

The Role of Ethnic Identity, Self-Concept, and Aberrant Salience in Psychotic-Like Experiences

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Objectives: Social-cognitive models of psychosis suggest that aberrant salience and self-concept clarity are related to the development and maintenance of psychoticlike experiences (PLEs). People with high aberrant salience but low self-concept clarity tend to have the highest levels of PLEs. Ethnic identity may also be related to PLEs. The current research aimed to (a) replicate the interaction between aberrant salience and self-concept clarity in their association with PLEs in an ethnically diverse sample, (b) examine whether ethnic identity and aberrant salience interact in their association with PLEs, and (c) determine if self-concept clarity and ethnic identity independently interact with aberrant salience in their association with PLEs. **Method:** An ethnically diverse group of undergraduates ($n = 663$) completed self-report measures of aberrant salience, self-concept clarity, ethnic identity, and PLEs. **Results:** There was an interaction between aberrant salience and self-concept clarity such that people with high levels of aberrant salience and low levels of self-concept clarity had the highest levels of PLEs. Similarly, there was an interaction between aberrant salience and ethnic identity such that people with high aberrant salience but low ethnic identity had the highest PLEs. These interactions independently contributed to explaining variance in PLEs. This interaction was present for the Exploration but not Commitment subscales of ethnic identity. **Conclusion:** These results suggest that, in addition to low self-concept clarity, low ethnic identity may be a risk factor for the development of psychosis.

Keywords: Asian, perceptual aberration, magical ideation, self-concept clarity, schizotypy

PLEs are relatively common in the general population, with some studies estimating that more than 20% of the population experiences these symptoms at some point in life (Freeman, 2007). PLEs are subclinical psychosis symptoms that, like psychosis, include delusions (fixed, false beliefs) and hallucinations (perceptual experiences in the absence of stimuli; Armando et al., 2010; Chapman & Chapman, 1980; Yung et al., 2009). Research on PLEs is important for several reasons. First, PLEs may represent a liability for the future development of psychosis, and understanding PLEs may help to better identify and treat people at risk (Kwapil, 1998; Lenzenweger, 1994). Second, research on PLEs may help to understand psychosis in the absence of confounds associated with research on people with psychosis such as medication use (Neale & Oltmanns, 1980). Third, PLEs are associated with Cluster A personality disorders like schizotypal personality disorder and paranoid personality disorder (Raine, 2006; Seeber & Cadenhead, 2005). Thus, understanding PLEs may help to understand and treat these personality disorders. Most theoretical models of psychosis and PLEs can be characterized as social-cognitive models (Beck & Rector, 2005; Bell, Halligan, & Ellis, 2006; Bentall, Corcoran, Howard, Blackwood, & Kinderman, 2001;

Freeman, 2007; Garety & Freeman, 1999). Two factors that are common to nearly all of these social-cognitive models are aberrant salience and self-relevant information processing (Cicero, Becker, Martin, Docherty, & Kerns, 2013).

Aberrant salience is the incorrect assignment of salience, significance, or importance to otherwise innocuous stimuli (Kapur, 2003). Theorists have linked aberrant salience to a well-established finding that schizophrenia is related to a dysregulation of the neurotransmitter dopamine (e.g., Howes & Kapur, 2009). The role of dopamine in psychosis can be further understood in terms of the role of dopamine in healthy individuals, which suggests that dopamine regulates incentive salience (Berridge, 2007; Depue & Collins, 1999). Incentive salience refers to the “wanting” aspects of reward learning as opposed to the “liking” or hedonic aspects of reward. A dysregulation in incentive salience is consistent with phenomenological descriptions of psychosis in which people report feeling like things they have not noticed before take on a sudden importance or significance (i.e., aberrant salience; Bowers & Freedman, 1966; Møller & Husby, 2000). The hypothesized mechanism for psychosis is that people develop delusional explanations for these experiences and/or these experiences cause people to attribute internal stimuli (e.g., thoughts) to external sources (Kapur, 2003).

Aberrant salience and PLEs such as perceptual aberration and magical ideation are conceptually distinct constructs. The aberrant salience theory of psychosis suggests that aberrant salience is the underlying mechanism of psychosis. According to social-cognitive models of PLEs, when people experience aberrant salience, they engage in a search for meaning, by which a delusional explanation is selected. In the case of a hallucination, the aberrant salience

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experience is attributed to an external or internal source. In addition to conceptual differences, previous research has empirically examined the discriminant validity of Aberrant Salience Inventory (ASI) scores from similar constructs related to psychosis in several ways. As mentioned, the aberrant salience theory is firmly grounded in the dopamine dysregulation theory of psychosis. Dopamine dysregulation is also associated with behavioral activation. In one study, the ASI was found to be correlated with measures of behavioral activation, but PLE scales were not (Cicero, Kerns, & McCarthy, 2010). This suggests that aberrant salience and PLEs are distinct constructs. In a second strategy of examining discriminant validity, previous research has found that aberrant salience interacts with self-concept clarity to explain variance with PLEs as measured with the Peters Delusions Inventory. However, PLE scores did not interact with self-concept clarity to explain variance in Peters Delusion Inventory scores (Cicero et al., 2013). Finally, in a separate sample, there was a significant interaction between aberrant salience and self-concept clarity in explaining variance in an interview rating of PLEs, but there was not a significant interaction between self-report PLE scores and self-concept clarity in explaining variance in this same measure (Cicero, Docherty, Becker, Martin, & Kerns, 2015). Taken together, these results suggest that aberrant salience and PLEs are distinct constructs.

