in psychiatry, dating back to some of the early thinkers who defined schizophrenia (Bleuler, 1911; Parnas, 2011). ASEs have gained much greater attention in recent years (Nelson, 2013), with theorists defining schizophrenia as primarily a self-disorder (Sass, 2014; Sass & Parnas, 2003), and noting a conspicuous lack of self-related phenomena among the official *Diagnostic and Statistical Manual 5* criteria for schizophrenia (Park & Nasrallah, 2014). One reason why more research has focused on ASEs in recent years is the emergence of new psychometrically sound interview measures of ASEs such as the Examination of Anomalous Self-Experience (EASE; Parnas et al., 2005). These interviews have allowed for more standardized measurement of ASEs and improved communication among researchers interested in the same phenomenon. However, there are currently no questionnaires of ASEs that can be administered quickly via self-report without extensive training. Thus, the primary goal of the current research is to develop a new self-report inventory to measure ASEs.

Research on ASEs is important for a number of reasons. First, theorists have suggested that ASEs are central to schizophrenia (Sass & Parnas, 2003). Second, research has suggested that ASEs may be a premorbid marker for future development of schizophrenia (Brent, Seidman, Thermenos, Holt, & Keshavan, 2014). Third, ASEs have been found to predict conversion to psychosis in people at risk for its development over and above other clinical symptoms (Nelson, Thompson, & Yung, 2012). Fourth, ASEs have been shown to be correlated with both positive and negative symptoms, and may provide insight into the course of schizophrenia (Nordgaard & Parnas, 2014). Finally, research has shown that changes in ASEs are associated with recovery from schizophrenia (Lysaker, Lysaker, & Lysaker, 2001). Thus, research on ASEs could help to understand premorbid, prodromal, acute, and recovery phases of schizophrenia.

Contemporary researchers interested in self-relevant information processing in schizophrenia have used several different theoretical frameworks to understand ASEs (Lysaker & Lysaker, 2010), the most common of which is the phenomenological approach. One prominent example is the ipseity-disturbance model (Sass, 2014). Ipseity, from the Latin *ipse* for self, refers to the core or minimal self, and the model suggests that this core is disturbed in two important ways in people with schizophrenia: hyperreflexivity and diminished self-affection (Sass, 2014). Hyperreflexivity is an excessive attention or self-consciousness to pro-

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David C. Cicero, Aaron M. Neis, Mallory J. Klaunig, and Christi L. Trask, Department of Psychology, University of Hawai'i at Manoa.

Correspondence concerning this article should be addressed to David C. Cicero, Department of Psychology, University of Hawaii at Manoa, C400 Sakamaki Hall, 2530 Dole Street, Honolulu, HI 96822. E-mail: dcicero@hawaii.edu

cesses that would ordinarily be implicitly experienced. Diminished self-affection refers to an experience of a loss of self-agency or the perception that one is acting out one's behaviors. Additionally, people with schizophrenia report a diminished hold or grip on reality that includes a loss of common sense.

Perhaps the measure of ASEs with the strongest support for its scores' reliability and validity in people with schizophrenia is the EASE (Parnas et al., 2005). The EASE is a semistructured phenomenological interview that assesses anomalous, experiential, and subjective disturbances in the experience of self. The EASE was developed after aggregating years of phenomenological descriptions of ASEs among inpatients with schizophrenia. It contains questions pertaining to five broad domains of ASEs: Cognition and Stream of Consciousness, Self-Awareness and Presence, Bodily Experiences (i.e., Somatization), Demarcation/Transitivism, and Existential Reorientation. Disturbances in cognition and stream of consciousness reflect problems with the perception of a normal stream of consciousness over time that is cognitively assessable and inhabited by the individual. This may include experiences like thought interference, silent thought echoes, spatialization of cognitive experiences (e.g., thoughts occupying a space in the real world outside of the head), disturbances in intentionality, and an altered experience of time. Disturbances in self-awareness and presence are disturbances of the sense of one's own existence and immersion in the world and everyday activities. This can manifest as diminished sense of basic self, distorted first-person perspective, depersonalization, derealization, diminished presence, hyper-reflexivity, identity confusion, and diminished initiative. Disturbances in bodily experiences (i.e., somatization) are related to both physically and psychically or spiritually inhabiting one's own body. Examples of disturbances in bodily experiences may include the feeling of body parts changing sizes or shapes, feelings of strangeness when seeing oneself in the mirror, bodily estrangement, psychophysical misfit or split, unusual bodily sensations, and abnormal motor experiences. Demarcation/transitivism is a disturbance in the perception of the boundary between the self and the outside world. This may include experiences of being someone else, feeling unsure of who one is, feeling threatened by bodily contact, and having a passive mood. Finally, Existential Reorientation refers to a reorientation in life philosophy, worldview, or interests. Examples of this include self-referential phenomena, self-centrality, solipsistic grandiosity, and intellectual changes.

Several studies using the EASE have found its scores to have high internal consistency (e.g., Nordgaard & Parnas, 2014; Raballo & Parnas, 2012) and interrater reliability (Møller, Haug, Raballo, Parnas, & Melle, 2011), to be specific to schizophrenia as opposed to affective psychosis (e.g., Haug et al., 2012; Raballo & Parnas, 2012) or borderline personality disorder (Nelson, Thompson, Chanen, Amminger, & Yung, 2013), and to be positively correlated with positive and negative symptoms in an expected manner (Nordgaard & Parnas, 2014). However, one potential limitation to the EASE is that it is a phenomenological interview that relies on the use of a trained and highly skilled interviewer. Thus, it would be useful to have a relatively short self-report measure available for research and clinical work.

A key concern in developing a new scale is to show that its scores have construct validity in the target populations by ensuring it is associated with variables in its nomological network (Cronbach & Meehl, 1955). One such variable for the IPASE is self-concept clarity (SCC), which refers to "the extent to which one's beliefs about one's attributes are clear, confidently held, internally consistent, stable, and cognitively accessible" (Stinson, Wood, & Doxey, 2008, p. 1541). We hypothesized that IPASE scores would be negatively correlated with self-report and behavioral measures of SCC. Previous research has shown that people with schizophrenia have decreased SCC compared to healthy controls (Cicero, Martin, Becker, & Kerns, 2016), and that low SCC interacts with other risk factors to predict attenuated psychotic symptoms (Cicero, Becker, Martin, Docherty, & Kerns, 2013; Cicero, Docherty, Becker, Martin, & Kerns, 2015). In addition to self-concept clarity, we hypothesized that the IPASE would be correlated with self-consciousness. Self-consciousness can be viewed as a form of excessive self-focused attention (Fenigstein & Vanable, 1992), which may be a less severe and more normative experience of hyper-reflexivity or solipsistic-like experiences that are an essential part of the phenomenological conceptualization of ASEs.

In addition to measures of SCC, we hypothesized that IPASE scores would be correlated with both positive and negative symptoms. Researchers have suggested that ASEs may underlie all aspects of schizophrenia symptoms (Kean, 2009). Thus, we included measures of magical ideation (i.e., subclinical delusion-like experiences), perceptual aberration (i.e., subclinical hallucination-like experiences), and social anhedonia (i.e., a lack of interest in or pleasure from social experiences), as well as a comprehensive measure of schizotypal personality disorder, the Schizotypal Personality Questionnaire (SPQ; Raine, 1991). Finally, given the conceptual overlap between ASEs and dissociation, particularly within the Self-Awareness and Presence domain, we expected that IPASE scores would be positively associated with dissociative processes.

