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The Aberrant Salience Inventory: A New Measure of Psychosis Proneness

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Aberrant salience is the unusual or incorrect assignment of salience, significance, or importance to otherwise innocuous stimuli and has been hypothesized to be important for psychosis and psychotic disorders such as schizophrenia. Despite the importance of this concept in psychosis research, no questionnaire measures are available to assess aberrant salience. The current research describes 4 studies designed to develop and validate the Aberrant Salience Inventory (ASI) as a measure of aberrant salience. In Study 1, an overinclusive item pool was subjected to an exploratory factor analysis, and items were kept or discarded based on factor loadings. In Study 2, the 5-factor structure of the ASI was confirmed with a confirmatory factor analysis, and a 2nd-order factor analysis found evidence consistent with a single higher order factor. Study 2 also provided support for the scale score's convergent validity as the ASI was strongly associated with psychosis-proneness measures and dissociation measures and moderately correlated with measures associated with levels of dopamine. This study also provided support for its discriminant validity as the ASI was only weakly associated with social anhedonia. Study 3 found that participants with elevated psychosis proneness had increased ASI scores, but in contrast, participants with elevated social anhedonia had similar scores to comparison participants. Finally, Study 4 found that participants with a history of psychosis had elevated ASI scores compared to a psychiatric comparison group. Overall, the ASI demonstrated sound psychometric properties and may be useful for measuring aberrant salience and psychosis proneness in clinical and nonclinical samples.

Keywords: aberrant salience, psychosis proneness, scale development, schizotypy, schizophrenia

Psychosis involves experiences such as delusional beliefs and hallucinations (Kapur, 2003) and is a common symptom in people with psychopathology, including schizophrenia spectrum disorders, mood disorders, and dementia (Kendler, Gallagher, Abelson, & Kessler, 1996; Kessler et al., 2005). Previous studies have found that psychosis is also a relatively common experience in the general population, with as many as 17.5% of the population endorsing at least one psychotic symptom (van Os, Hanssen, Bijl, & Ravelli, 2000). Moreover, a long line of research suggests that these relatively normal subclinical psychotic symptoms are similar to full-blown psychotic symptoms often found in people with serious mental illnesses, such as schizophrenia (van Os, Hanssen, Bijl, & Vollebergh, 2001; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). Previous research has suggested that psychotic disorders often emerge gradually in a prodromal period ranging from several weeks to several years or more (e.g., Yung & McGorry, 1996), and some research has suggested that a longer duration of untreated psychosis or longer time in the prodromal period without treatment may result in a worse prognosis (Marshall et al., 2005). Thus, identifying and treating people at risk for the development of psychotic disorders may improve the course of the illness after onset and possibly even prevent the onset of the illness altogether (Compton, McGlashan, & McGorry, 2007). A potential important identifier of risk for psychosis for which there are no questionnaire- or interview-based measures is aberrant salience.

Aberrant salience is the unusual or incorrect assignment of salience or significance to innocuous stimuli and has been hypothesized to be a central mechanism in the development of psychosis (Kapur, 2003). The concept of aberrant salience has a long history in psychosis research, and it is consistent with phenomenological descriptions of the emergence of psychosis (Berner, 1991; Cutting, 1989; Moller & Husby, 2000; Parnas, Handest, Saebye, & Jansson, 2003; Raballo & Maggini, 2005; Sass, 1992). The central experience that defines aberrant salience is experiencing periods in which stimuli that ordinarily would not seem important become more significant and capture attention (Bowers, 1968; Bowers & Freedman, 1966). Accompanying these perceptual experiences of noticing seemingly important details is that people often report feeling that their senses have become sharpened, possibly due to heightened interest in perceptual details. In addition, people often report an increased sense of meaning and a feeling that they are on the verge of some important breakthrough, possibly one that would help explain why innocuous details suddenly seem so significant. Along similar lines, some people report heightened cognitive abilities, as if their increased sense of understanding is being accompanied by an increase in their cognitive powers. Moreover, along with feeling that some important understanding may be forthcoming, people often report a heightened sense of emotionality, which can range from ecstasy at new revelations or excitement over what

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might be upcoming to anxiety and dread at the sense of unknown and possibly uncontrolled changes.

The aberrant salience hypothesis for psychosis is in part derived from research on normal incentive salience processes. Incentive salience refers to the wanting component of learning, as opposed to the liking component (Berridge, 2007). Research on incentive salience has supported a critical role for subcortical dopamine. This suggests that aberrant salience should be associated with an impairment in incentive salience and dopamine dysregulation (Kapur, 2003). This is consistent with a long line of research supporting an association between increased subcortical dopamine and psychosis (Davis, Kahn, Ko, & Davidson, 1991; Guillin, Abi-Dargham, & Laruelle, 2007).

Despite the importance of aberrant salience in possibly explaining the development and maintenance of delusions, there are currently no questionnaire measures of aberrant salience in clinical or nonclinical populations. There are questionnaire measures that have been shown to have reliable test scores and valid interpretations of these scores for measuring psychosis proneness in nonclinical populations, including the Magical Ideation Scale (Eckbald & Chapman, 1983; similar to delusions), the Perceptual Aberration Scale (Chapman, Chapman, & Raulin, 1978; similar to hallucinations), and the Referential Thinking Scale (Lenzenweger, Bennett, & Lilenfeld, 1997; similar to delusions of reference). However, none of these scales assess aberrant salience, which has been hypothesized to be the mechanism driving psychosis (Kapur, 2003). Additionally, these scales may have a high false-positive rate for identifying people at risk for the development of psychosis (Chapman, Chapman, Kwapil, Eckblad, & Zinser, 1994; Hanssen, Krabbendam, Vollema, Delespaul, & van Os, 2006). There is some preliminary evidence for a reaction time task that might measure aberrant salience (i.e., the Salience Attribution Test; Roiser et al., 2008). However, there are currently no other instruments designed to measure aberrant salience that could be used to establish convergent validity with tasks like the Salience Attribution Test, which raises difficulties in elaborating their construct validity. Thus, there is a great need for a questionnaire measure of aberrant salience that will be easily administered and yield reliable and valid test scores.

The main goal of the current research was to create and evaluate a scale to measure lifetime occurrence or trait aberrant salience that can be used in nonclinical samples. Measuring aberrant salience in nonclinical samples is important for several reasons. First, it may help identify people at risk for the development of psychosis, which may be beneficial for prevention and treatment (Compton, McGlashan, & McGorry, 2007; McGlashan et al., 2006). Second, a long line of research supports the similarities between psychosis and subclinical psychotic symptoms as well as prodromal symptoms of schizophrenia (Chapman et al., 1994; Meehl, 1962; Raine, 2006). Understanding subclinical psychotic symptoms may provide insight into full-blown psychotic symptoms. Third, research on psychosis proneness could help to understand symptoms of psychosis while removing confounds associated with psychosis research (e.g., medication; Neale & Oltmanns, 1980). This may be especially pertinent for the concept of aberrant salience because aberrant salience is thought to be associated with subcortical dopamine levels, which are the target of most antipsychotic medications (Nikam & Awasthi, 2008). Hence, there might be difficulties in clearly and easily studying aberrant salience in people with psychotic disorders, most of whom are receiving medication to block subcortical dopamine (Neale & Oltmanns, 1980). However, it is also important to establish the psychometric properties of the scale in patients with a history of psychosis.