In addition to aberrant salience, a second important facet of social-cognitive models of psychosis is a disturbance in the processing of self-relevant information. Self-relevant information processing is broadly defined and includes any aspect of information processing that involves the self. In the current research, we focus on two aspects of self-relevant information processing: self-concept clarity and ethnic identity. One approach to understanding self-concept disturbances in psychosis is referred to as the dialogical psychology approach. This approach describes self-concept as multifaceted, in which a person may display different selves in different conditions or circumstances (Hermans, 1996; Meehan & MacLachlan, 2008). For example, individuals may report being students at school and parents or siblings at home, which varies for as many unique situations in which they find themselves. In this approach, the self-concept emerges as these distinct self-concepts are integrated across these circumstances. Theorists posit that the deficit in self-concept in psychosis is related to difficulties in maintaining these different “dialogues” (Lysaker & Lysaker, 2001, 2002). In other words, this deficit may manifest as low self-concept clarity.

Self-concept clarity refers to how clear, consistent, stable, and confident one’s self-concepts are (Stinson, Wood, & Doxey, 2008). Individuals with low self-concept clarity may feel like their core identities, attitudes, and personalities are changing regularly and constantly in conflict. Previous research has found that people with schizophrenia have low levels of self-concept clarity on both self-report and task measures, and that self-concept clarity is correlated with both positive and negative symptoms (Cicero, Martin, Becker, & Kerns, 2016).

In addition to self-concept clarity, one unexplored potential mechanism related to self-concept, psychosis, and PLEs is ethnic identity. Ethnic identity refers to the how individuals feel about their ethnic groups and how important or central ethnicity is to their identities (Phinney & Ong, 2007). Previous work suggests that ethnic identity is multifaceted and changes throughout time and circumstances. Although there are many conceptualizations of

ethnic identity, in the current research, we use Phinney & Alipuria’s (1990) conceptualization as measured with the Multigroup Ethnic Identity Measure-Revised (MEIM-R; Phinney & Ong, 2007). The MEIM-R is rooted in Erikson’s psychodynamic theory of ego identity development. Erikson postulated that identity involved a feeling of stability and continuity that can inform choices in one’s life (Erikson, 1950). Rather than being present automatically, identity develops over time through a process that begins in childhood, has particular salience and importance in adolescence and early adulthood, and can last well into adulthood for some people. Critically for the current research, not all individuals achieve a coherent and stable identity. Those who do not may experience difficulties with roles and commitments and be more likely to experience distress and psychopathology (Erikson, 1968).

Marcia (1980) later extended Erikson’s theory by suggesting important roles for exploration and commitment. These facets of ethnic identity are conceptually distinct, but may be applied together to understand the ethnic identity of an individual. Based on whether individuals have fully engaged in each of these processes, they may be categorized as one of four groups. People who have fully explored their identities and made appropriate commitments are said to have an “achieved identity” and tend to be the most psychologically healthy. These individuals have autonomously internalized their identities and have clear conceptualizations of the self. People who have explored their identities but not committed are in the “moratorium period.” They are thought to be actively exploring alternatives, but have only vague conceptualizations of the self, which may result in anxiety and other maladaptive symptoms (Marcia, 1993). Those who have made a commitment without having explored alternatives are in “identity foreclosure.” Individuals in this stage have typically adopted the attitudes and beliefs of their parents and are more likely to endorse authoritarian values. Finally, those who have neither explored nor committed to their identities are in a state of “identity diffusion.” Individuals with identity diffusion have the least clear conceptualization of the self. This prevents individuals from committing to values and goals while experiencing a sense of incoherence in identity. Previous research has linked identity diffusion to identity disturbances in borderline personality disorder in several studies (see Kernberg, 2005; for a review). In addition, previous work has found that identity diffusion is related to PLEs (Lenzenweger, Clarkin, Kernberg, & Foelsch, 2001).

Phinney (Phinney & Alipuria, 1990) later extended this model to ethnic identity, by developing the Multigroup Ethnic Identity Measure (MEIM). The original MEIM included components of exploration and commitment as well as ethnic behaviors. Later, the MEIM was revised to contain just exploration and commitment aspects of ethnic identity (MEIM-R; Phinney & Ong, 2007). Rather than representing exploration and commitment as categorical variables, Phinney’s model views them as continuous dimensions of ethnic identity. Previous research on the factor structure of the MEIM-R has found that the Exploration and Commitment subscales of the MEIM-R are distinct, albeit highly correlated, factors of ethnic identity.

Previous research has linked clarity of ethnic identity to self-concept clarity. For example, some research suggests that a potentially indistinguishable construct, cultural identity clarity, is central to an individual’s clarity of self-concept, due to the centrality of ethnic and cultural identity in self-concept (Taylor & Osborne, 2010;

Usborne & Taylor, 2010). Cultural identity clarity refers to the clarity of an individual's identification with a particular cultural group. People with high cultural identity clarity would have a strong commitment to their cultural identities and have in-depth knowledge of their cultural heritage as a result of exploration. Thus, it is not clear if there is a conceptual distinction between cultural identity clarity and ethnic identity. Cultural identity clarity is strongly correlated with self-concept clarity (Usborne & Taylor, 2010), but to our knowledge, previous research has not examined the relations between cultural identity clarity or ethnic identity and PLEs.

Previous research suggests that ethnic minorities are at an increased risk for psychotic disorders such as schizophrenia (e.g., Veling, 2013; Veling, Hoek, Wiersma, & Mackenbach, 2010). Although it has been suggested that strength of ethnic identity may be related to psychosis, previous results have been mixed. Some research suggests that weak ethnic identity may be related to increased risk for psychosis (Veling et al., 2010; Velthorst et al., 2012), while other studies have suggested that a strong ethnic identity may contribute to psychosis risk, particularly when other risk factors, such as racial discrimination or acculturative stress, are also present (Anglin, Lui, Espinosa, Tikhonov, & Ellman, 2016; Gonidakis et al., 2013; Reininghaus et al., 2010). Thus, the relation between ethnic identity and psychosis is not clear based on previous empirical findings. Other work has found that psychosis is related to social adversity, social defeat, and social disadvantage that are often experienced by people who are ethnic minorities (Morgan & Hutchinson, 2010; Morgan et al., 2008; Selten & Cantor-Graae, 2005; Veling, Hoek, & Mackenbach, 2008).