We employed Clark and Watson's (1995) steps for objective scale development in the current research. In Study 1, we generated an overinclusive item pool and administered it to a large sample of participants. Items were retained or discarded based on item frequencies and factor loadings in an exploratory factor analysis (EFA). In Study 2, we administered the scale to a different large sample, conducted a confirmatory factor analysis (CFA), and examined the scale score's construct validity based on correlations with self-concept and psychotic-like experiences. We expected to find that the factor structure identified in Study 1 would fit the data well in Study 2 and that the correlations among the latent variables could be accounted for by a second-order factor. We expected to find that the factor structure would be invariant between sexes, which would suggest that the scores mean the same thing in men and women. Moreover, we expected to find that IPASE scores would be correlated with measures of psychotic-like experiences including magical ideation, perceptual aberration, schizotypal personality disorder, and dissociation. We expected that IPASE scores would be associated with self-processing variables including negative correlations with self-report and task measures of self-concept clarity, negative correlations with self-esteem, and positive correlations with self-consciousness. In Study 3, we selected participants who were either high in positive schizotypy or high in social anhedonia, and compared their IPASE scores to one another as well as to a group of control participants to see if only the positive group had elevated IPASE scores. We expected to find that the positive schizotypy group would have higher scores than

both the negative schizotypy and comparison groups, and that the negative group would have higher scores than the comparison group. Finally, in Study 4, we administered the measure to a sample of patients with schizophrenia and a healthy control group to test whether the group with schizophrenia had elevated IPASE scores. We expected to find that the schizophrenia group would have higher scores than the healthy control group.

Study 1: Item Generation and Scale Refinement

In Study 1, we generated items and administered them to a large sample of undergraduates. Although a convenience sample, there are several reasons to test the initial psychometric properties of the IPASE in undergraduates. First, ASEs are common during the prodromal and premorbid stages of psychosis, and may play an important role in its development (Nelson et al., 2009), and undergraduates are close to the average age of onset for psychosis. Second, psychotic-like experiences are relatively common among undergraduates (Cicero, Martin, Becker, Docherty, & Kerns, 2014), and psychotic-like symptoms can be modeled in college students using the psychometric schizotypy approach (Kwapil & Barrantes-Vidal, 2015). Finally, Studies 1–3 included a total of 1,834 participants, and sample sizes this large would not have been possible in clinical samples. For this reason, methodologists recommend examining the initial construct validity of new scales in convenience samples, which are often composed of undergraduates (Clark & Watson, 1995).

Study 1 Method

Participants. Participants were 650 undergraduates recruited from a subject pool at a large, public Pacific university who participated in exchange for partial completion of a course requirement. They were 74.5% percent female, 33.3% Asian, 18.6% White, 2.0% Hispanic, 0.5% Black or African American, 13.8% Pacific Islander, 29.5% Multiethnic, and 3.4% other. Their mean age was 21.31 (SD = 4.18). They were 19.6% first-year, 23.7% second-year, 25.8% third-year, 16.4% fourth-year, and 11.5% fifth-year or above students. Participants with missing data were excluded listwise. Twenty-seven participants began the study but discontinued prior to completing the IPASE portion of the study, and another 58 participants had missing data on one or more item. Thus, the final analyses included 565 participants.

Initial item pool. An item pool of 112 items was generated by the first author based on a thorough literature review of phenomenological descriptions of ASEs. These descriptions included ASEs reported during the prodrome (e.g., Møller & Husby, 2000; Nelson et al., 2009), first-episode psychosis (e.g., Møller et al., 2011; Parnas & Handest, 2003), and chronic schizophrenia (e.g., Kean, 2009; Parnas et al., 2005; Raballo & Parnas, 2011; Sass & Pienkos, 2013). Rather than restricting items to specific dimensions, we emphasized content validity by creating an overinclusive item pool. Thus, we did not make a priori hypotheses about the factor structure of the IPASE, and did not write items with a specific factor structure in mind. Since the gold-standard in the assessment of ASEs is the EASE, an effort was made to include all five of the aspects of ASEs, as described above, but no items were taken directly from the instrument. At the same time, we also made an effort to include the conceptualization of ipseity disturbance, including hypersensitivity and diminished affection, in our measure. We drew broadly on all relevant phenomenological descriptions of ASEs.

Items were written to include simple language appropriate for people of all levels of education and to avoid double-barreled language. The final scale has a grade reading level of 5.3 according to the Flesch Reading Ease Formula (Flesch, 1948). The initial item pool was overinclusive, and the goal of Study 1 was to refine this item pool into the final, shorter version of the scale (Clark & Watson, 1995; Floyd & Widaman, 1995). Participants were given the following instructions: "This questionnaire contains a series of statements. Read each statement carefully, and then mark the appropriate response. Use the following scale to record your responses: 1 *Strongly Disagree,* 2 *Disagree,* 3 *Neutral,* 4 *Agree*, 5 *Strongly Agree.*"

Study 1 Results and Discussion

Prior to conducting an exploratory factor analysis (EFA), items that were answered 5 (*strongly agree*) or 4 (*agree*) by less than 5% of the sample were excluded from the scale because they did not contribute enough variance to warrant their inclusion. This resulted in 24 items being excluded. Next, we ran an EFA on the data in Mplus 7.3 (Muthén & Muthén, 1998–2015). We conducted an EFA, as opposed to a principal components analysis, because the primary goal of this stage of data collection was to uncover the latent factor structure of the data, rather than to reduce the manifest variables down to as few components as possible. Since the response options were ordinal, the "categorical" specification was used, which employs a polychoric rather than a Pearson correlation matrix. We used the Weighted Least Squares, Mean and Variance (WLSMV) adjusted estimation method (Brown, 2006; Muthén & Muthén, 1998–2015). WLSMV does not assume a normal distribution and is less likely than maximum likelihood extraction to produce spurious multidimensionality (Beauducel & Herzberg, 2006).

After data extraction, we plotted the eigenvalues on a scree plot in Microsoft Excel (Fabrigar, Wegener, MacCallum, & Strahan, 1999), and the slope of the line approached zero at five factors. In addition, we conducted a parallel analysis. The line of eigenvalues plotted against number of factors intersected with the scree plot between five and six factors, suggesting that five factors should be extracted. The fit statistics for these models can be found in Table 1. Factors 1, 2, 3, 4, and 5 explained 7.82%, 11.21%, 15.50%, 12.53%, and 9.18% of the variance, respectively, in the five-factor solution. Next, we rotated the solution with geomin rotation, an oblique rotation, because we expected the factors would be moderately to strongly correlated with each other (Fabrigar et al., 1999). We eliminated items that had loadings less than .35 on any factors and items that loaded higher than .35 on more than one factor (Floyd & Widaman, 1995). This resulted in 31 additional items being excluded; ultimately, the final scale contained 57 items (α = .97). The geomin-rotated factor loadings can be found in the online Supplemental Table 1 and the first factor correlations can be found in the online Supplemental Table 2.