To provide evidence of the construct validity of the new measure, we hypothesized that it would be associated with a number of theoretically meaningful variables (i.e., a nomological network; Cronbach & Meehl, 1955). As Kapur (2003) hypothesized that aberrant salience drives the phenomenological experience of psychosis, the Aberrant Salience Inventory (ASI) should be related to other measures of psychotic-like experiences such as magical ideation. As aberrant salience is thought to be related to dopamine dysregulation, the ASI should be related to other measures that are associated with increased dopamine or fluctuations in dopamine levels. For example, previous research has suggested that increased levels of dopamine may be related to the behavioral activation system (Pickering & Gray, 1999).

We also hypothesized that our aberrant salience measure would be correlated with the related constructs of dissociation and absorption. Previous research has conceptualized subclinical dissociation experiences to be a part of a more general "peculiarity" personality characteristic along with unusual perceptual experiences (e.g., perceptual aberration, similar to hallucinations) and unusual beliefs (e.g., magical ideation, similar to delusions; Berenbaum, 1996). Additionally, previous research has found that dissociation is highly correlated with magical ideation and perceptual aberration (e.g., Allen & Coyne, 1995; Giesbrecht, Merckelbach, Geraerts, & Smeets, 2004; Irwin, 1999; Watson, 2001). Hence, it would be expected that a measure of aberrant salience would also be associated with dissociation and absorption.

While aberrant salience should be associated with psychosis-proneness measures, it should be less strongly correlated with measures reflecting increased liability for other aspects of serious mental illness. For example, in addition to psychosis, people with schizophrenia often exhibit negative symptoms, reflecting a lack of some function (e.g., Andreasen, Arndt, Alliger, Miller, & Flaum, 1995). Social anhedonia (i.e., lack of pleasure from social interactions) has been found to be associated with an increased likelihood of developing schizophrenia-spectrum disorders (Gooding, Tallent, & Matts, 2005; Kwapil, 1998), but it has not been found to be associated with an increased likelihood for psychotic disorders specifically. Given previous evidence of small to moderate associations between psychosis-proneness measures and social anhedonia (e.g., Kwapil, Barrantes-Vidal, & Silvia, 2008), the ASI should be associated with social anhedonia, but not as strongly as it is with measures such as magical ideation. Similarly, a group of people psychometrically identified as having extreme scores on magical ideation/perceptual aberration scales should have elevated ASI scores compared to a group of people psychometrically identified as having extreme scores on social anhedonia or to a control group. Finally, a group of participants with a history of psychosis should have elevated ASI scores compared to a psychiatric comparison group.

The current research followed Clark and Watson's (1995) steps for objective scale development. In Study 1, we administered an overinclusive item set to a large sample of participants, examined item frequencies, conducted an exploratory factor analysis (EFA), and refined the item pool. In Study 2, we administered the scale to a separate sample, tested the factor structure with a confirmatory

factor analysis (CFA), and examined the scale scores' construct validity based on their correlations with other variables in our hypothesized nomological network. In Study 3, we confirmed the factor structure again; selected participants high in psychosis proneness, participants high in social anhedonia, and controls; and compared ASI scores to see if only the positive group had elevated ASI scores. In Study 4, we administered the measure to a sample of patients with a history of psychosis and a psychiatric comparison group to test whether the group with a history of psychosis had elevated ASI scores.

Study 1: Item Generation and Scale Refinement

Method

Participants. Participants (n = 233) were native English-speaking undergraduate college students at the University of Missouri (Columbia, MO) who completed the study as partial completion of a course requirement. Participants ranged from 18 to 25 years old, with a mean age of 18.71 (SD = 0.99). Participants were 47% female, 83.7% White, 7.7% African American, 3.4% Asian American, and 5.1% other.

Initial item pool. Items were generated by David C. Cicero and John G. Kerns based on the phenomenological descriptions of the initial experience of psychosis in the literature (Bowers, 1968; Bowers & Freedman, 1966; Gottesman, 1991; Kapur, 2003; Macdonald, 1960; Parnas et al., 2003; Sass, 1992), descriptions of the prodromal phase of schizophrenia (Moller & Husby, 2000; Thomas & Woods, 2006; Yung & McGorry, 1996), and transcripts of interviews of people with schizophrenia from several studies conducted in our own laboratory (Kerns, 2007; Kerns & Berenbaum, 2003). Items were constructed with simple language that was appropriate for the target population, and double-barreled items were avoided. The initial item pool was overinclusive, and the purpose of Study 1 was to refine these items down to a final, shorter version of the scale. Participants responded either yes or no to the items, and the scale score was calculated as a count of the number of yes responses.

Results

The frequency distributions of the initial items were first examined to identify items that were endorsed by too high (e.g., >80%) of a percentage of the original sample to provide meaningful variance. One item was removed due to being endorsed by over 80% of the sample.

Next, we subjected the data to an EFA using principal-axis factor analysis. To determine the number of factors to be extracted, we examined the scree plot and the percentage of variance explained by each factor (Fabrigar, Wegener, MacCallum, & Strahan, 1999). We extracted five factors during this step of the data analysis. We chose five factors for several reasons. First, the slope of the scree plot approached zero at five factors. Moreover, if six factors were extracted, few items would have their primary loading on the sixth factor. These five factors explained 39% of the common variance, with most of this variance being attributable to the first factor. After extracting five factors, we rotated the factor solution with an equimax rotation, which is an oblique rotation method. We used this particular rotation method, as opposed to an orthogonal rotation, because we expected the factors to be moderately correlated with each other (Fabrigar et al., 1999).

We then retained items that had high loadings (>.35), as suggested by Floyd and Widaman (1995). In addition, we eliminated items with high loadings on more than one factor (>.35 on primary factor and >.30 on another factor). As shown in Table 1, this resulted in 29 items being retained. On the basis of the content of the items comprising each factor, the ASI is composed of five factors, including feelings of increased significance, senses sharpening, impending understanding, heightened emotionality, and heightened cognition.

Study 1 Discussion

The purpose of Study 1 was initial item generation and item refinement. Study 1 yielded five psychologically interpretable factors that represent aspects of the original conceptualization of aberrant salience. The first factor, labeled *increased significance*, is central to Kapur's (2003) conceptualization of aberrant salience. It is composed of items directly reflective of increased attribution of salience to stimuli. The second factor, labeled *senses sharpening*, is also consistent with the concept of aberrant salience and is similar to constructs described as sensory gaiting or sensory flooding (Johannesen, Bodkins, O'Donnell, Shekhar, & Hetrick, 2008; Potter, Summerfelt, Gold, & Buchanan, 2006). The judgment of salience to these perceptual experiences may be related to increased levels of dopamine. The third factor, labeled *impending understanding*, represents a general feeling of importance, salience, or significance that is reported to accompany a psychotic episode (Kapur, 2003). Additionally, the fourth factor, labeled *heightened emotionality*, represents increased levels of anxiety during the early stages of a psychotic episode in which an individual is trying to make sense of the increased importance of stimuli. Finally, the fifth factor, labeled *heightened cognition*, represents experiences in which individuals feel as if they are a part of something important that may not be readily apparent.

Study 1 yielded a set of items generated from both theoretical and empirical considerations. The EFA resulted in five interpretable factors that are consistent with the original conceptualization of aberrant salience. However, the ASI was designed to be summed to a single scale score, which would be consistent with a single higher order factor. In Study 2, we sought to confirm the five-factor structure of the ASI using CFA and tested whether the ASI factors loaded on a single higher order factor.