Social-cognitive models of psychosis suggest that when people experience aberrant salience, a number of other factors influence how these experiences are interpreted (Freeman, 2007). These other factors include self-concept, beliefs about others, beliefs about the world, and cognitive biases associated with psychosis. The aberrant salience experience triggers a search for meaning that is influenced by these other factors and an explanation for the experience is selected. This explanation may be a delusionlike explanation (e.g., that the suddenly significant stimulus is a message from the president) or a nonpsychotic explanation (e.g., that the suddenly significant stimulus is just a coincidence). In the case of a hallucination, these factors may influence whether or not the individual attributes the sensation to an external or internal source. Thus, not everyone with aberrant salience will develop a PLE as a result. Only individuals with processing styles and attitudes that predispose them to PLEs will develop these experiences.

In the current research, we focus on self-concept with a particular emphasis on self-concept clarity and ethnic identity. When people have aberrant salience experiences, the lack of a stable self-concept may interfere with the coherent selection of an explanation, resulting in a delusion-like explanation, or the attribution of internal stimuli to external sources (Freeman, 2007). In addition, the instability of low self-concept clarity may trigger searches for meaning, which, coupled with aberrant salience and reinforced by the same low self-concept clarity, may lead to increased PLEs. Thus, high aberrant salience and low self-concept clarity alone may not be sufficient for the

development of psychosis, but individuals with this combination will be the most likely to have PLEs.

In addition to theoretical arguments, the role of aberrant salience and self-concept clarity in PLEs has empirical support in undergraduate and psychometric high risk samples, using both questionnaire and interview-based measures of PLEs. Across four samples, previous research has found an interaction between aberrant salience and self-concept, such that self-concept clarity is associated with PLEs at high levels of aberrant salience, but is unassociated with PLEs at low levels of aberrant salience (Cicero et al., 2013, 2015).

Although psychosis has been linked to ethnicity in several studies, the link between ethnic identity and PLEs is not clear. Due to the importance of ethnic identity to overall identity and the compelling evidence for a link between broader identity and PLEs, it is likely that ethnic identity may play a role in the development and maintenance of PLEs. Like people with low self-concept clarity, when people with low ethnic identity exploration and low ethnic identity commitment (i.e., those with identity diffusion), their weak ethnic identity may prevent them from selecting an adaptive explanation for the experience, resulting in a PLE. We hypothesized that aberrant salience would interact with total ethnic identity, exploration, and commitment in the same manner as self-concept clarity, such that people with high levels of aberrant salience and low levels of overall ethnic identity, exploration, and commitment would have the highest PLEs. In other words, we hypothesized that ethnic identity total scores and Exploration and Commitment subscale scores would be negatively related to PLEs in people with high levels of aberrant salience. Thus, the second goal of the current research was to test whether ethnic identity interacts with aberrant salience in the same manner as self-concept clarity. The third goal was to examine whether the interaction between aberrant salience and self-concept clarity and the interaction between aberrant salience and ethnic identity each independently contributed to explain PLEs when removing shared variance. We expected to find that both ethnic identity and self-concept clarity would independently interact with aberrant salience in accounting for variance in PLEs.

The first goal of the current research was to replicate the finding that aberrant salience and self-concept clarity interact to explain variance in PLEs in this diverse sample of undergraduates. We expected to find a significant interaction between aberrant salience and self-concept clarity such that self-concept clarity is negatively associated with PLEs at high levels of aberrant salience, but unassociated with PLEs at low levels of aberrant salience. The second goal of the current research was to examine whether ethnic identity interacted with aberrant salience in the same manner as self-concept clarity. We expected to find a significant interaction between ethnic identity and aberrant salience such that ethnic identity is negatively associated with PLEs at high levels of aberrant salience and unassociated with PLEs at low levels of aberrant salience. We expected to find this interaction for the total ethnic identity score as well as the Exploration and Commitment subscales. The third goal of the current research was to test whether these interactions independently contributed to explaining variance of PLEs. We expected to find that ethnic identity and self-concept clarity would independently interact with aberrant salience to explain variance in PLEs.

Method

Participants

Participants were 663 undergraduates at a large, public, Pacific, university who participated in exchange for partial completion of a course requirement. They were recruited through the online subject pool management system, SONA. The mean age was 20.50 ($SD = 4.10$). They were 23.7% White, 27.7% Asian, 16.2% Pacific Islander, 28.0% Multiethnic, 1.6% African American, and 2.7% Hispanic. Multiethnic participants were 20.8% Asian and White, 17.4% Pacific Islander and Asian, 11.4% Pacific Islander and White, 7.2% Hispanic and White, 3.4% White and African American, 2.1% Pacific Islander and Hispanic, 1.3% Asian and African American, 0.8% Pacific Islander and African American, 0.4% Asian and Hispanic, 0.4% African American and Hispanic, and 34.7% more than two ethnicities. Participants were 73.0% female.