This EFA revealed a theoretically meaningful set of five factors that are consistent with phenomenological descriptions and interview measures of ASEs. The first factor, labeled Cognition, includes seven items (α = .94) and represents anomalous experi-

Table 1
Fit Statistics for the Exploratory Factor Analysis Models in Study 1

Model	χ^2	*df*	RMSEA	90% CI	TLI	CFI	BIC	AIC	% Var Explained	χ^2_{diff} (df)
1-Factor	20495.86	3740	.089	[.088, .090]	.612	.621	120455.836	119310.914	43.15	—
2-Factor	15600.95	3653	.076	[.075, .077]	.717	.730	116112.230	114590.004	50.58	4894.91 (87)
3-Factor	13574.61	3567	.070	[.069, .072]	.757	.774	114630.862	112735.669	53.55	2026.34 (86)
4-Factor	11752.48	3482	.065	[.064, .066]	.794	.813	111083.540	113347.363	56.23	1822.13 (85)
5-Factor	10512.99	3398	.061	[.060, .062]	.819	.839	112640.161	110012.045	58.24	1239.49 (84)

Note. *df* = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; TLI = Tucker Lewis Index; CFI = Comparative Fit Index; BIC = Bayes Information Criterion; AIC = Akaike Information Criterion; χ^2_{diff} = Satorra-Bentler chi-square difference test between the 2- vs 1-factor, 3- vs 2-factor, 4- vs 3-factor, and 5- vs 4-factor.

ences of one's cognitions or thoughts, (e.g., hearing one's thoughts echoed outside of one's head), which are common in people with schizophrenia (Kean, 2009). The second factor to emerge, Self-Awareness and Presence, includes 22 items ($\alpha = .97$) and represents the subjective experience of the notion of the self being altered. This is consistent with many phenomenological reports of feeling the self fundamentally changing (Møller & Husby, 2000). This factor also encompasses items related to hyper-reflexivity, in which excessive self-focused attention seems to blur the first-person experience of existence. The third factor, Consciousness, represents disturbances in conscious experience of reality and includes six items ($\alpha = .86$) related to difficulty in determining whether the individual really experienced something or just imagined it. This is also common in the schizophrenia prodrome, and is one of the most common attenuated psychotic symptoms (Marshall et al., 2014). The fourth factor, Somatization, includes 17 items ($\alpha = .93$) and is composed of items related to distortions of body sensations, such as feeling changes in shape of arms or legs, or electric sensations. This factor may be similar to early theories of perceptual aberrations which focused on distortions of bodily experiences rather than visual or auditory experiences (Chapman, Edell, & Chapman, 1980). The fifth factor, Demarcation/Transitivism, includes five items ($\alpha = .86$) and represents the existential feeling of nonexistence. This may manifest in people with schizophrenia as the feeling of having once existed, but no longer existing following the development of psychosis (Uhlhaas & Mishara, 2007). Overall, the IPASE has a Cronbach's alpha of 0.97.

These five factors are very similar to the five factors of the EASE. However, despite items being included in the pool for existential reorientation, an existential reorientation factor was not identified with our EFA. Instead, items written to cover the Cognition and Stream of Consciousness facets of the EASE loaded distinctly onto two separate factors, which we termed Cognition and Consciousness, respectively. The cognition factor included items pertaining to the experience of thoughts, while the Consciousness factor included the way in which the individual interacted with and remembered experiences. This suggests that disturbances related to stream of consciousness and those related to cognitions are sufficiently distinct from one another in ASEs.

One potential limitation of the IPASE is that its subscales have unequal numbers of items. This is likely a result of an unequal number of items representing each empirically derived factor being included in the original overinclusive item pool. Since items were written based on a wide range of phenomenological descriptions, more items were written to represent constructs that were more common in the literature than constructs that were less prevalent in the literature.

Overall, Study 1 yielded a refined set of 57 items based on theoretical and empirical concerns. The five factors extracted are consistent with a long line of empirical and phenomenological work on ASEs in people with schizophrenia. The next step was to confirm this factor structure in a separate large sample and to examine whether a higher-order model—in which the five factors load on a single higher-order factor—would fit the data just as well as a first-order factor. If a higher-order model fits the data well, then it would be appropriate to sum the scores of the five subscales into a single IPASE score.

Study 2: Confirmation of Factor Structure and Initial Construct Validity

In Study 2, we administered the IPASE to a new sample of undergraduates. The first goal of Study 2 was to confirm the factor structure that was found in the EFA in Study 1 via confirmatory factor analysis (CFA). We expected to find that the five-factor model would fit the data well. We also expected to find that a higher-order factor model in which the five first-order factors loaded on a single higher-order factor would not fit significantly worse than a first-order factor model in which all the factors were allowed to correlate freely. If the higher-order model fits the data well and does not fit significantly worse than the first-order model, then it makes sense to sum all of the subscales of the IPASE into a single score (Rubio, Berg-Weger, & Tebb, 2001). If the higher-order model does not fit the data well and fits significantly worse than the first-order model, then the scale should be viewed as multidimensional and should not be summed into a single score. We also expected to find that the factor structure would be invariant between men and women.

The second goal of Study 2 was to examine the construct validity of the scale by examining its correlations with other constructs in its nomological network. We examined the nomological network of the IPASE by examining the correlations with a) other measures of self-relevant information processing, and b) measures of psychotic-like experiences, symptoms of schizotypal personality disorder, and dissociation. We expected to find that IPASE scores would be negatively correlated with self-concept clarity (both behavioral and self-report measures), but positively correlated with self-consciousness. Since SCC has been shown to be associated with self-esteem (Campbell, 1990; Campbell et al.,

1996), we expected to find significant zero-order correlations between IPASE scores and self-esteem, but hypothesized that this correlation would be diminished when removing shared variance with SCC. Finally, we expected to find that IPASE scores would be positively correlated with all measures of psychotic-like experiences, schizotypal personality disorder symptoms, and dissociation. In the interest of limiting participant burden, we did not include additional measures to establish discriminant validity.

Study 2 Method

Participants. Participants were 733 undergraduates from a large Pacific university who participated in exchange for partial completion of a course requirement or extra credit. The mean age was 20.61 (range 18–62; *SD* = 4.73). They were 69.5% female, 20.6% White, 24.7% Asian, 19.1% Pacific Islander, 25.1% Multiethnic, and 10.5% other. 37.3% were first-year, 18.8% second-year, 27.3% third-year, 9.7% fourth-year, and 7.0% were fifth-year or above students.

Materials.

Anomalous self-experiences. ASEs were measured with the 57 items of the IPASE that were retained in Study 1.

Self-concept. Global self-esteem was measured with the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), a 10-item Likert scale ranging from 1 *strongly agree* to 4 *strongly disagree*. The RSES may be the most commonly used measure of self-esteem (Leary, Tambor, Terdal, & Downs, 1995). The first measure of SCC was the Self-Concept Clarity Scale (SCCS; Campbell, 1990). The SCCS is a 12-item scale on which participants rate statements from 1 *strongly agree* to 5 *strongly disagree*. A second measure of SCC was the Me Not-Me Decision Task (MNMDT; Campbell et al., 1996) in which participants are asked to decide whether 60 adjectives describe or do not describe themselves. Among these 60 adjectives are 30 pairs of opposites. SCC is conceptualized as the number of consistent responses. Self-consciousness was measured with the Self-Consciousness Scale (SCS; Fenigstein et al., 1992), a 23-item true–false questionnaire designed to access self-awareness and self-focused attention. This scale is commonly used to measure self-consciousness in psychosis research (e.g., Combs & Penn, 2004; Lenzenweger et al., 1997).