Study 2: Confirmation of Factor Structure and Initial Construct Validity

We administered the ASI to a new sample and used CFA to confirm the five-factor structure. In addition, we tested a higher order factor model to examine whether the five ASI factors could be explained by a single second-order factor. By definition, a second-order factor model is more restrictive than a single-order model. Thus, the second-order model cannot provide statistically better fit to the data than the first-order model (Rubio, Berg-Weger, & Tebb, 2001). However, if the construct of aberrant salience is consistent with a single second-order factor, then a second-order factor model should fit the data as well as a first-order factor model in which the factors are allowed to correlate

Table 1
Standardized Factor Loadings for the Aberrant Salience Inventory Items and First-Order Factors in the Second-Order Factor Model in Study 2

Item	Factor loadings					
	1	2	3	4	5	Second order
Factor 1: Increased Significance						.84
1. Do certain trivial things ever suddenly seem especially important or significant to you?	.52					
5. Do you sometimes notice small details that you have not noticed before that seem important?	.47					
10. Do you ever feel the need to make sense of seemingly random situations or occurrences?	.41					
16. Do you sometimes attribute importance to objects which you normally would not?	.52					
21. Do you often become fascinated by the little things around you?	.55					
27. Have you sometimes become interested in people, events, places, or ideas that normally would not make an impression on you?	.56					
15. Do you go through periods in which songs sometimes seem to have an important meaning for your life?	.33					
Factor 2: Senses Sharpening						.63
22. Do your senses ever seem extremely strong or clear?		.77				
3. Do your senses sometimes seem sharpened?		.59				
12. Do you sometimes feel that you can hear with a greater clarity?		.63				
18. Has your sense of taste ever seemed more acute?		.47				
9. Do you ever go through periods of heightened awareness?		.67				
Factor 3: Impending Understanding						.74
2. Do you sometimes feel like you are on the verge of something really big, but you're not sure what it is?			.65			
6. Do you sometimes feel like it is important for you to figure something out, but you're not sure what it is?			.63			
11. Do you sometimes feel like you are finding the missing piece to a puzzle?			.56			
17. Do you sometimes feel like you are on the verge of figuring out something really big or important, but you aren't sure what it is?			.80			
29. Do you sometimes notice things that you haven't noticed before that take on a special significance?			.34			
Factor 4: Heightened Emotionality						.99
8. Do you ever have difficulty telling if you are thrilled, freightened, pained, or anxious?				.23		
14. Do normally trivial observations sometimes take on an ominous significance?				.56		
20. Do you go through periods in which you feel overstimulated by things or experiences that are normally manageable?				.54		
24. Do you ever feel that your boundaries between inner and outer sensations have been removed?				.47		
26. Do you ever have a feeling of inexpressible urgency, and you are not sure what to do?				.61		
28. Do your thoughts and perceptions ever come faster than can be assimilated?				.55		
Factor 5: Heightened Cognition						.83
4. Do you ever feel like you are rapidly approaching the height of your intellectual powers?					.36	
25. Do you sometimes feel like the world is changing and you are searching for an explanation?					.51	
7. Do you ever go through periods where you feel especially religious or mystical?					.50	
13. Do you sometimes feel like you are an especially spiritually evolved person?					.55	
19. Do you ever feel like the mysteries of the universe are revealing themselves to you?					.53	
23. Do you ever feel like a whole world is opening up to you?					.56	

freely. If the second-order model fits as well as the first-order factor model, then it is logical to sum the items over the entire scale to create a total ASI score. If not, then the construct should be viewed as multidimensional, and the items should not be summed over the entire scale (Rubio et al., 2001). Instead, subscale scores should be calculated. Thus, we tested whether the construct of aberrant salience is consistent with a single second-order factor by testing whether a model with a second-order factor fit the data significantly worse than a model with just first-order factors.

Another goal of Study 2 was to examine the convergent and discriminant validity of the ASI scores. We tested the convergent validity of the ASI scores by testing if the scores were positively correlated with magical ideation, perceptual aberration, dissociation, absorption, and behavioral activation. We tested the discriminant validity of ASI scores by testing whether the scores were less strongly correlated with social anhedonia than magical ideation, perceptual aberration, and referential thinking. Finally, we further tested the discriminant validity of ASI scores by testing whether they were less strongly correlated with behavioral inhibition than behavioral activation.

Method

Participants. Participants (n = 348) were native English-speaking undergraduate college students at the University of Mis-

souri who completed the study as partial completion of a course requirement. Following previous research (e.g., Chmielewski, Fernandes, Yee, & Miller, 1995), participants ($n = 26$) were excluded due to Chapman infrequency scores of 3 or greater to eliminate participants with careless or invalid responses (Chapman & Chapman, 1983). This resulted in 322 total participants. Participants ranged from 18 to 37 years old, with an average age of 19.16 ($SD = 1.55$). Participants were 47% female, 87.9% White, 9.0% African American, 0.6% Asian American, and 2.7% other.

Materials

Aberrant Salience Inventory. The 29 items identified in Study 1 were used in Study 2.

Psychosis-proneness measures. Several psychosis-proneness scales were included in the current study (see Table 2). The Magical Ideation Scale (Eckbald & Chapman, 1983) is a 30-item true–false questionnaire designed to measure "beliefs in forms of causation that by conventional standards are invalid" (Eckbald & Chapman, 1983, p. 215). For example, "I have worried that people on other planets may be influencing what happens on Earth." The Perceptual Aberration Scale (Chapman et al., 1978) is a 35-item true–false scale that includes 29 items designed to measure schizophrenia-like distortions in perception of one's own body and seven items for other perceptual distortions (e.g., "My hearing is sometimes so sensitive that ordinary sounds become uncomfortable"). The Magical Ideation Scale and the Perceptual Aberration Scale have considerable support for the reliability and validity of their scores (for a review, see Edell, 1995). Finally, the Referential Thinking Scale was used to measure referential thinking, which is highly correlated with measures of psychosis proneness (Lenzenweger et al., 1997). The Referential Thinking Scale (Lenzenweger et al., 1997) is a 34-item true–false questionnaire that includes a variety of referential thoughts and experiences (e.g., "I often wonder if radio DJs play songs just for me").

Dissociation. One measure of dissociation in the current study was the Dissociative Processes Scale (DPS; Harrison & Watson, 1992), designed to measure relatively normal dissociative experiences as opposed to clinical dissociation (Watson, 2001). The DPS is a 33-item questionnaire containing subscales of Obliviousness, Detachment, and Imagination. Possible responses range from 1 (*strongly agree*) to 5 (*strongly disagree*). An example item is "I sometimes 'step outside' of my usual self and experience a different state of consciousness." The DPS has been found to load on a factor with other measures of dissociation (Chmielewski & Watson, 2008; Watson, 2001).

Absorption. The Tellegen Absorption Scale (TAS; Tellegen & Atkinson, 1974) was also included in the current study. The TAS is a 34-item scale in which participants respond 0 (*never*) to 3 (*always*). Previous research has found the TAS to be associated with fantasy, aesthetics, and feelings facets of the five-factor model Openness to Experience factor (Glisky, Tataryn, Tobias, Kihlstrom, & McConkey, 1991), hypnotizability (Glisky & Kihlstrom, 1993), and measures of dissociation (Eisen & Carlson, 1998). An example item is "Things that might seem meaningless to others often make sense to me."