Materials

Aberrant salience. The ASI (Cicero et al., 2010) was used to measure aberrant salience. The ASI is a 29-item yes-no questionnaire that includes five subscales. Subscales include Increased Significance (e.g., “Do you often become fascinated by the little things around you?”), Sharpening of Senses (e.g., “Do you sometimes feel that you can hear with a greater clarity?”), Impending Understanding (e.g., “Do you sometimes feel like it is important for you to figure something out, but you’re not sure what it is?”), Heightened Emotionality (e.g., “Do your thoughts and perceptions ever come faster than can be assimilated?”), and Heightened Cognition (e.g., “Do you sometimes feel like the world is changing and you are searching for an explanation?”). Previous research has found that ASI scores are correlated with measures of PLEs and dopamine functioning. People at risk for psychosis and with a history of psychosis have elevated ASI scores (Cicero et al., 2010). ASI scores are calculated by summing the affirmative answers. In the current research, the ASI had a Cronbach’s alpha of .94. Previous work has found that a higher-order factor model in which all five of the ASI subscales loaded onto a higher-order factor fit the data just as well as a factor model in which the factors were allowed to correlate freely. This suggests that a summary score for aberrant salience can be used by summing all of the variables together (Cicero et al., 2010).

Self-concept clarity. Self-concept clarity was measured with the Self-Concept Clarity Scale (SCCS; Campbell et al., 1996). The SCCS is a 12-item scale on which participants rate statements on a scale from 1 (*Strongly Agree*) to 5 (*Strongly Disagree*; e.g., “My beliefs about myself seem to change very frequently”). The SCCS has been found to be correlated with other measures of self-concept clarity including agreement of pairs of adjectives describing the self (Campbell et al., 1996). The items were recoded such that *Strongly Agree* = 5, *Agree* = 4, *Neither Agree nor Disagree* = 3, *Disagree* = 2, and *Strongly Disagree* = 1, and the scores were summed across all 12 items. In the current research the SCCS had a Cronbach’s alpha of .89.

PLEs. PLEs were conceptualized as perceptual aberration and magical ideation. Perceptual aberration was measured with the Perceptual Aberration Scale (PerAb; Chapman, Chapman, & Rau-

lin, 1978). The PerAb is a 35-item true-false scale that measures schizophreniclike distortions in perceptions (e.g., “My hearing is sometimes so sensitive that ordinary sounds become uncomfortable”). Magical ideation was measured with the Magical Ideation Scale (MagicId; Eckblad & Chapman, 1983), a 30-item true-false scale designed to measure “beliefs in forms of causation that by conventional standards are invalid” (Eckblad & Chapman, 1983, p. 215). For example, “I have worried that people on other planets may be influencing what happens on Earth.” The PerAb and MagicId have considerable support for the reliability and validity of their scores (for a review, see Edell, 1995). Scores are calculated by summing the affirmative answers. Many previous studies examining the factor structure of PLEs have found that the PerAb and MagicId load on a single factor (e.g., Cicero & Kerns, 2010a, 2010b; Kendler & Hewitt, 1992; Kerns, 2006; Kwapil, Barrantes-Vidal, & Silvia, 2008). Thus, PerAb scores and MagicId scores appear to be a part of a larger PLE construct. As commonly done in schizotypy research (Chapman, Chapman, Kwapil, Eckblad, & Zinser, 1994) scores on PerAb and MagicId were added together to form a single Perceptual Aberration/Magical Ideation (PerMag) score. In the current research, the combined PerMag score had a Cronbach’s alpha of .91. Based on norms developed in previous research, 80 participants exceeded the cut score for high schizotypy (i.e., risk for the development of schizophrenia). Meehl (1962) originally hypothesized that 10% of the population would have schizotypy, and this claim has been supported by previous research (Blanchard, Gangestad, Brown, & Horan, 2000). This is relatively consistent with the current research in which 12.1% exceed this cut score. However, previous research has used cut scores aiming to target just the top 2.5–5%, which suggests that more people in the current research would be classified as high schizotypy than expected. The mean score of 14.10 falls within a range of means found in previous research with college students of 11.69 to 18.24 from diverse backgrounds (Chmielewski, Fernandes, Yee, & Miller, 1995). However, Asian, Pacific Islander, and Multiethnic participants tend to have higher scores on these scales than White participants (Cicero, Martin, & Krieg, 2016). Thus, the current sample including primarily Asian, Pacific Islanders, and Multiethnic participants may account for a higher than expected proportion of participants being classified as at risk.

Ethnic identity. Ethnic identity was measured using the MEIM-R (Phinney & Ong, 2007). The MEIM-R is a six-item, self-report scale designed to measure the strength of ethnic identity and includes constructs of affirmation and belonging, ethnic identity achievement, and ethnic behaviors. Participants answer on a scale of 1 (*Strongly Agree*) to 5 (*Strongly Disagree*). Items were recoded such that higher scores indicate more agreement, and answers were summed across items. The MEIM-R had good internal reliability for the total scale ($\alpha = .94$) and for the Exploration ($\alpha = .89$) and Commitment subscales ($\alpha = .92$; Phinney & Ong, 2007). Many studies have found support for the two-factor structure of Exploration and Commitment (Brown et al., 2014; Chakawa, Butler, & Shapiro, 2015; Homma, Zumbo, Saewyc, & Wong, 2014; Yoon, 2011).

Procedure

In an online study using the program Qualtrics that lasted approximately 60 min, participants completed the scales in the

following order: SCCS; ASI; the PerAb and MagicId mixed together, called "The Survey of Attitudes and Experiences"; and the MEIM-R.

Results

Zero-Order Correlations

The means, standard deviations, and Cronbach's alphas can be found in Table 1. First, we examined the zero-order correlations among self-concept clarity, ethnic identity, and all other variables in the study. Self-concept clarity was positively correlated with ethnic identity total scores and with Commitment subscale scores, but negatively correlated with aberrant salience and PLEs. There were no significant zero-order correlations between PLEs and ethnic identity total or subscale scores. Aberrant salience was positively correlated with PLEs (see Table 1).