Psychotic-like experiences (PLEs). The first measure of PLEs was the Magical Ideation Scale (Eckblad & Chapman, 1983), a 30-item true–false scale designed to measure "beliefs in forms of causation that by conventional standards are invalid" (Eckbald & Chapman, 1983, p. 215). A second measure of PLEs was the Perceptual Aberration Scale (Chapman, Chapman, & Raulin, 1978) which is a 35-item true–false scale that measures schizophrenic-like distortions in perception of one's own body. The MagicId and PerAb have considerable support for the reliability and validity of their scores (for a review, see Edell, 1995). Social anhedonia was measured with the Revised Social Anhedonia Scale (SocAnh; Eckbald, Chapman, Chapman, & Mishlove, 1982), a 40-item true–false questionnaire designed to measure a lack of pleasure from relationships. The SocAnh has been found to predict future schizophrenia-spectrum disorders (Gooding, Tallent, & Matts, 2005; Kwapil, 1998). A final measure of PLEs was the Schizotypal Personality Questionnaire (SPQ; Raine, 1991). The SPQ is a 74-item yes–no questionnaire with one subscale for each of the nine symptoms of schizotypal personality disorder (STPD).

Dissociation. The Dissociative Processes Scale (DPS; Harrison & Watson, 1992), designed to measure relatively normal dissociative experiences as opposed to clinical dissociation (Watson, 2001), was used to measure dissociation. The DPS is a 33-item questionnaire with responses ranging from 1 *strongly agree* to 5 *strongly disagree*. The DPS has been found to have high internal reliability and to load on a factor with other measures of dissociation (Cicero & Kerns, 2010; Watson, 2001).

Procedure. Some participants completed the study in person in private cubicles (n = 332). To reduce participant burden, the remaining participants completed the study online (n = 401). Participants completed the tasks in the following order: the Rosenberg Self-Esteem Scale, the Inventory of Psychotic-Like Anomalous Self-Experiences, the Self-Concept Clarity Scale, the Me Not-Me Decision Task, the Aberrant Salience Inventory, the Survey of Attitudes and Experiences (Magical Ideation, Perceptual Aberration, and Social Anhedonia Scales mixed together), the Dissociative Processes Scale, the Schizotypal Personality Questionnaire, and the Self-Consciousness Scale. Scales were given in this order, as opposed to random order, to alternate psychotic-like questionnaires with self-concept questionnaires in an effort to avoid participant fatigue. The participants who completed the study online did not complete the Me Not-Me Decision Task. The entire study took approximately 1 hour.

Study 2 Results and Discussion

Data analysis. Model fitting was done using Mplus 7.3 software (Muthén & Muthén, 1998–2015). As in Study 1, factors were specified with Weighted-Least Squares Mean and Variance adjusted (WLSMV) parameter estimates. Three test statistics were used to determine whether the model fit the data well (Hu & Bentler, 1998): a) Root Mean Squared Error of Approximation (RMSEA) $< .05$, b) Comparative Fit Index (CFI) $> .95$, and c) Tucker-Lewis Index (TLI) $> .95$.

First, we tested a one-factor model in which all 57 items loaded on a single factor. Second, a five-factor model in which the items loaded on their identified factor from Study 1 was specified. In this model, the latent factors were allowed to correlate freely with each other. Third, a higher-order model was tested in which the latent factors were specified to load on a single higher-order factor. No additional constraints were placed on the model. The higher order model is more restrictive, and thus cannot provide a better fit to the data (Brown, 2006; Rubio et al., 2001). We tested whether this model fit the data significantly worse than the five-factor model in which the factors were allowed to correlate freely. Model comparisons were done with the χ^2 difference test in the "difftest" command in Mplus. However, previous research has shown that the χ^2 difference test is too sensitive with a large sample size, creating a high Type I error rate (e.g., Cheung & Rensvold, 2002). Thus, we supplemented the χ^2 difference test with the Target Coefficient (T) developed by Marsh and Hocevar (1985), and used this extensively to compare the fit of higher-order and second-order models (e.g., Dedrick, Tan, & Marfo, 2008; Marsh, Parada, & Ayotte, 2004). The T coefficient is the ratio of the χ^2 of the first-order model to the χ^2 of the higher-order model. The T represents how well the higher-order factor accounts for the correlations among the first-order factors, and a value over 0.90

suggests that it accounts for these correlations well (Arendt, Hougaard, & Thastum, 2014).

CFA and model comparisons. The one-factor model did not fit the data well ($\chi^2(1952) = 9637.43$, RMSEA = 0.076, 90% CI [.075, .078], CFI = 0.911, TLI = 0.908). The five-factor model identified in Study 1 fit the data well in Study 2 ($\chi^2(1942) = 5989.36$, RMSEA = 0.056, 90% CI [.054, .057], CFI = 0.953, TLI = 0.951). The higher-order factor model in which the five factors were specified to load on a single higher-order factor also fit the data well ($\chi^2(1947) = 6099.721$, RMSEA = 0.056, 90% CI [.055, .058], CFI = 0.952, TLI = 0.950). The one-factor model fit significantly worse than did the five-factor model (χ^2 diff (10) = 1148.94, $p < .001$) and the higher-order model (χ^2 diff (5) = 916.79, $p < .001$). The higher-order model fit the data significantly worse than the model in which the factors were allowed to correlate freely (χ^2 diff (5) = 90.377, $p < .001$), according to the Satorra-Bentler χ^2 difference test. However, the *T* score is equal to 0.98, which suggests that the higher-order factor adequately accounts for the correlations among the first-order factors. Since the higher-order factor model fit the data well and the T value was very close to one, it suggests that the higher-order factor model fit the data as well as the five-factor model. The standardized factor loadings for the higher-order model can be found in the online Supplemental Table 3.

This confirmation of the factor structure in a separate sample is important because it shows that the factor structure identified in Study 1 was not a result of something unusual about the original sample. The finding that the higher-order model fit the data as well as the first-order model suggests that five subscales are facets of a larger ASE construct and that subscale scores can be summed across all subscales for a single meaningful IPASE score. This interpretation of the higher-order model is consistent with theoretical explanations of hierarchical models (Rubio et al., 2001), common practice in scale development (e.g., Hu, Wang, & Li, 2014; Hunt, Peters, & Rapee, 2012; Jopp & Hertzog, 2010), and supported by the finding that both the five-factor and higher-order model fit better than a one-factor model. An alternative interpretation of the finding that the higher-order factor fit as well as the five-factor first-order model could be that the subscales cannot be discriminated from each other. This is supported by the finding that subscales are highly correlated and have similar correlations with the convergent validity indicators. Future research could continue to examine whether the subscales of the IPASE are distinct from each other by testing whether they have differential associations with other variables.