Social anhedonia. The Revised Social Anhedonia Scale (Eckbald, Chapman, Chapman, & Mishlove, 1982), a 40-item true–false questionnaire designed to measure lack of relationships and lack of pleasure from relationships (e.g., "I am usually content just to sit alone, thinking and daydreaming"), was used to measure social anhedonia. The Social Anhedonia Scale has been found to predict future development of schizophrenia-spectrum disorders (Gooding et al., 2005; Kwapil, 1998).

Behavioral activation/inhibition. The Behavioral Inhibition System/Behavioral Activation System (BIS/BAS) Scale (Carver & White, 1994) is a 20-item scale in which participants rate statements from 1 (*very true for me*) to 4 (*very false for me*). The BIS/BAS contains four subscales including Behavioral Inhibition (e.g., "I feel pretty worried or upset when I think or know someone is angry at me"), Behavioral Activation—Drive (e.g., "I go out of my way to get things that I want"), Behavioral Activation—Fun Seeking (e.g., "I'm always willing to try something new if I think it will be fun"), and Behavioral Activation—Reward Sensitivity (e.g., "When I'm doing well at something, I love to keep at it"). Previous research has found that BAS scores are associated with reward sensitivity (Carver & White, 1994), dopamine receptor genes (Lee, Ham, Cho, Lee, & Shim, 2007), and extraversion and positive emotionality, while BIS scores have been found to be

Table 2
Correlations Among the Aberrant Salience Inventory, Other Psychosis-Proneness Scales, Social Anhedonia, Absorption, and Dissociation in Study 2

Measure	1	2	3	4	5	6	7
1. Aberrant Salience Inventory	**.89**						
2. Magical Ideation Scale	.55*	**.85**					
3. Perceptual Aberration Scale	.47*	.66*	**.87**				
4. Social Anhedonia Scale	.17*	.21*	.37*	**.82**			
5. Referential Thinking Scale	.41*	.49*	.41*	.32*	**.80**		
6. Tellegan Absorption Scale	.56*	.58*	.47*	.20*	.38*	**.93**	
7. Dissociative Processes Scale	.51*	.50*	.50*	.26*	.32*	.57*	**.93**
M	13.73	6.62	4.09	8.66	6.63	35.64	62.15
SD	6.62	5.22	4.56	5.17	4.71	17.05	22.06
Skewness	0.10	1.17	2.58	1.56	0.72	0.60	0.17
Kurtosis	−0.66	1.22	9.22	4.02	1.22	0.52	0.32

Note. Boldfaced numbers on the diagonal represent Cronbach's alpha.
* $p < .05$.

associated with avoidance temperament (Elliot & Thrash, 2002). Both the BAS and BIS subscale scores had high internal reliability in the current study (see Table 3).

Chapman Infrequency Scale. Participants also completed the Chapman Infrequency Scale (Chapman & Chapman, 1983), which measures careless or invalid responding (e.g., "I cannot remember a time when I talked to a person wearing eyeglasses"). This scale is composed of questions that should rarely be endorsed (sometimes reverse-keyed) if the participant is paying attention and answering truthfully. On the basis of previous research, participants endorsing three or more items were excluded from the analysis (Chmielewski et al., 1995).

Procedure

Participants first completed the ASI. Then, they completed the Magical Ideation Scale, Perceptual Aberration Scale, Social Anhedonia Scale, and Chapman Infrequency Scale mixed together and labeled *Survey of Attitudes and Experiences.* Then, participants completed the Referential Thinking Scale, the DPS, the TAS, and the BIS/BAS Scale.

Data Analysis

Model fitting was done with MPlus3 software (Muthén & Muthén, 2004) using maximum-likelihood parameter estimates with standard errors and a mean-adjusted chi-square statistic that is robust to nonnormality (the Satorra-Bentler chi-square; Satorra & Bentler, 1994). Four test statistics were used to assess whether models provided a good fit to the data (Hu & Bentler, 1998): (a) χ^2/df ratio < 2.5, (b) RMSEA (root-mean-square error of approximation) $< .05$, (c) SRMR (standardized root-mean-square residual) $< .08$, and (d) CFI (comparative fit index) $> .90$. Chi-square difference tests of the model comparisons were done using a scaled-difference test statistic (Satorra & Bentler, 2001).

Results

Reliability and psychometric properties. As seen in Table 2 and Table 3, the ASI had high internal reliability and a relatively normal distribution. The ASI had lower levels of skewness and kurtosis than several other psychosis-proneness scales used in the current study. The mean ASI score was 13.71, and this did not differ between men ($M = 14.08$) and women ($M = 13.23$), $t(307) = 1.10$, $p = .27$. The final 29-item scale has a grade reading level of 7.5 according to the Flesch reading ease formula (Flesch, 1948).

CFA and model comparisons. According to the χ^2/df, RMSEA, and SRMR, the first-order factor model ($\chi^2/df = 1.81$, RMSEA = .05, SRMR = .07) and the second-order factor model ($\chi^2/df = 1.81$, RMSEA = .05, SRMR = .07) fit the data well. However, the CFI statistics were below cutoffs for good fit for the first-order and second-order models (CFI = .85 for both models). The chi-square difference test revealed that the second-order model fit the data just as well as the model with just the first-order factors in which the factors were allowed to correlate freely, $\chi^2(5, N = 322) = 10.60$, $p = .06$.

As can be seen in Table 2, ASI scores were highly correlated with magical ideation, perceptual aberration, and referential thinking as hypothesized. The ASI was also positively correlated with the Social Anhedonia Scale. To test whether ASI was more strongly correlated with measures of psychosis proneness than with a measure of risk for schizophrenia-spectrum disorders, *z* scores were calculated to compare correlated coefficients, as suggested by Meng, Rosenthal, and Rubin (1992). Aberrant salience was more strongly correlated with magical ideation ($z = 6.28$), perceptual aberration ($z = 6.59$), and referential thinking ($z = 3.79$) than it was with social anhedonia. Additionally, the ASI was highly correlated with absorption and dissociation. As can be seen in Table 3, the ASI was also associated with all three factors of the BAS Scale but was not significantly associated with the BIS Scale, as hypothesized. Moreover, the other psychosis-proneness scales were not significantly associated with behavioral activation.

Study 2 Discussion

In Study 2, we confirmed the factor structure of the ASI. The fit indices for the first-order and second-order models met the criteria for good model fit, with the exception of the CFI. Nevertheless, the majority of the fit indices suggest that the models fit the data well and that the ASI is composed of five moderately to highly corre-

Table 3
Correlations Between the Aberrant Salience Inventory, Other Psychosis-Proneness Scales, Social Anhedonia, Behavioral Activation Scales, and the Behavioral Inhibition Scale in Study 2

Measure	1	2	3	4	5	6	7	8
1. Aberrant Salience Inventory	**.89**							
2. Magical Ideation Scale	.55*	**.85**						
3. Perceptual Aberration Scale	.47*	.66*	**.87**					
4. Social Anhedonia Scale	.17*	.21*	.37*	**.82**				
5. Behavioral Activation—Drive	.15*	.08	.11	.01	**.82**			
6. Behavioral Activation—Fun Seeking	.15*	.11	.11	−.03	.52*	**.71**		
7. Behavioral Activation—Reward Sensitivity	.17*	.10	.07	−.07	.49*	.50*	**.80**	
8. Behavioral Inhibition Scale	.11	.11	.10	−.09	.07	−.02	.32*	**.74**
M	13.73	6.62	4.09	8.66	11.74	12.88	17.49	20.42
SD	6.62	5.22	4.56	5.17	2.41	2.20	2.31	3.76

Note. Boldfaced numbers on the diagonal represent Cronbach's alpha.
* $p < .05$.

lated factors. These factors represent related aspects of the construct of aberrant salience. However, the finding that a model with a higher order factor did not fit the data significantly worse suggests that the ASI has a single second-order factor (Rubio et al., 2001), which is consistent with the original conceptualization of the construct. This suggests that it is meaningful to sum the scores over the entire scale and to use this score as an indicator of individual difference in aberrant salience. The low number of items on some of the ASI subscales may limit their use in clinical settings. Previous research with similar scales has found that using factor scores rather than subscales with small numbers of items results in more reliable score interpretations (e.g., Compton, Goulding, Bakeman, & McClure-Tone, 2009).