Mean Comparisons Across Ethnicity

Next, we examined whether the mean scores of the key variables differed across ethnicities. As can be seen in Table 2, there were group differences for self-concept clarity, ethnic identity, and PLEs. Follow-up *t* tests with a Bonferroni adjustment for multiple comparisons revealed a pattern in which White participants tended to have lower scores than the Asian, Pacific Islander, and Multiracial participants. White participants had lower self-concept clarity scores than both the Asian and Multiracial groups; lower ethnic identity total and subscale scores than the Asian, Pacific Islander, and Multiracial groups; and lower PLEs than the Pacific Islander groups. There were no other group differences.

Aberrant Salience, Self-Concept Clarity, and PLEs

The first goal of the current research was to replicate the finding that aberrant salience and self-concept clarity interact to explain variance in PLEs in a racially diverse sample. To test this interaction, mean-centered ASI and SCCS scores were entered in Step 1 of a hierarchical linear regression with the sum of the PerAb

and MagicId scores (PerMag) entered as the outcome variable. The product of mean-centered ASI and SCCS was entered in Step 2. For significant interactions, we tested the simple main effects by examining the relation between self-concept clarity at 1 *SD* above the mean on ASI scores and 1 *SD* below the mean on ASI scores (Aiken & West, 1991). There was a significant interaction between aberrant salience and self-concept clarity in explaining variance in PLEs, $t(608) = 2.38, p = .018; f^2 = 0.08$ such that participants with high aberrant salience and low self-concept clarity had the highest levels of PLEs (Figure 1 and Table 3). Follow up analyses of the simple main effects showed that self-concept clarity was strongly associated with PLEs at 1 *SD* above the mean on aberrant salience ($\beta = -0.25, t(605) = 5.08, p < .001; r = .20$), but only weakly associated with PLEs at 1 *SD* below the mean on aberrant salience ($\beta = -0.09, t(605) = 2.01, p = .045; r = .08$).

Aberrant Salience, Ethnic Identity, and PLEs

The second goal of the current research was to examine whether ethnic identity would interact with aberrant salience in the same manner as self-concept clarity to explain variance in PLEs. Mean-centered ASI and MEIM-R scores were entered into Step 1 of a hierarchical linear regression with PerMag score as the outcome variable, and the product of mean-centered ASI and MEIM-R scores was entered in Step 2. As can be seen in Table 3, there was a significant interaction between aberrant salience and total ethnic identity in explaining variance in PLEs, $t(608) = -2.05, p = .040; f^2 = 0.005$ such that participants with high aberrant salience and low ethnic identity had the highest levels of PLEs. Follow up analyses of the simple main effects showed that ethnic identity was not associated with PLEs at 1 *SD* below the mean of aberrant salience ($\beta = 0.08, t(608) = 1.10, p = .27; r = .04$), but there was a trend for ethnic identity to be negatively associated with PLEs at 1 *SD* above the mean on aberrant salience ($\beta = -0.14, t(608) = -1.84, p = .066, r = .06$). Similarly, there was a significant interaction between aberrant salience and the Exploration subscale of the MEIM-R in explaining variance in PLEs, $t(608) = -2.35, p = .019$. Follow-up analyses revealed that ethnic identity exploration was negatively associated with PLEs at high levels of aberrant salience ($\beta = -0.33, t(608) = -2.257, p = .027$), but not at low levels of aberrant salience ($\beta = 0.15, t(608) = 1.0394, p = .299$). In contrast, there was not a significant interaction between aberrant salience and ethnic identity commitment in explaining variance in PLEs, $t(608) = -1.58, p = .115$.

Independent Contribution of Ethnic Identity and Self-Concept Clarity

To examine whether the interaction between aberrant salience and self-concept clarity and the interaction between aberrant salience and ethnic identity each independently contribute to explaining variance in PLEs, we specified a model in which both MEIM-R and SCCS scores moderate ASI in explaining variance in PLEs. In this model, a hierarchical regression was specified in which mean-centered aberrant salience, self-concept clarity, and ethnic identity scores were entered in Step 1 with PLEs as the dependent variable, and the product of aberrant salience and self-concept clarity and the product of aberrant salience and ethnic identity scores were entered in Step 2. Both the interaction be-

Table 1
Correlation Matrix for All Variables in the Current Research

Measures	1	2	3	4	5	6
1. Aberrant salience	.94					
2. Self-concept clarity	-.34*	.89				
3. Ethnic identity	-.03	.09*	.94			
4. Exploration	.01	.06	.96*	.89		
5. Commitment	-.07	.12*	.95*	.83*	.92	
6. Psychoticlike experiences	.52*	-.34*	-.01	-.04	.02	.91
Mean	12.51	35.64	15.51	7.88	7.62	14.10
SD	8.36	9.41	5.73	3.02	2.96	9.17

Note. Pearson correlation coefficients; numbers on the diagonal (italics) are Cronbach's α . Aberrant salience = Aberrant Salience Inventory; Self-concept clarity = Self-Concept Clarity Scale; Ethnic identity = Multigroup Ethnic Identity Measure-Revised; Exploration = Multigroup Ethnic Identity Measure-Revised Exploration subscale; Commitment = Commitment subscale of the Multigroup Ethnic Identity Measure-Revised; Psychoticlike experiences = combined Perceptual Aberration/Magical Ideation Scale.

* $p < .05$.