Measurement invariance by sex. Next, we examined the measurement invariance of the higher-order model between men and women. Due to the well-documented limitations of chi-square change tests in measurement invariance research (e.g., Cheung & Rensvold, 2002), we compared the model fit with the change in comparative fit index (ΔCFI) and the change in McDonald's noncentrality index (Mc; McDonald, 1989) and as suggested by Meade, Johnson, and Braddy (2008). Following the recommendations of by Cheung and Rensvold (2002), the cutoffs of .02 for Mc and .010 for ΔCFI were used. To enable a test of metric invariance, we treated the Likert data as continuous and used a Maximum Likelihood extraction. To test the measurement invariance, we specified three models. First, we allowed the factor loadings and intercepts to vary between groups (i.e., the configural model). Second, we constrained the factor loadings to be equal between groups, but let the intercepts vary between groups (i.e., metric model). Third, we constrained both the intercepts and loadings to be equal between groups (i.e., scalar model). The configural model fit the data reasonably well ($\chi^2(4012) = 11531.51$, RMSEA = 0.076, 90% CI [.074, .078], CFI = .749, TLI = 0.741), as did the metric ($\chi^2(3963) = 11634.54$, RMSEA = 0.076, 90% CI [.074, .077], CFI = .748, TLI = 0.743) and scalar models ($\chi^2(4017) = 11769.87$, RMSEA = 0.076, 90% CI [.074, .077], CFI = .744, TLI = 0.745). Most important, the metric and scalar models did not fit worse than the configural model (ΔCFI = .001, .005, Mc = .0001, .0004, respectively). These results suggest that the IPASE measures the same constructs in men and women, and the magnitude of the scores has the same meaning in each group.

Correlations with self-processing. We hypothesized that the IPASE would be negatively correlated with both measures of self-concept clarity (the SCCS and the MNMDT) and positively correlated with self-consciousness. Given that SCC is strongly correlated with self-esteem, we expected to find that the IPASE would also be correlated with self-esteem, but that it would no longer correlate with self-esteem after partialing out variance shared with SCC. As can be seen in Table 2, the IPASE and all five subscales were negatively correlated with both measures of SCC and positively correlated with self-consciousness. This is consistent with previous work showing that people with schizophrenia tend to have lower SCC than healthy controls (Cicero et al., 2016). Self-consciousness as a construct is similar to hyper-reflexivity, which has been suggested to be a key feature of ASEs. The IPASE also had a significant negative correlation with RSES scores. As expected, a partial correlation between IPASE scores and RSES scores removing shared variance with SCC was much weaker, albeit still significant ($r_{sccs} = -.15$, $p = .001$). Conversely, a partial correlation between IPASE and the SCCS, removing shared variance with RSES, was still moderately large and significant ($r_{rses} = .36$, $p < .001$). Taken together, these results suggest that the relation between IPASE and RSES scores can be mostly accounted for by shared variance with the SCCS, but that the IPASE is still correlated with the SCCS after accounting for RSES.

Correlations with psychotic-like experiences. As our second check of the convergent validity of IPASE scores, we hypothesized that IPASE scores would be correlated with positive and negative schizotypy, symptoms of schizotypal personality disorder, and dissociation. The IPASE was positively correlated with all of these measures (see Table 3). These results provide evidence for the convergent validity of IPASE scores in this population.

Having established the psychometric properties and initial construct validity of the scale scores in an unselected sample, the next step was to test whether people at an increased risk for the development of schizophrenia-spectrum disorders would have elevated IPASE scores compared to people with high negative schizotypy and a healthy comparison group.

Study 3: Validation in an At-Risk Sample

The goal of Study 3 was to examine the validity of IPASE scores in a sample of people at risk for the development of schizophrenia-spectrum disorders. One common approach to examining risk for schizophrenia-spectrum disorders is the Psychometric High-Risk Strategy (Lenzenweger, 1994; Miller, 1995), by

Table 2
Correlations Among the Inventory of Psychotic-Like Anomalous Self-Experiences and Other Measures of Self-Processing in Study 2

Scale	1	2	3	4	5	6	7	8	9	10
1. IPASE	**.97**									
2. IPASE-Cognition	.76*	**.87**								
3. IPASE-Self-Awareness and Presence	.94*	.64*	**.96**							
4. IPASE-Consciousness	.78*	.61*	.65*	**.82**						
5. IPASE-Somatization	.89*	.62*	.75*	.63*	**.92**					
6. IPASE-Demarcation/Transitivism	.80*	.57*	.80*	.55*	.61*	**.84**				
7. Self-Concept Clarity Scale	−.56*	−.56*	−.55*	−.49*	−.42*	−.47*	**.88**			
8. Me Not-Me Decision Task	−.26*	−.21*	−.21*	−.22*	−.24*	−.24*	.36*	**.77**		
9. Rosenberg Self-Esteem Scale	−.49*	−.31*	−.53*	−.35*	−.33*	−.53*	.51*	.21*	**.89**	
10. Self-Consciousness Scale	.33*	.21*	.31*	.33*	.31*	.28*	−.46*	−.28*	−.29*	**.93**
Mean	1.90	1.82	1.80	2.54	1.89	1.71	36.84	27.89	30.27	32.91
Standard deviation	.66	.74	.75	.90	.75	.76	9.37	4.63	5.36	5.31
Skewness	.58	.70	.89	−.07	.65	1.11	−.32	−.67	−.19	.66
Kurtosis	−.36	−.17	.20	−.71	−.32	.86	−.03	2.43	−.31	.05

Note. Numbers on the diagonal are Cronbach's alpha. Cohen's (1988) guidelines for effect sizes are small: $r = .1$, medium: $r = .3$, and large: $r = .5+$.
* $p < .05$.

which participants are assigned to "positive," "negative," and "psychometric control" groups based on scores on schizotypy scales. Performance on tasks and questionnaire scores are then compared across groups (e.g., Chapman, Chapman, Kwapil, Eckblad, & Zinser, 1994; Gooding et al., 2005; Kwapil, 1998; Lenzenweger, 1993). Previous research has shown that creating schizotypy groups in this manner can be used to identify people at risk for the future development of schizophrenia-spectrum disorders (see Kwapil & Chun, 2015, for a review).

In Study 3, we selected participants with high positive and negative schizotypy scores as well as control participants who had low schizotypy scores. If IPASE scores are valid indicators of ASEs in people at risk for schizophrenia, then we would expect to find that people with positive and negative schizotypy would have higher scores than the control group. Given that IPASE scores were more strongly correlated with positive schizotypy scales than negative schizotypy scales in Study 2, we expected to find that the positive schizotypy group would have higher scores than the negative schizotypy group.

Study 3 Method

Participants. Participants ($n = 452$) were recruited from a larger pool of undergraduates ($n = 1{,}890$) who completed a battery of questionnaires including abbreviated versions of the Magical Ideation Scale (MagicId), Perceptual Aberration Scale (PerAb), and Social Anhedonia Scale (SocAnh). Participants were recruited over two semesters. During the first 2 weeks of each semester, participants completed a screening, which took approximately 30 min to complete. In an effort to attract more people with elevated

Table 3
Correlations Among the Inventory of Psychotic-Like Anomalous Self-Experiences and Psychotic-Like Experiences in Study 2