In addition to confirming the factor structure of the ASI, Study 2 also provided support for the reliability, construct validity, and discriminant validity of ASI scores and interpretations. Importantly, ASI scores have high internal reliability ($\alpha = .89$). This internal reliability is higher than the scores for many scales commonly used to measure related constructs (e.g., the Perceptual Aberration Scale, Magical Ideation Scale, and Social Anhedonia Scale). In Study 2, ASI scores had the highest reliability of any scale measuring psychosis proneness.

As hypothesized, the ASI was strongly correlated with the Perceptual Aberration Scale, the Magical Ideation Scale, the Referential Thinking Scale, the TAS, and the DPS. Moreover, as predicted, the ASI was also significantly correlated with measures that have been hypothesized to be associated with dopamine functioning, the three subscales of the BAS Scale (Depue & Collins, 1999; Gray, 1994). Conversely, the ASI was not significantly correlated with the BIS Scale. Although the correlations with BAS subscales were relatively small, these results are consistent with previous research on the association among the BIS/BAS Scale and dopamine functioning (Scholten, van Honk, Aleman, & Kahn, 2006). Since the BAS subscales are only moderately associated with dopamine, then it makes sense that the BAS subscales would only be moderately correlated with the ASI.

In addition to convergent validity, Study 2 also provided evidence for the discriminant validity of ASI scores. The ASI was positively correlated with the Social Anhedonia Scale, but not as strongly as it was with the Magical Ideation Scale and the Perceptual Aberration Scale, which provides evidence for the discriminant validity of ASI scores. Moreover, the ASI is not as strongly correlated with the Magical Ideation Scale or the Perceptual Aberration Scale as they are with each other ($Z = 4.81$), and these two scales are generally considered to represent distinct, albeit highly correlated, constructs. This suggests that ASI scores have discriminant validity from both the Magical Ideation Scale and the Perceptual Aberration Scale. Additionally, the ASI was significantly correlated with all three BAS subscales but was unassociated with the BIS subscale, as hypothesized. Moreover, the other psychosis-proneness measures were unassociated with the BIS/BAS Scale, which suggests that it is aberrant salience, not psychosis proneness in general, that is associated with increased behavioral activation.

Study 3: Further Construct Validation

Study 2 confirmed the factor structure of the ASI and found that the construct is consistent with a single higher order factor structure. Additionally, it provided support for the convergent and discriminant validity of the scale scores. One very common method for examining risk for psychosis and for schizophrenia is the high-risk approach (G. A. Miller, 1995). In this method, participants are placed into elevated or control groups, and their scores on questionnaires or task performance are compared between groups (e.g., Chapman et al., 1994; Gooding et al., 2005; Kerns, 2005; Kwapil, 1996, 1998; Lenzenweger, 1993). In Study 3, we selected participants with high scores on either psychosis-proneness or social anhedonia scales, as well as control participants who were low on both types of scales. If ASI scores are valid indicators of psychosis proneness, then we would expect participants with high magical ideation and/or perceptual aberration to have elevated ASI scores, but we would not expect control participants to have elevated scores. Moreover, if ASI scores have discriminant validity, then we would expect the psychosis-proneness group to have higher ASI scores than the social anhedonia group. In addition to testing the convergent and discriminant validity of ASI scores from a high-risk approach, we also used a CFA to confirm the factor structure of the ASI in Study 3.

Method

Participants. Participants ($n = 662$) were recruited from a larger pool of participants ($n = 1{,}901$) who completed a battery of questionnaires, including abbreviated versions of the Magical Ideation Scale (Eckbald & Chapman, 1983), Perceptual Aberration Scale (Chapman et al., 1978), and Social Anhedonia Scale (Eckbald et al., 1982). Participants completed this battery online during a 1-week period. The prescreening study took less than 60 min to complete.

In an individual testing session, the screened participants completed the full version of the three scales and the 29-item ASI. Participants were ultimately selected for group membership based only on their full-scale scores compared to norms from previous large college-student samples (Kerns & Berenbaum, 2000). This method of identifying a psychosis-proneness group and a group with high social anhedonia is commonly used in psychosis-proneness research (e.g., Gooding et al., 2005; Kerns, 2005; Kwapil, 1998).

Psychosis-proneness group. Following previous research (Chapman et al., 1994; Eckbald & Chapman, 1983; Kwapil, Crump, & Pickup, 2002), participants ($n = 27$) in the psychosis-proneness group scored 1.96 standard deviations above the mean on either the Magical Ideation Scale or the Perceptual Aberration Scale or scored a combined three standard deviations above the mean on both scales. Participants in the psychosis-proneness group ranged from 18 to 20 years old, with an average age of 18.40 ($SD = 0.57$). Participants were 51.7% female, 65.5% White, 3.4% African American, 3.4% Asian American, and 24.1% other.

Social anhedonia group. Participants in the social anhedonia group ($n = 53$) scored two standard deviations above the mean on the Social Anhedonia Scale. They ranged from 18 to 25 years old, with an average age of 19.82 ($SD = 1.72$). Participants were 66.7% female, 63.2% White, 14.0% African American, 5.3% Asian American, and 17.5% other. Participants who met criteria for both the positive and negative groups were not included in the analyses.

Control group. Participants in the control group ($n = 301$) scored less than 0.5 standard deviations above the mean on the

Perceptual Aberration Scale, the Magical Ideation Scale, and the Social Anhedonia Scale. They ranged from 18 to 24 years old, with an average age of 19.40 (SD = 0.68). Participants were 60.6% female, 80.3% White, 1.9% African American, 1.6% Asian American, and 15.1% other.

In addition to the control, psychosis-proneness, and social anhedonia groups, 281 additional participants who did not meet criteria for any group participated in the study. These participants were recruited to test the factor structure of the ASI with the entire range of scores and not just people expected to score high or low. These participants were 56.6% female, 70.5% White, 7.4% African American, 1.9 % Asian American, and 20.2% other. They ranged from 18 to 25 years old, with an average age of 18.48 (SD = 0.98).

Procedure

Participants completed the Magical Ideation Scale, Perceptual Aberration Scale, and Social Anhedonia Scale mixed together and labeled the Survey of Attitudes and Experiences. Then, participants completed the ASI. Participants completed the study in isolated rooms on a single occasion. The entire study took approximately 40 min.