Table 2
Mean Comparisons Across Ethnic Groups

Measures	White	Asian	Pacific Islander	Multiracial	Black	Hispanic	<i>F</i>	η^2
Aberrant salience	11.57 (8.61)	12.23 (8.41)	13.74 (8.38)	12.63 (8.01)	12.45 (8.81)	14.72 (8.46)	1.09	.001
Self-concept clarity	33.17 ^a (9.38)	37.08 ^b (9.03)	35.97 ^{ab} (9.18)	36.16 ^b (8.93)	35.09 ^{ab} (10.77)	34.41 ^{ab} (12.58)	3.28 ^{**}	.060
Ethnic identity	11.71 ^a (5.97)	14.68 ^b (5.32)	15.43 ^b (5.39)	15.85 ^b (5.12)	13.19 ^{ab} (6.72)	17.42 ^b (6.89)	11.93 ^{***}	.089
Exploration	5.72 ^a (3.18)	7.18 ^b (2.76)	7.57 ^b (2.77)	7.87 ^b (2.71)	5.82 ^{ab} (3.60)	8.68 ^a (3.77)	11.68 ^{***}	.084
Commitment	6.03 ^a (3.04)	7.50 ^b (2.77)	7.87 ^b (2.89)	7.97 ^b (2.62)	7.36 ^{ab} (3.64)	8.74 ^a (3.38)	9.81 ^{***}	.072
Psychoticlike Experiences	12.54 ^a (8.14)	14.36 ^{ab} (9.22)	16.25 ^b (9.67)	14.12 ^{ab} (9.78)	15.55 ^{ab} (10.01)	12.00 ^{ab} (6.99)	3.30 ^{**}	.018

Note. Groups that share a superscript do not significantly differ from each other. Aberrant salience = Aberrant Salience Inventory; Self-concept clarity = Self-Concept Clarity Scale; Ethnic identity = Multigroup Ethnic Identity Measure-Revised total score; Exploration = Multigroup Ethnic Identity Measure-Revised Exploration subscale; Commitment = Commitment subscale of the Multigroup Ethnic Identity Measure-Revised; Psychoticlike experiences = Combined Perceptual Aberration/Magical Ideation Scales.

** $p < .01$. *** $p < .001$.

tween aberrant salience and self-concept clarity ($\beta = 0.01$, $t(608) = 2.537$, $p = .01$, $\Delta R^2 = 0.008$), and aberrant salience and ethnic identity ($\beta = -.02$, $t(608) = 2.207$, $p = .03$, $\Delta R^2 = 0.006$) independently contributed to explaining variance in PLEs.

Discussion

The results of the current research extend previous research in several important ways. First, the current study was the first study to find that aberrant salience interacted with self-concept clarity to explain variance in PLEs in a diverse sample including people of Asian and multiracial ancestry. Given the differences between self-concept in people of Eastern and Western descent (Heine, 2001), it is important to establish that self-concept clarity has the same relation with PLEs in these diverse groups. For example, one major difference between self-concepts in Eastern and Western self-concepts is self-construal (Markus & Kitayama, 1991). Self-construal is related to how one defines oneself. In Eastern cultures, people tend to define themselves interdependently with others. In contrast, people in Western cultures tend to define themselves independently of other people (Markus & Kitayama, 2010). Differences in self-construal have been hypothesized to be related to

different types of psychopathology including anxiety (Mak, Law, & Teng, 2011), social anxiety (Kleinknecht, Dinnel, Kleinknecht, Hiruma, & Harada, 1997; Okazaki, 1997) and depression (Nora-sakkunkit & Kalick, 2002). Differences in self-construal may also play a role in the importance of self-concept clarity to the overall identity of the individual. For example, people with interdependent self-construal may place less of an emphasis on clarity of self-concept, because self-concept clarity is conceptualized as being attributed to the individual (English & Chen, 2011; Gage, Coker, & Jobson, 2015). Thus, it is important that the current research found that self-concept clarity interacted with aberrant salience in an ethnically diverse sample that is composed of people from traditionally independent and interdependent cultures. Future research could include measures of self-construal directly to determine whether it is related to PLEs.

Second, the current research extends previous work on the role of ethnic identity and PLEs. We hypothesized that low ethnic identity, including both low exploration and low commitment, would be associated with increased PLEs in people who have high levels of aberrant salience. This interaction was present for the total MEIM scores and the Exploration subscale, but not the

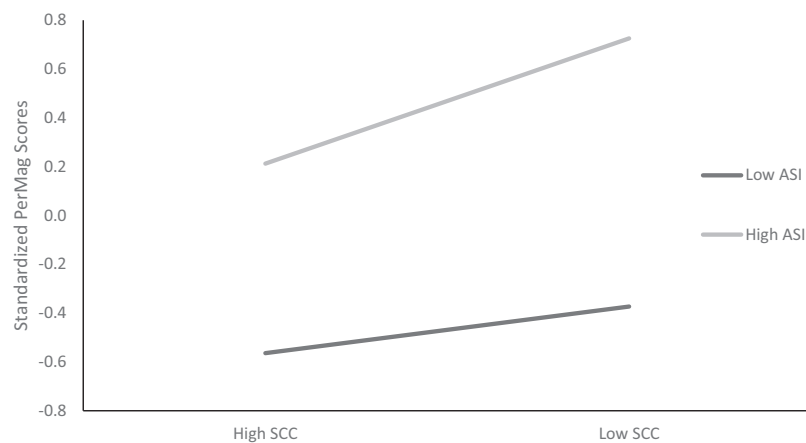


Figure 1. Standardized psychoticlike experiences as a function of aberrant salience and self-concept clarity. ASI = Aberrant Salience Inventory; SCC = self-concept clarity; PerMag = Combined Perceptual Aberration/Magical Ideation score.