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. IPASE	**.97**																		
2. IPASE-Cog	.76*	**.87**																	
3. IPASE-SAP	.94*	.64*	**.96**																
4. IPASE-Con	.78*	.61*	.65*	**.82**															
5. IPASE-Som	.89*	.62*	.75*	.63*	**.92**														
6. IPASE-DT	.80*	.57*	.80*	.55*	.61*	**.84**													
7. Magical Ideation Scale	.52*	.45*	.43*	.47*	.52*	.39*	**.80**												
8. Perceptual Aberration Scale	.53*	.43*	.47*	.38*	.52*	.48*	.65*	**.86**											
9. Social Anhedonia Scale	.43*	.32*	.44*	.29*	.35*	.46*	.27*	.42*	**.81**										
10. SPQ-Magical Ideation	.36*	.32*	.30*	.30*	.38*	.27*	.62*	.49*	.22*	**.72**									
11. SPQ-UPE	.50*	.41*	.42*	.43*	.51*	.39*	.61*	.61*	.32*	.70*	**.78**								
12. SPQ-Ideas of Reference	.45*	.35*	.39*	.40*	.46*	.31*	.57*	.43*	.29*	.54*	.65*	**.80**							
13. SPQ-Suspiciousness	.44*	.33*	.41*	.40*	.42*	.35*	.43*	.40*	.41*	.43*	.59*	.72*	**.81**						
14. SPQ-Excessive Social Anxiety	.40*	.27*	.39*	.37*	.32*	.38*	.28*	.26*	.35*	.29*	.43*	.54*	.57*	**.85**					
15. SPQ-No Close Friends	.45*	.32*	.43*	.38*	.37*	.46*	.27*	.38*	.67*	.34*	.50*	.47*	.59*	.62*	**.79**				
16. SPQ-Constricted Affect	.47*	.34*	.46*	.37*	.40*	.46*	.30*	.42*	.55*	.35*	.48*	.47*	.57*	.62*	.76*	**.77**			
17. SPQ-Odd Behavior	.42*	.32*	.37*	.39*	.42*	.34*	.35*	.36*	.32*	.44*	.53*	.53*	.56*	.47*	.51*	.50*	**.83**		
18. SPQ-Odd Speech	.49*	.36*	.43*	.48*	.46*	.38*	.41*	.39*	.37*	.38*	.55*	.58*	.66*	.60*	.57*	.64*	.67*	**.81**	
19. Dissociative Processes Scale	.57*	.41*	.47*	.52*	.55*	.40*	.49*	.43*	.27*	.41*	.51*	.45*	.43*	.34*	.33*	.33*	.45*	.51*	**.95**
Mean	1.90	1.82	1.80	2.54	1.89	1.71	9.15	5.44	12.75	1.51	1.96	3.43	2.96	3.91	2.90	2.46	2.48	3.82	89.71
Standard deviation	.66	.74	.75	.90	.75	.76	5.08	4.66	5.96	1.75	2.15	2.69	2.48	2.75	2.50	2.19	2.29	2.75	24.93
Skew	.58	.70	.89	−.07	.65	1.11	.46	2.06	.57	1.20	1.19	.32	.47	−.01	.60	.67	.48	.19	−.02
Kurtosis	−.36	−.17	.20	−.71	−.32	.86	−.33	5.02	−.01	.81	.98	−1.00	−.87	−1.38	−.58	−.41	−1.11	−1.07	−.07

* $p < .05$.

schizotypy, participants with *z*-scores greater than 1.96 on the abbreviated MagicId, PerAb, SocAnh, or a combined *z*-score greater than 3.00 on the MagicId and PerAb were invited via e-mail to participate in the full study online. Participants scoring less than 0.5 *SD* above the mean on all three scales were also contacted via e-mail to participate in the study. In addition, the study was open for participation to all participants in the subject pool.

Positive schizotypy group. Schizotypy group membership was determined using the full version of the scales. Following previous research (Chapman et al., 1994; Eckblad & Chapman, 1983; Kwapil, Crump, & Pickup, 2002), participants in the positive schizotypy group ($n = 43$) scored 1.96 *SD*s above the mean on either the MagicId or the PerAb or scored a combined three *SD*s above the mean on both scales. They ranged in age from 18–46 with a mean age of 20.77 ($SD = 4.87$). They were 59.1% female, 15.9% White, 22.7% Asian, 18.2% Pacific Islander, 34.1% Multiethnic, and 9.1% other.

Negative schizotypy group. Participants in the negative schizotypy group ($n = 173$) scored 1.96 *SD*s above the mean on the SocAnh. Participants ranged in age from 18–48 with a mean age of 20.51 ($SD = 3.56$). They were 64.1% female, 18.5% White, 26.0% Asian, 13.9% Pacific Islander, 32.4% Multiethnic, and 5.2% other.

Psychometric control group. Participants in the psychometric control group ($n = 236$) scored less than 0.5 *SD* above the mean on the MagicId, PerAb, and SocAnh scales. They ranged in age from 18–56 with a mean age of 20.55 ($SD = 4.16$). They were 78.4% female, 27.5% White, 22.9% Asian, 10.6% Pacific Islander, 33.9% Multiethnic, and 4.2% other.

Procedure. In the final testing session, participants completed the MagicId, PerAb, and SocAnh scales, which were mixed together and called the "Survey of Attitudes and Experiences." Then, participants completed the IPASE.

Study 3 Results and Discussion

The IPASE had an internal reliability (Cronbach's alpha) of .98, .98, and .96 in the positive, negative, and control groups, respectively. First, a multivariate analysis of variance (MANOVA) was run to compare the means for the five subscales. There was a statistically significant difference among means in this analysis (Wilks's Lambda (10) = .511, $F = 30.875$, $p < .001$). To examine which specific scales differed, mean scores among the positive schizotypy, negative schizotypy, and psychometric control group were compared with a one-way ANOVA and follow-up *t* test comparisons of a) positive versus control groups, b) positive versus negative groups, and c) negative versus control groups. To account for multiple comparisons, the Bonferroni correction to *p* values was applied. As can be seen in Table 4, the omnibus *F* test was statistically significant for the total score and each of the five subscales. As expected, the positive schizotypy group had higher scores than both the negative schizotypy group and the control group for the total score and all five subscales. The negative group had higher IPASE scores than the psychometric control group for the total score and all five subscales.

These findings suggest that people at risk for the future development of psychotic-spectrum disorders have increased ASEs, and are consistent with previous findings that ASEs are common in the schizophrenia prodrome (Nelson et al., 2009) and predict conversion to psychosis over and above positive and negative attenuated symptoms (Nelson et al., 2012). However, the current research extends these results by showing that ASEs are common in psychometric schizotypy, which represents an earlier, preprodromal, or premorbid phase of the disorder, from which most people do not progress on to prodromal or frank psychosis (Cicero et al., 2014). Theorists have suggested that ASEs may be a premorbid indicator of schizophrenia and may be more common among adolescents and emerging adults due to typical brain development during these time periods (Brent et al., 2014). Moreover, these results are consistent with recent research findings that people with high levels of schizotypy have more ASEs than healthy comparisons (Torbet, Schulze, Fiedler, & Reuter, 2015).

One limitation of Study 3 is that other concurrent validity measures such as interpersonal difficulty or other measures of psychological functioning were not included. Future research could include these measures as well as semistructured interview measures. For example, future research could examine the construct validity of the IPASE by testing its scores' correlations with symptom ratings on the Structured Interview for Prodromal Syndromes (Miller et al., 2003) or the EASE (Parnas et al., 2005).

Study 4: Validation in a Clinical Sample

The results from Study 3 demonstrate that IPASE scores are associated with subclinical psychotic symptoms, and that its scores have high internal consistency and evidence for convergent validity in people at risk for the future development of psychosis. However, the IPASE was designed to also assess ASEs in people with schizophrenia. Thus, it is important to examine the psychometric properties of the scale in this population and to establish

Table 4
Means and Standard Deviations for Positive, Negative, and Control Groups in Study 3

Score	Positive schizotypy ($n = 43$)	Negative schizotypy ($n = 173$)	Comparison group ($n = 236$)	*F*-Score	η^2
Total score	3.04 (.74)	2.19 (.76)	1.46 (.46)	104.52*	.418
Cognition	2.77 (.96)	2.14 (.88)	1.35 (.47)	108.11*	.328
Self-Awareness and Presence	2.90 (.90)	2.18 (.82)	1.38 (.50)	121.29*	.366
Consciousness	3.36 (.81)	2.72 (.96)	1.88 (.88)	55.18*	.200
Somatic	3.28 (.70)	2.13 (.79)	1.45 (.52)	152.30*	.415
Demarcation/Transitivism	2.67 (.97)	2.18 (.88)	1.38 (.51)	94.11*	.300

* $p < .001$.

that people with schizophrenia have higher IPASE scores than healthy controls.