Results

The psychosis-proneness group had by far the highest scores on the ASI (M = 22.26, SD = 5.40), while the social anhedonia (M = 13.58, SD = 6.30) and control groups (M = 11.25, SD = 5.75) had lower scores, $F(2, 368) = 28.39$, $p < .001$. Planned comparisons revealed that the psychosis-proneness group had higher scores than both the social anhedonia group, $t(80) = 6.13$, $p < .001$, Cohen's d = 1.48, and the control group, $t(325) = 9.57$, $p < .001$, Cohen's d = 1.97, and the social anhedonia group had slightly higher scores than the control group, $t(353) = 2.72$, $p = .028$, Cohen's d = 0.39. Additionally, the first-order factor model identified in Study 1 and confirmed in Study 2 also fit the data well in Study 3 (χ^2/df = 2.21, RMSEA = .04, CFI = .90, SRMR = .04). The higher order model also fit the data well (χ^2/df = 2.28, RMSEA = .05, CFI = .89, SRMR = .05). Results were similar if only control, psychosis-proneness, and socially anhedonic participants were included.

In addition to testing the factor structure of the ASI, we examined whether the factor loadings were invariant across gender. To do this, a multigroup model was specified in which the loadings for the first-order and second-order factors were freely estimated and allowed to vary for males and females. Then, the fit of this model was compared to a similar model in which the factor loadings were constrained to be equal for males and females. The model in which the loadings were constrained to be equal did not fit significantly worse than the model in which the loadings were freely estimated, χ^2 difference(24) = 28.95, $p = .22$. This suggests measurement invariance. In other words, the factor loadings do not differ between men and women. This is consistent with previous research that did not find differences between men and women on the Magical Ideation and Perceptual Aberration Scales (Chmielewski et al., 1995).

Study 3 Discussion

The results of Study 3 provide further support for the validity of ASI score interpretations. As expected, the psychosis-proneness group had higher scores than a social anhedonia group as well as a control group. This suggests that people with psychosis proneness have elevated ASI scores. Moreover, Study 3 also provided support for the discriminant validity of ASI scores because the effect sizes for the difference between the psychosis-proneness group and the control group and for the difference between the psychosis-proneness group and the social anhedonia group were large, while the effect size for the difference between the social anhedonia group and the control group was small. This suggests that, although statistically significant, the difference between the social anhedonia group and the control group is also small. If the ASI is able to identify people with high psychosis-proneness scores, it may also be useful in identifying people with positive symptoms of schizophrenia or psychosis.

In addition to providing further support for the validity of ASI scores, Study 3 provided support for the first-order factor structure of the ASI. In Study 2, three of the four indices were consistent with a well-fitting model. However, in Study 3, all four fit indices were consistent with good model fit. Thus, Study 3 confirmed the factor structure identified with an EFA in Study 1 and initially confirmed with a CFA in Study 2.

Study 4: Validation in a Clinical Sample

The ASI is designed for use in subclinical populations of people at risk for the development of schizophrenia. However, examining the psychometric properties of the scale in a clinical sample of people with a history of psychosis can provide additional evidence for the construct validity of the measure. On the basis of the centrality of aberrant salience to psychosis, we would expect psychiatric patients with a history of psychosis to have higher ASI scores than psychiatric patients without a history of psychosis.

Method

Participants. Participants (n = 64) were clinically stable (i.e., not currently experiencing an acute exacerbation of symptoms) inpatients at a state forensic mental hospital. Two groups of participants were recruited for the current research: a history-of-psychosis group and a psychiatric comparison group. Both groups were recruited from the same forensic inpatient facility. Since the inpatient facility was a forensic center, the majority of the participants were long-term patients who, although hospitalized, were nonetheless clinically stable.

History-of-psychosis group. Participants (n = 36) in this group had a history of psychosis as identified by a review of their charts. All participants were extensively evaluated upon admission by several professionals, including a psychiatrist, psychologist, and social worker. Additionally, each participant was evaluated by all three professionals every 6 months during the first year of hospitalization and every 12 months following the first year, and all of these assessments were available in the current research. Moreover, participants were closely monitored during their hospitalization. Therefore, it seems likely that determining a history or lack of history of psychosis based on chart review would be accurate.

Twenty-one participants in the history-of-psychosis group had a *DSM–IV* primary diagnosis of schizophrenia, and 15 had a *DSM–IV* primary diagnosis of schizoaffective disorder. Many participants also met criteria for a comorbid mental disorder. One participant also met criteria for major depressive disorder, 27 met criteria for a drug or alcohol use disorder (although all were currently in remission in a controlled environment), 19 met criteria for a personality disorder, one participant met criteria for a sexual disorder, 11 had borderline intellectual functioning, one had posttraumatic stress disorder, and one had obsessive-compulsive disorder. Participants in the history-of-psychosis group ranged from 21 to 60 years old, with an average age of 40.88 ($SD = 10.73$). Participants were 78.8% male, 44.4% White, 44.4% African American, and 2.8% Asian American. All of the participants were taking psychotropic medications. All 36 participants were taking antipsychotic medications, 18 were taking antidepressants, 17 were taking mood stabilizers, 18 were taking anxiolytics, two were taking sleep aids, and seven were taking medication for parkinsonian side effects.

Psychiatric comparison group. Participants ($n = 28$) in the psychiatric comparison group were clinically stable inpatients at the same forensic state hospital as the psychosis group. Two participants were excluded for having a diagnosis of dementia and being unable to understand the questions, leaving 26 participants in the analyses. Comparison participants ranged from 20 to 72 years old, with a mean age of 42.38 ($SD = 15.71$). Participants were 85% male, 81% White, 15% African American, and 4% other. Comparison participants had a variety of nonpsychotic diagnoses, and many met criteria for comorbid *DSM–IV* disorders. Sixty-one percent of the sample had a mood disorder. Nine participants had major depressive disorder, six participants had Bipolar I, Bipolar II, or Bipolar NOS (not otherwise specified), and two participants had mood disorder NOS. Eight participants had personality disorder NOS, and three had antisocial personality disorder. Thirteen participants had a history of alcohol or substance abuse. Nine participants had a cognitive disorder NOS or an Axis II diagnosis of borderline intellectual functioning. Finally, four participants had a sexual disorder, two participants had posttraumatic stress disorder, and three participants had attention-deficit/hyperactivity disorder. Many of the participants were taking psychotropic medications. Eighteen participants were taking antidepressants, 13 were taking mood stabilizers, 13 were taking antipsychotic medications (note that antipsychotic medications are often prescribed for treating symptoms other than psychosis, such as agitation, and antipsychotics are often used for off-label purposes; see Groleger, 2007, for a review), 17 were taking anxiolytics, eight were taking sleep aids, seven were taking anticonvulsants, five were taking medication for parkinsonian side effects, and one was taking a stimulant.

Materials

Aberrant Salience Inventory. All participants completed the 29-item version of the ASI as in Study 2 and Study 3.

Mental status. Participants completed the Mini-Mental Status Exam (MMSE). The MMSE is one of the most commonly used screening measures for cognitive impairment and dementia (Hodges, 1994; Manning et al., 2007). MMSE scores have been found to have high interrater reliability (Tombaugh & McIntyre, 1992), internal consistency, and well-established normative data (Tombaugh, McDowell, Kristjansson, & Hubley, 1996). In the current research, the MMSE was used to screen for and exclude participants with dementia.

History-of-psychosis assessment. Assessment of the presence or absence of a psychotic episode was made with by reviewing the charts of participants. Participants with a history of psychosis were assigned to the history-of-psychosis group, and participants without a history of psychosis were assigned to the comparison group.