Table 3

Psychotic Experiences as a Function of the Interactions Between Aberrant Salience and Self-Concept Clarity, Ethnic Identity, Exploration, and Commitment

Regression analysis		Psychoticlike experiences					
Step 1 (ΔR^2)	.32***	Step 1 (ΔR^2)	.28***	Step 1 (ΔR^2)	.28***	Step 1 (ΔR^2)	.27***
Aberrant salience (β)	.42***	Aberrant salience (β)	.80***	Aberrant salience (β)	.57***	Aberrant salience (β)	.57***
Self-concept clarity (β)	-.17*	Ethnic identity (β)	-.03	Exploration (β)	-.09	Commitment (β)	-.01
Step 2 (ΔR^2)	.03**	Step 2 (ΔR^2)	.01*	Step 2 (ΔR^2)	.01*	Step 2 (ΔR^2)	.003
Interaction (β)	-.17*	Interaction (β)	-.02*	Interaction (β)	-.03*	Interaction (β)	-.02

Note. Outcome variable in all analyses is Psychoticlike experiences (sum of the Perceptual Aberration and Magical Ideation Scales). Aberrant salience = Aberrant Salience Inventory; Self-concept clarity = Self-Concept Clarity Scale; Ethnic identity = Multigroup Ethnic Identity Measure-Revised; Exploration = Exploration subscale of the Multigroup Ethnic Identity Measure-Revised; Commitment = Commitment subscale of the Multigroup Ethnic Identity Measure-Revised; Mod = moderator (i.e., Self-concept clarity, Ethnic identity, Exploration, and Commitment).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Commitment subscale. However, all three interactions had similar and relatively small effect sizes, and the Exploration and Commitment subscales were very strongly correlated with each other ($r = .83$). Thus, it is unlikely that these divergent results represent a specificity of the interaction to exploration and not commitment, but instead are due to the effect of commitment being slightly smaller.

The hypothesis of low ethnic identity being associated with PLEs at high levels of aberrant salience is an extension of social-cognitive models of psychosis, which suggest that anomalous experiences or aberrant salience experiences interact with the way individuals view themselves and the world to generate psychosis and PLEs (Beck & Rector, 2005; Bentall et al., 2001; Freeman, 2007). These models suggest that a risk factor for psychosis or PLEs, such as aberrant salience, is necessary for psychosis to form, but aspects of self-concept shape how these symptoms are expressed. The finding that low exploration and commitment are associated with PLEs at high aberrant salience is consistent with these theories.

In addition to being consistent with social-cognitive models of PLEs, the ethnic identity results of the current research are consistent with Erikson's ego psychology theory (Erikson, 1950), on which the current measure of ethnic identity is based (Phinney & Alipuria, 1990). People with low exploration and low commitment would fit with Marcia's conceptualization of identity diffusion (Marcia, 1966). Within this model, individuals with identity diffusion would be expected to have high levels of psychopathology, especially personality disorders (Kernberg, 2005). In contrast, individuals with high exploration and high commitment would be in the identity achievement phase and would be expected to be the most psychologically healthy. Thus, it fits with these predictions that the strength of ethnic identity would be related to PLEs in such a way that people with ethnic identity diffusion would have the highest levels of PLEs while people with ethnic identity achievement would have the lowest levels of PLEs. Several previous studies have applied the theory of identity diffusion to borderline personality disorder and found that identity diffusion is higher in people with borderline personality disorder and associated with more severe symptoms (e.g., Clarkin, Lenzenweger, Yeomans, Levy, & Kernberg, 2007; Jørgensen, 2010; Sollberger et al., 2012). Moreover, identity diffusion may also be common in people with schizophrenia spectrum disorders who experience PLEs (Lenzen-

weger et al., 2001). Thus, the current results are consistent with Erikson's ego psychology theory.

An alternative hypothesis that could emerge from Erikson's ego psychology, in contrast to social-cognitive theories of PLEs, is that exploration and commitment should have a significant negative zero-order correlation with PLEs, and not be moderated by other factors. In the current work, there was not a significant zero-order correlation between ethnic identity and PLEs. However, there was a significant interaction between ethnic identity and aberrant salience in explaining variance in PLEs. Ethnic identity was not associated with PLEs at low levels of aberrant salience, but was associated with PLEs at high levels of aberrant salience. Notably, this interaction and simple main effects for ethnic identity scores are similar to the role of self-concept clarity found in the current research and in previous studies (Cicero et al., 2013, 2015), which suggests that ethnic identity may play a similar role to self-concept clarity in associating with PLEs. Like self-concept clarity, low ethnic identity alone does not appear to be enough to relate to PLEs. This is consistent with previous research on ethnic identity and PLEs, which found that ethnic identity was only associated with PLEs in the presence of other risk factors such as racial discrimination (Anglin et al., 2016). Rather than being inconsistent with Erikson's ego psychology, these results may be a nuanced interpretation of one part of his theory.

At the same time, some previous research has suggested that people in the moratorium stage (i.e., people with high exploration, but low commitment) have the highest levels of anxiety because they are actively searching for their identities, but not achieving them (Marcia, 1966). Thus, one could hypothesize that exploration should be positively correlated with PLEs in people with high aberrant salience, but that commitment should be negatively correlated with PLEs in this sample. Although previous studies have found that ethnic identity is multifaceted and that Exploration and Commitment are distinct (Phinney & Ong, 2007), the two subscales were very strongly correlated with each other in the current research. Thus, it is unclear if the Exploration and Commitment subscales could be discriminated from each other enough to test this potential prediction.

Third, the current research found that low self-concept clarity and low ethnic identity independently interact with aberrant salience to explain variance in PLEs. This is important because it suggests that the strength of ethnic identity is not simply a part of

a broader self-concept clarity construct, at least in terms of its relations with aberrant salience and PLEs. At the same time, the interaction effect between aberrant salience and ethnic identity in explaining variance in PLEs was small. This suggests that the impact of ethnic identity on PLEs may also be small and may have little clinical significance. However, future research could examine the clinical significance of this effect by following high risk individuals longitudinally and examining whether ethnic identity has predictive power of conversion to psychosis over and above clinical symptoms and self-concept clarity.