Study 4 Method

Participants. Participants were a group of outpatients with a diagnosis of schizophrenia or schizoaffective disorder ($n = 27$) and a group of healthy controls ($n = 21$) without a history of mental illness. Participants with schizophrenia were recruited from community mental health centers and clubhouses associated with the state Department of Health and from a local supported housing program. The mean age of the experimental group was 47.19 ($SD = 11.07$). They were 59.3% female, 18.5% Asian, 29.6% White, 25.9% Pacific Islander, 14.8% Multiethnic, 7.4% African American, and 3.7% other. Healthy controls were recruited via Craigslist advertisements and flyers posted in community organizations. Their mean age was 44.24 ($SD = 13.34$). They were 62.4% female, 19.1% Asian, 42.9% White, 4.8% Pacific Islander, 28.6% Multiethnic, and 4.8% other.

Materials.

Diagnosis. In order to confirm a diagnosis of schizophrenia or schizoaffective disorder in the experimental group, and to verify the absence of mental illness in the control group, all participants were administered the Structured Clinical Interview for the *DSM–IV* (SCID; First, Spitzer, Gibbon, & Williams, 1998). The SCID has high test–retest and interrater reliability (Zanarini et al., 2000). In the current research, the SCID was conducted by the second, third, and fourth authors, who are graduate students in a clinical psychology PhD program.

Anomalous self-experience. As in Studies 1–3, participants completed the IPASE.

Procedure. As part of a larger study, all participants provided informed consent and then completed the SCID and IPASE. The entire study took place in two or three sessions lasting between 2 and 3 hours each. Participants were compensated either $50 or $75, depending on the length of time it took to complete. The study was conducted in a private room at the community mental health centers, the clubhouses, the supported residential program, or an office in our laboratory.

Study 4 Results and Discussion

Compared to healthy controls, participants with schizophrenia had higher IPASE total scores ($M = 2.34$, $SD = 0.90$ vs. $M = 1.41$, $SD = 0.45$, $t(46) = 4.37$, $p < .001$, $d = 1.31$), as well as higher scores on the Consciousness ($M = 2.58$, $SD = 1.05$ vs. $M = 1.84$, $SD = 0.90$, $t(46) = 2.58$, $p = .013$, $d = 0.92$), Cognition ($M = 2.18$, $SD = 0.98$ vs. $M = 1.39$, $SD = 0.63$, $t(46) = 3.80$, $p = .003$, $d = 0.96$), Self-Awareness and Presence ($M = 2.37$, $SD = 0.92$ vs. $M = 1.33$, $SD = 0.42$, $t(46) = 4.80$, $p < .001$, $d = 1.46$), Somatization ($M = 2.39$, $SD = 0.94$ vs. $M = 1.39$, $SD = 0.52$, $t(46) = 4.374$, $p < .001$, $d = 1.46$), and Demarcation/Transitivism ($M = 2.01$, $SD = 1.01$ vs. $M = 1.31$, $SD = 0.45$, $t(46) = 2.92$, $p = .005$, $d = 0.90$) subscales. Moreover, a logistic regression analysis found that the IPASE total score could be used to predict group membership ($\chi^2(1) = 11.34$, $p = .001$, *O.R.* = 7.71, 95% CI = [2.35, 25.35]). These results suggest that for each one-unit increase in IPASE total score (range 1–5), the odds of being classified as schizophrenia increased by 771%. The IPASE had an internal consistency (Cronbach's alpha) of .98 in the schizophrenia group and .96 in the healthy control group. To determine the relative strength of the subscales in predicting group membership, all five subscales were entered stepwise into a logistic regression. In this model, only the Self-Awareness and Presence subscale was retained ($\chi^2(1) = 12.19$, $p < .001$, *O.R.* = 9.13, 95% CI = [2.64, 31.567]). This suggests that the finding that IPASE scores predict group membership may be driven mostly by this one subscale. At the same time, the lack of significance for the other subscales over and above the SAP subscale may be related to a lack of statistical power due to the small sample size.

General Discussion

The primary goal of the current research was to develop and test a new measure of ASEs, the IPASE. Results suggest that IPASE scores are reliable and valid in a general sample of undergraduates, undergraduates with high levels of schizotypy and a risk for the future development of psychosis, and in people with schizophrenia. The current research suggests that it is possible to measure the construct of ASEs with a self-report measure in these populations, and the IPASE may provide a shorter and more easily administered alternative to phenomenological interviews.

The results of Study 1 revealed that the IPASE has a five-factor structure that is very similar to the EASE. The first factor, Cognition, consisted of items related to difficulties with thought processes like thought interference, feeling like thoughts exist in space outside of the head, and thought echoing. The second factor, Self-Awareness and Presence, contained items related to a loss of basic self or identity and a loss of a connection to the world. The third factor, Consciousness, included items about disturbances in the experience of time, disturbances in intentionality, and difficulty with distinguishing between imagination and reality. Although this factor is generally grouped with Cognition in phenomenological descriptions of ASEs and in interview measures like the EASE, Consciousness was found to split into its own distinct factor in Study 1. The fourth factor, Somatization, included items involving disturbances in bodily experiences, such as feeling like the body was changing shape or difficult to control, as well as thoughts of not feeling present either physically or psychically within one's own body. Finally, the fifth factor, Demarcation/Transitivism was composed of items related to a disintegrating boundary between the self and the world or a feeling of nonexistence. One notable difference between the IPASE and other measures of ASEs is that the items written to describe existential reorientation did not form a distinct factor. Instead, some of these items loaded on different factors, while others did not load strongly onto any factor and thus were excluded. The results of Study 2 confirmed this five-factor structure, and the higher-order factor analysis suggests that the first-order factors are all part of a broader, more unified construct of ASEs. Therefore, it is reasonable to sum the items on the total scale into a single IPASE score.

In addition to confirming the factor structure of the IPASE, Study 2 found that the IPASE and its subscales were correlated with several measures of self-experience and psychotic-like experiences that are part of its nomological network. The IPASE total score and all of its subscales were negatively correlated with a self-report and behavioral measure of self-concept clarity and positively correlated with self-consciousness. In addition, IPASE

scores were positively correlated with magical ideation, perceptual aberration, social anhedonia, all nine subscales of the SPQ, and dissociation. This pattern of correlations provides strong support for the construct validity of the scale scores in an undergraduate sample. Moreover, the results of Study 3 provide support for the construct validity of IPASE scores in people with high positive and negative schizotypy, and Study 4 provides this evidence in people with a diagnosis of schizophrenia or schizoaffective disorder.