Procedure

Participants were identified via chart reviews. Participants meeting criteria completed the MMSE followed by the ASI. The current research protocol was approved by the university institutional review board, the state department of mental health, and the review board of the hospital where the study took place. All participants provided informed consent prior to completing the study.

Results

There were no differences in MMSE scores between the psychosis group ($M = 26.37$, $SD = 3.25$) and the comparison participants ($M = 26.81$, $SD = 2.90$), $t(62) = 0.57$, $p = .57$. There were also no group differences in parental education, as 85% percent of the participants with psychosis had at least one parent who had finished high school, while 88% of the comparison participants had at least one parent who had finished high school.

Participants with a history of psychosis had a significantly higher mean on the ASI than did comparison participants ($M = 15.17$, $SD = 7.43$, and $M = 11.50$, $SD = 5.35$, respectively), $t(60) = 2.15$, $p = .04$, Cohen's $d = 0.57$. Moreover, a logistic regression analysis found that the ASI could be used to predict group membership, χ^2 (1, $N = 62$) $= 4.18$, $p = .04$, odds ratio $=$ 1.09, 95% CI [1.00, 1.18]. These results indicate that each unit increase (affirmative answer) in ASI scale score (range of 0–29) was associated with a 9% increase in the odds of being classified in the history-of-psychosis group. The ASI had a Cronbach's alpha of .91 in the history-of-psychosis group and .80 in the comparison group.

Study 4 Discussion

The results of Study 4 provide further support for the reliability and validity of ASI scores. The group of participants with a history of psychosis had a significantly higher mean than did the group of participants without a history of psychosis. Moreover, ASI scores had a high level of reliability in the both the history-of-psychosis and comparison groups.

When comparing the means from Study 4 to Studies 2 and 3, participants in Study 4 with a history of psychosis had a smaller mean than the participants at risk for the development of psychosis in Study 3, and the mean was only a few points higher than the mean for all participants in Study 2. This result is consistent with previous research on similar scales comparing samples of people with psychosis to samples of people at risk for schizophrenia. For example, people with a diagnosis of schizophrenia have much lower mean Magical Ideation Scale (e.g., means between 6 and 10; Horan, Reise, Subotnik, Ventura, & Nuechterlein, 2008) and mean

Perceptual Aberration Scale (e.g., means between 4 and 8; Horan et al., 2008) scores than high-risk participants (e.g., suggested cut scores based on a large college-student sample of between 16 and 20 and between 20 and 21 for these two scales, respectively; Chmielewski et al., 1995). Moreover, research has consistently found that participants 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). Thus, it is possible that scores for people with schizophrenia in Study 4 are a lower bound estimate of their level of aberrant salience. At the same time, the comparison group in Study 4 should be a more adequate comparison group than healthy college-student participants in Studies 2 and 3 because comparison participants in Study 4 were also psychiatric inpatients in the same state hospital with a similar level of illness severity. Thus, their level of impairment from psychopathology was comparable, which makes it more likely that the difference in ASI scores is related to a history of psychosis than other differences between samples.

General Discussion

The goal of this research was to develop and test a new measure of aberrant salience. Results suggest that ASI scores and their interpretation are reliable and valid for measuring the construct of aberrant salience in nonclinical samples and in clinical samples of people with a history of psychosis. Much previous research has suggested that aberrant salience should be related to psychosis or psychosis-like symptoms in nonclinical samples, but only one method is available to measure it, which is not a self-report measure and is not easily administrable. The current studies found that it is possible to measure the construct of aberrant salience in a face- and construct-valid manner.

The results of Study 1 suggest that aberrant salience is composed of several correlated factors that are consistent with Kapur's (2003) conceptualization of aberrant salience. The first factor is increased feelings of significance; this factor is central to Kapur's theory of increased salience to otherwise innocuous stimuli and may be the mechanism that drives the experience of the other four factors. The second factor involves anomalies of perception in the form of subjective feelings of sharpening of senses. The experience of aberrant salience may cause a subjective feeling of the senses sharpening as previously nonsalient stimuli become salient. This factor is similar to what is assessed in other measures of prepsychotic experiences and may be more general to the schizophrenia prodrome than is the first factor. The third factor, which we labeled impending understanding, is also central to Kapur's theory in that the individual experiencing aberrant salience may feel as if these increased feelings of salience are leading to a breakthrough in understanding. The fourth and fifth factors, heightened emotionality and heightened cognition, may be the result of a person making an attempt to understand the emotions and cognitions that accompany an aberrant salience experience but may also be more general to prepsychotic experiences. The results of Study 2 and Study 3 confirmed this five-factor structure identified with the EFA in Study 1. Moreover, the results of Study 2 support the assertion that the five factors are dimensions of the same experience, in that the correlations among these factors are better represented by a second-order factor. Therefore, it seems appropriate for scores on the ASI to be summed to create a single aberrant salience score.

Study 2 also found that the ASI was correlated with several constructs hypothesized to comprise its nomological network, including magical ideation, perceptual aberration, referential thinking, dissociation, and absorption. Specific scales for these constructs were used to assess the convergent validity of the ASI in the current research due to their long history of identifying participants at risk for the development of psychosis in similar undergraduate samples (Chapman et al., 1994; Gooding et al., 2005; Kwapil, 1998). These scales are arguably the most established measures of psychosis proneness (Compton et al., 2009; Grove, 1982; Lenzenweger, 1994). However, it should be noted that several other measures have been recently developed to assess risk for psychosis, and these measures could be used to further examine the validity of the ASI in future research. For example, the Structured Interview for Prodromal Syndromes (SIPS) is an interview measure designed to identify patients at imminent risk for the development of psychosis (T. J. Miller et al., 1999). The SIPS includes measurement of a broad range of prepsychotic experiences, some of which overlap with the current instrument. For example, one portion of the SIPS focuses on perceptual anomalies, similar to what is referred to as senses sharpening in the ASI. Another interview measure of prepsychotic experiences is the Bonn Scale for the Assessment of Basic Symptoms (BSABS; Szily & Keri, 2009; Vollmer-Larsen, Handest, & Parnas, 2007). The BSABS is a semistructured interview designed to measure basic symptoms or antecedents to psychotic symptoms. The Schizotypal Personality Questionnaire (SPQ; Raine, 1991) is another commonly used scale designed to measure schizotypal personality disorder, a similar construct to the schizophrenia prodrome. Moreover, the Prodromal Questionnaire (PQ) is a 92-item questionnaire that is a combination of the SPQ and SIPS overview questions (Loewy, Bearden, Johnson, Raine, & Cannon, 2005). Some of these basic symptoms overlap with the concept of aberrant salience. Thus, the SIPS, BSABS, SPQ, and PQ contain items that are similar to aberrant salience, but none of these measures specifically assess aberrant salience. Future research could examine the relations among the ASI and these scales to further establish the validity of the ASI as well as to further examine the nomological network of aberrant salience itself. Moreover, future research could establish the concurrent validity of the ASI by comparing participant scores on the ASI to scores on interview measures such as the SIPS and BSABS, since the goal of the current study was to establish an easily administered questionnaire measure of aberrant salience.

In addition to being correlated with magical ideation, perceptual aberration, referential thinking, absorption, and dissociation, the ASI was correlated with scales that are thought to be associated with dopamine functioning. Also consistent with the convergent validity of ASI scores, participants with high magical ideation/perceptual aberration scores had higher ASI scores than did participants with high social anhedonia and comparison participants who did not have elevated psychosis proneness or social anhedonia.