In addition to these findings, the current research also examined ethnic differences in self-concept clarity, aberrant salience, ethnic identity, and PLEs. These findings revealed a pattern in which White participants tended to have lower scores on all of the key variables than other ethnic groups. These analyses were exploratory. Future research could replicate these findings and examine the measurement invariance of these scales. For example, The MEIM-R has been shown to have configural and metric invariance, but not scalar invariance among groups (Yap et al., 2014). This suggests that the MEIM-R measures the same construct among groups, but that mean comparisons may not be appropriate. Likewise, the MagicId and PerAb have been shown to have configural and metric invariance, but not scalar invariance between groups (Cicero et al., 2016), again suggesting that mean comparisons may not be appropriate. To our knowledge, the ASI and SCCS have not been examined for measurement invariance between groups. Thus, it is unclear whether the observed differences represent actual differences in the variables of interest or are related to differences in psychometric properties of the scales among groups.

Overall, the current research provides support for social-cognitive models in which aberrant salience, self-concept clarity, and ethnic identity contribute to psychosis and PLEs as causal mechanisms. However, because the current research used exclusively correlational methods, it is not possible to determine whether these mechanisms actually *cause* psychosis. Future research could use experimental methods to determine whether experimentally manipulating the salience of ethnic identity and self-concept clarity can actually cause an increase in PLEs. Future research could follow general population, at risk, and clinical samples longitudinally to determine whether changes in aberrant salience and self-concept temporally precede changes in PLEs.

Another limitation of the current research is that participants were undergraduates. Previous research suggests that psychosis exists on a continuum and PLEs can be modeled in community or general population samples (van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009; Yung et al., 2009). Many of the scales in the current research, including the measures of PLEs, self-concept clarity, and aberrant salience, were developed for college students, and the measure of PLEs has been used in hundreds of studies with college students (see Mason, 2015; for a review). However, compared with the general population, undergraduates may have higher socioeconomic status (SES), higher IQs, and more education. This may have affected the results and limited the generalizability in two important ways. First, due to these differences, undergraduates may be more psychologically healthy than the general population, and they are certainly healthier than clinical populations exclusively composed of people with schizophrenia spectrum disorders. Second, undergraduates may

experience their ethnicities in different ways than people who do not attend college. Many of the previous studies that have linked psychosis and PLEs to ethnicity and ethnic identity have suggested that the mechanism conferring the risk is social disadvantage, social adversity, or racial discrimination (Anglin, Lighty, Greenspoon, & Ellman, 2014; Gonidakis et al., 2013; Reininghaus et al., 2010). By virtue of having higher SES, undergraduates may be less likely to have experienced these issues related to ethnic identity, or may experience them in a diminished fashion.

At the same time, recent research suggests that undergraduates have similar levels of psychopathology as compared with their non-college-attending peers (Blanco et al., 2008), which includes PLEs (Cicero, Martin, Becker, Docherty, & Kerns, 2014; Loewy, Johnson, & Cannon, 2007). Moreover, undergraduates are not immune from racial discrimination and other potential risk factors related to ethnic identity (Hwang & Goto, 2009; Solórzano, Ceja, & Yosso, 2000; Swim, Hyers, Cohen, Fitzgerald, & Bylsma, 2003). In 2015, more than two thirds of graduating high school seniors matriculated in the United States (Bureau of Labor Statistics, 2016). Forty percent of young people between the ages of 18 and 24 are currently enrolled in college, which includes over 20 million people (National Center for Education Statistics, 2016). Thus, these results may be useful to researchers and clinicians working with college students even if the results do not generalize beyond these populations. Future research could examine whether these results generalize to other populations such as people with schizophrenia, people with schizotypal personality disorder, and general population samples of people not attending college.

In addition to the use of undergraduates, one limitation of the current research is that we measured only one aspect of ethnic identity. Ethnic identity, as measured with the MEIM-R, is only one aspect of an array of experiences related to the role of ethnicity in mental health. Future research could include other measures of the experience of ethnicity as well as measures of collectivism. At the same time, another limitation of the current research is that other potential risk factors related to ethnic identity and PLEs were not measured. Since previous research found interactions between MEIM-R scores and discrimination (Anglin et al., 2016), future research could examine whether MEIM-R scores interact with other risk factors related to ethnic identity such as social adversity or acculturative stress. Another area for future research is to extend this finding beyond just self-report. Future research could use behavioral or task measures of self-concept, ethnic identity, aberrant salience, and PLEs. Future research might also include interview measures of these key constructs to improve the precision at which they are measured.

Future research could also explore whether similar constructs to strength of ethnic identity interact with aberrant salience to explain variance in PLEs in the same manner. For example, future studies could include the Multicultural Identity Integration Scale (Yampolsky, Amiot, & de la Sablonnière, 2016), the Cultural Identity Clarity Scale (Usborne & Taylor, 2010), or the Bicultural Identity Integration Scale (Benet-Martínez & Haritatos, 2005), which have all been associated with psychological adjustment. Like the MEIM-R and SCCS, these scales treat identity as an adaptive factor, as opposed to conceptualizing identity by the lack of its clarity. In our research, we hypothesized that low ethnic identity would create conflict within an individual, resulting in PLEs, which is a maladaptive psychological process. Future research

could potentially explore this question more directly by using scales geared toward assessing problems with ethnic identity, such as the Ethno-Cultural Identity Conflict Scale (Ward, Stuart, & Kus, 2011). This research could examine whether the identity conflict interacts with aberrant salience such that people with high ethno-cultural conflict and high aberrant salience had the highest levels of PLEs. Moreover, this research could examine whether the interaction between aberrant salience and ethnic identity is mediated by ethno-cultural conflict as our model would suggest.

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