Despite this strong evidence for convergent validity, one potential limitation of the current research is a lack of clear evidence for discriminant validity. We hypothesized that the IPASE would not be correlated with self-esteem. However, given the high correlation between self-concept clarity and self-esteem in the current research and in several previous studies (e.g., Campbell, 1990; Stinson et al., 2008), it is not surprising that the IPASE was moderately correlated with self-esteem. The partial correlation when removing shared variance with self-concept clarity was weak ($r = .15$), but still statistically significant due to the large sample size. Future research could further work to establish the discriminant validity of scale scores in unselected, at-risk, and schizophrenia samples by including measures that are not hypothesized to be in the IPASE's nomological network. For example, ASEs are hypothesized to be related to many symptoms of schizophrenia including positive, negative, and disorganized domains (Nordgaard & Parnas, 2014). However, ASEs are not hypothesized to be related to other psychiatric symptoms that are common in people with schizophrenia spectrum disorders, such as depression and anxiety. Future research could examine the discriminant validity of the IPASE by examining whether its scores are correlated with measures of depression and anxiety.

In addition to a lack of discriminant validity, another limitation of the current research is a lack of evidence for the incremental validity of IPASE scores. As mentioned, some previous research suggests that the EASE has incremental validity over and above other measures of clinical symptoms in predicting "conversion" to psychosis in an ultrahigh risk sample. Nelson et al. (2012) found that the EASE was a significant predictor of the development of psychosis even when removing shared variance with initial severity and duration of symptoms. Future research could examine whether the IPASE is also a significant predictor of the future development of psychosis while removing variance shared with more commonly measured clinical symptoms such as positive, negative, and disorganized dimensions of schizophrenia.

In all of the samples in the current research, the IPASE had high indices of internal consistency, ranging in Cronbach's alpha from .96 to .98. However, ASEs, like psychosis and psychotic-like experiences, may fluctuate with time as people experience episodes of increased ASEs. Future research could work to establish test–retest reliability while examining how IPASE scores fluctuate over time and whether increases in IPASE scores are correlated with increases in positive and negative symptoms.

Another potential limitation of the current research is that ASEs may be difficult or impossible to measure with a self-report. Researchers have suggested that ASEs cannot be measured with checklists or self-reports due in part to the idiosyncratic nature of the experiences (e.g., Parnas & Henriksen, 2014), while at the same time finding some success extracting items from existing measures like the Minnesota Multiphasic Personality Inventory (MMPI) with a face validity approach (Parnas, Carter, & Nordgaard, 2016). Whether ASEs can be measured with self-reports is a question that can be answered with empirical research. A clear next step is to examine correlations between the IPASE and EASE in samples of people with and at risk for schizophrenia. Likewise, future research could examine whether IPASE scores are correlated with other measures of subjective experiences in schizophrenia, such as the Bonn Scale for the Assessment of Basic Experiences (Vollmer-Larsen, Handest, & Parnas, 2007). Future work could also examine the relations between the IPASE and other self-report measures of self-experiences in people with schizophrenia. For example, researchers have measured disturbances in self-experiences in schizophrenia by rating the lack of coherence in participants' personal narratives (e.g., Lysaker, Clements, Plascak-Hallberg, Knipscheer, & Wright, 2002). One possible avenue would be to use the Narrative Coherence Rating Scale (Lysaker et al., 2002) to further validate IPASE scores in people with schizophrenia.

Another limitation of the current research is that the comparison groups in Study 3 and Study 4 were healthy controls without any psychopathology. Previous research examining self-disturbances has shown that ASEs are specific to schizophrenia, even when considering other types of psychotic disorders (e.g., affective psychosis; Haug et al., 2012; Raballo & Parnas, 2012). It is possible that the elevated scores of the schizotypy groups in Study 3 and the schizophrenia/schizoaffective group in Study 4 could be related to poor overall mental health, rather than psychotic-like and psychotic symptoms in particular. Future research could further examine the construct validity of the IPASE by comparing people with schizophrenia to psychiatric controls, especially people with affective psychosis. If IPASE scores are valid in people with schizophrenia, we would expect these individuals to have higher IPASE scores than people with affective psychosis.

In addition to psychiatric comparison groups, future research could examine the construct validity of IPASE scores in clinical high-risk populations. As mentioned, previous work has suggested that ASEs are one of two core experiential dimensions of the schizophrenia prodrome (Møller & Husby, 2000), and ASEs predict conversion to psychosis in people at high clinical risk (Nelson et al., 2012). In the current research, IPASE scores were elevated in people with high schizotypy. Previous work has shown that people with high schizotypy have high levels of psychotic-like experiences, but that few of them are at high clinical risk for psychosis (Cicero et al., 2014), and the majority of people with high schizotypy do not develop schizophrenia if followed longitudinally (Kwapil, 1998), which is consistent with the original conceptualization of schizotypy (Lenzenweger, 1994). Thus, the results of the current research may not generalize to clinical high-risk populations. Future research could examine the psychometric properties of the IPASE in these populations and examine whether its scores predict conversion to psychosis.

All of the items on the IPASE are scored in the affirmative, such that higher agreement with the statements was related to higher levels of ASEs. Although some methodologists argue that the absence of reverse scoring can lead to acquiescence, others argue that reverse coding can introduce method variance into the scale, noting that exploratory factor analyses tend to find a separate factor for the reversed-scored items (Rodebaugh, Woods, Heimberg, Liebowitz, & Schneier, 2006). At the same time, disagreeing with the absence of ASEs (i.e., a reversed-coded item) is not the

same as agreeing with the presence of ASEs (Rodebaugh, Woods, & Heimberg, 2007), and reverse-scored items may be confusing to participants (Conrad et al., 2004) and interfere with the goal of writing simple, straightforward, easy to understand questions that are unlikely to be misinterpreted. Thus, we decided not to reverse score any items because the potential error introduced by reverse scoring items seemed to outweigh the potential benefit.

The finding that the means of the scores for people with schizophrenia in Study 4 were lower than the means for people at risk for the future development of schizophrenia in Study 3 may appear counterintuitive. One would expect people with schizophrenia to have more ASEs than people at risk for schizophrenia. However, this result is consistent with several previous studies that have compared people at risk for schizophrenia with a psychometric schizotypy approach to people with schizophrenia. People with schizophrenia have been shown to have lower means on the Perceptual Aberration Scale (e.g., means between 4 and 8; Horan et al., 2008) and Magical Ideation Scale (e.g., means between 6 and 10; Horan et al., 2008) than high risk participants. Researchers have suggested that cut-scores should be between 20 and 21 and 16–20 for the Perceptual Aberration and Magical Ideation Scales, respectively, in college students (Chmielewski, Fernandes, Yee, & Miller, 1995). Additionally, a recent series of studies found a similar pattern for Aberrant Salience Inventory scores, such that participants with schizophrenia had lower scores than at-risk undergraduates (Cicero, Kerns, & McCarthy, 2010). One explanation for people with schizophrenia having lower IPASE scores than at-risk individuals could be that people with schizophrenia are especially likely to underreport symptoms as a defensive mechanism against the consequences of their illness, a lack of awareness into their illness, or a desire to avoid perceived stigmatization (Kruck et al., 2009). The scores in people with schizophrenia may represent a lower-bound estimate of their levels of ASEs. Another reason for the differences could be that the sample of people with schizophrenia was older, and ASEs may be more common in a younger cohort. Future research may address whether these differences represent real differences in ASEs for the psychometric properties of the scales with appropriate techniques such as measurement invariance or differential item functioning. This research could examine whether there is measurement invariance in people with schizophrenia compared to at-risk participants, across ages, and among different ethnicities.

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