In addition to convergent validity, the current research also provides some evidence for the discriminant validity of ASI scores. The ASI was only weakly correlated with social anhedonia in Study 2, and the social anhedonia group had lower scores than the psychosis-proneness group in Study 3. This suggests that

people with high psychosis proneness are likely to have higher ASI scores than comparison participants and that they are more likely to have high ASI scores than participants with psychometrically identified high negative schizotypy symptoms. Additionally, Study 4 found that participants with a history of psychosis have elevated scores compared to a group of psychiatric comparison participants with similar severity of mental illness but no history of psychosis.

The current research also provides support for the internal consistency reliability of ASI scores. The ASI had a higher coefficient alpha than did the other psychosis-proneness scales used in the current study. However, future research could continue to address the reliability of the ASI in the form of test–retest reliability. Although test–retest reliability might be an important indicator of the reliability of the ASI, it may not be essential because the ASI may not be expected to be stable across time. Previous research has suggested that dopamine fluctuates in psychosis, that dopamine levels are associated with current psychosis, and that other scales may fluctuate with changes in dopamine levels (Myin-Germeys, Marcelis, Krabbendam, Delespaul, & van Os, 2005). Moreover, subclinical psychosis may be relatively unstable as well (van Os et al., 2009). In addition to administering the test at multiple time points as an indicator of test–retest reliability, future research could also examine whether the ASI would fluctuate with dopamine levels (Myin-Germeys et al., 2005).

In addition to the psychometric properties of the ASI, the current research provides evidence that the experience of aberrant salience is somewhat common in the general population. The mean of the ASI for participants in Study 2 was 13.73, which means that participants answered yes to around 14 items on average. This seems consistent with previous research on the rates of psychotic experiences among people without psychotic disorders in the general population. For example, van Os et al. (2000) found that nearly one in five people in an epidemiological study reported a lifetime psychotic experience. The items on the final version of the ASI were developed to have adequate variability if aberrant salience is similarly common in the general population. Despite the high mean of the ASI in a normal population, Study 3 found a very large difference between the psychosis-proneness group and the social anhedonia ($d = 1.48$) and control groups ($d = 1.97$), and Study 4 found a moderate difference between a group of people with a history of psychosis and a serious mental illness control group ($d = 0.57$). This suggests that although aberrant salience is experienced by most of the general population to a certain degree, people with a risk for the development of psychosis or a history of psychosis have much higher ASI scores than people without this risk or history. Moreover, one significant strength of the ASI is that scores are normally distributed within the general population. This is important because previous research on psychosis-proneness scales has found that the scales are not normally distributed, which violates the assumptions of many statistical techniques (e.g., Johns & van Os, 2001). ASI scores were also strongly correlated with the validity indicators in Study 2. Thus, the interpretation of ASI scores seems to be valid in this population while avoiding some of the psychometric weaknesses of other scales.

One potential limitation of the ASI is that none of the items are reverse-scored. Some methodologists have argued that reverse-scoring is necessary to avoid acquiescence among participants. However, others have argued that reverse-scored items may be confusing to participants (Conrad et al., 2004), that the opposite of a construct reverse-scored may be fundamentally different than the construct (Rodebaugh, Woods, & Heimberg, 2007), and that reverse-scored items tend to be the worst fitting items in factor analyses or that the factor structure of scales includes a straightforward worded factor and a reverse-scored factor (Rodebaugh, Woods, Heimberg, Liebowitz, & Schneier, 2006). Moreover, several commonly used schizotypy scales (e.g., the SPQ; Raine, 1991) do not use reverse-scored items, and other schizotypy scales have very few reverse-scored items (e.g., the Referential Thinking Scale; Lenzenweger et al., 1997).

Another potential limitation of the current research is that information about the predictive power of the scale is missing. For example, future research could further validate ASI score interpretations in measuring psychosis proneness with a longitudinal study to see if scores can prospectively predict conversion to psychosis (Cannon et al., 2008; Gooding et al., 2005; Kwapil, 1998). The current research used a history-of-psychosis group and a psychiatric comparison group as evidence for the validity of scale scores in assessing psychosis in this population. Future research could evaluate the validity of ASI scores in samples of relatives of patients with psychosis (e.g., Compton, Chien, & Bollini, 2007) or with first-episode psychosis patients who are approximately the same age as participants in current Study 3 (Horan et al., 2008).

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Correction to Aarons et al. (2010)

In the article "Psychometric Properties and U.S. National Norms of the Evidence-Based Practice Attitude Scale (EBPAS)," by Gregory A. Aarons, Charles Glisson, Kimberly Hoagwood, Kelly Kelleher, John Landsverk, and Guy Cafri (*Psychological Assessment*, 2010, Vol. 22, No. 2, pp. 356–365), there were three errors in Table 1 on p. 360. In the last row, the row label should be "Overall EBPAS mean," $M = 2.73$, and $SD = 0.49$. The revised Table 1 appears below.

Table 1
EBPAS Subscale and Item Means, Standard Deviations, Factor Loadings, and Reliability Estimates

Subscale and total	*M*	*SD*	α	ρ′[a]	1	2	3	4	ICC	a_{wg}
1. Requirements	2.41	0.99	.91	.91	**.44**				.04	.48
Agency required	2.40	1.06			*.99*				.05	.51
Supervisor required[b]	2.33	1.05			*.88*				.03	.51
State required	2.50	1.14			*.77*				.03	.41
2. Appeal	2.91	0.68	.80	.85		**.89**			.05	.59
Makes sense	3.05	0.80				*.63*			.02	.62
Intuitively appealing[b]	2.79	0.88				*.49*			.03	.59
Colleagues happy with intervention	2.70	0.93				*.75*			.05	.61
Get enough training to use	3.10	0.88				*.80*			.04	.55
3. Openness	2.76	0.75	.84	.84			**.61**		.05	.58
Will follow a treatment manual	2.77	0.95					*.78*		.07	.55
Therapy developed by researchers	2.80	0.86					*.85*		.04	.62
Like new therapy types[b]	2.85	0.87					*.70*		.03	.59
Therapy different than usual	2.61	0.95					*.68*		.01	.56
4. Divergence	1.25	0.70	.66	.67				**.22**	.02	.45
Research-based treatments not useful	0.77	0.87						*.68*	.02	.47
Will not use manualized therapy	0.82	0.97						*.57*	.02	.36
Clinical experience more important	2.05	1.08						*.55*	.01	.49
Know better than researchers[b]	1.35	1.05						*.49*	.01	.48
Overall EBPAS mean	2.73	0.49	.76[c]						.03	.53

Note. EBPAS subscale scores are expressed as item averages. Bold denotes second-order factor loadings of each subscale on the EBPAS total scale, presented above the corresponding first-order factor loadings, which appear in italics. All factor loadings are statistically significant ($p < .05$). EBPAS = Evidence-Based Practice Attitude Scale; ρ′ = a generalization of Raykov's reliability that accounts for error covariances (Kano & Azuma, 2001); ICC = intraclass correlation; a_{wg} = average within-clinic agreement of responses.

[a] Based on second-order factor loadings and error variances. [b] Item used to scale the latent variable by fixing the factor loading to 1, with the Requirements factor used to scale the higher order factor. [c] We provide only the appropriate alpha reliability estimate for the higher order factor.

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