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## Differential associations between schizotypy facets and emotion traits

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## ABSTRACT

Although emotional deficits in schizotypy have been reported, the exact nature of these deficits is not well understood. The goal of the current research was to further differentiate possible emotion deficits in schizotypy. In the current study, individuals with elevated social anhedonia (SocAnh;  $n = 54$ ) and elevated perceptual aberration/magical ideation (PerMag;  $n = 27$ ) were compared to control participants ( $n = 304$ ) on measures of attention to either positive or negative affect, level of anticipatory versus consummatory pleasure, and on the influence of negative mood on judgment of future risk. SocAnh was associated with decreased attention to positive emotions. At the same time, SocAnh was associated with both decreased anticipatory and decreased consummatory pleasure. In addition, in contrast to the other groups, there was no association in the SocAnh group between current negative mood and performance on a judgment task. In contrast to SocAnh, PerMag was associated with increased attention to negative emotions. Overall, these results suggest that SocAnh is associated with decreased attention to and experience of positive emotions and that PerMag is associated with increased attention to negative emotions.

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## 1. Introduction

Schizotypy is a personality organization characterized by the presence of schizophrenia-like symptoms reflecting vulnerability to develop schizophrenia (Meehl, 1962, 2001). There is evidence that schizotypy is associated with emotion deficits (Horan et al., 2008; Phillips and Seidman, 2008). At the same time, there is evidence that schizotypy is multidimensional (Kwapil et al., 2008). Furthermore, emotion traits are also multifaceted (Barrett et al., 2007), with distinctions between positive versus negative emotions (Watson et al., 1988) and between types of positive affective experience (Gard et al., 2007). The goal of the current research was to further characterize the relationship between schizotypy facets and specific emotion traits.

Psychopathologists have suggested that emotion traits might be important for schizotypy. For instance, anhedonia has often been thought to involve a diminution in emotional experience (Dowd and Barch, 2010), although the exact nature of any emotion deficits is still unclear (Germans and Kring, 2000). Research on emotion traits in anhedonia could help understand the nature of anhedonia. At the same time, it has been suggested that emotion disturbances might foster the development of peculiar beliefs and experiences (Berenbaum et al., 2003, 2006). Understanding which emotion traits are associated with peculiar beliefs and experiences might suggest how emotion factors could contribute to psychotic-like symptoms.

A potentially important distinction in emotional experience is between the initial and immediate activation of emotion versus the subsequent attention to and elaboration of emotion (Mayer and Gaschke, 1988; Mayer et al., 1991; Barrett et al., 2007). There is evidence that schizotypy is associated with the trait attention to emotions. For example, people with elevated social anhedonia (SocAnh) report decreased attention to emotions (Berenbaum et al., 2006; Kerns, 2006). In contrast, people with elevated perceptual aberration and magical ideation (PerMag) report increased attention to emotions and increased influence of emotion on judgment (Kerns, 2005; Cicero and Kerns, 2010). Given that SocAnh and PerMag measures tend to be at least moderately correlated (Kwapil et al., 2008), it is somewhat puzzling that SocAnh and PerMag could be strongly and inversely correlated with the same emotion trait. However, other emotion research has found that SocAnh tends to be most strongly associated with decreased positive affect (Horan et al., 2008). In contrast, PerMag tends to be most strongly associated with increased negative affect (Horan et al., 2008). The current research examined whether SocAnh might only be associated with decreased attention to positive emotions and whether PerMag might only be especially associated with increased attention to only negative emotions.

One measure that assesses attention to both positive and negative emotions is the Following Affective States Test (Gasper and Bramesfeld, 2006). In addition, it also separately assesses both focusing on emotions as well as ignoring emotions. Intuitively, it might be expected that focusing on a certain type of emotion might be strongly inversely correlated with ignoring that same type of emotion. For example, someone who strongly focuses on their positive emotions might be likely then to not ignore their positive emotions. However, focusing on

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and ignoring emotions are only modestly correlated at best. This suggests that there could be differences between focusing on and ignoring emotions. For example, perhaps someone who tends to experience strong but unwanted negative emotions might then tend to often focus on their negative emotions, but that same person might also then try to often ignore their negative emotions. In addition to examining attention to positive and negative emotions, the current research also explored whether schizotypy facets were differentially associated with focusing on versus ignoring their emotions.

If schizotypy is associated with differences in attention to emotions compared to a control group, then it might be expected that the relationship between one's current mood and one's judgment might be altered in schizotypy. The affect-as-information theory (e.g., Schwarz and Clore, 1983, 1988, 1996; Clore et al., 2001) suggests that when making judgments, people often attend to their feelings, as if asking, "How do I feel about it?", before making a decision (Schwarz and Clore, 1988). Thus, if PerMag is associated with increased attention to negative emotions, then potentially current negative mood should have a larger effect on the judgments of people with extremely elevated PerMag. Hence, the current research also examined the relationship between current mood and performance of a judgment task (Gasper and Clore, 2000).

In addition to examining attention to positive versus negative emotions, the current research also examined whether schizotypy facets were distinctly associated with either of two facets of positive emotion, anticipatory and consummatory pleasure (Gard et al., 2006). Gard et al. (2007) reported that people with schizophrenia have deficits in anticipatory pleasure, but not in consummatory pleasure, measured by the Temporal Experience of Pleasure Scale (TEPS; Gard et al., 2006). They also reported that clinician ratings of anhedonia (i.e. SANS Anhedonia–Asociality subscale) were correlated with participants' anticipatory, but not consummatory pleasure ratings. The current research examined whether SocAnh in people at-risk for schizophrenia-spectrum disorders might only be associated with decreased anticipatory pleasure. In contrast, if SocAnh is associated with a general decrease in positive emotion, then SocAnh might be associated with both decreased anticipatory and consummatory pleasure.

## 2. Method

### 2.1. Participants

We used an extreme-groups approach (Preacher et al., 2005) that compared people with elevated social anhedonia (SocAnh) and people with elevated levels of perceptual aberration and magical ideation (PerMag) to a control group. Participants were undergraduates from a large Midwestern university. They were recruited from a larger group of students ( $n=1901$ ) who completed a subset of items from psychosis-proneness scales as part of a departmental mass testing—15 items from the Revised Social Anhedonia Scale (Eckblad et al., 1982), seven items from the Perceptual Aberration Scale (Chapman et al., 1978), and eight items from the Magical Ideation Scale (Eckblad and Chapman, 1983). Individuals who scored 1.96 standard deviations above or 0.5 standard deviations below the same-sex gender mean were recruited to the laboratory. In the laboratory, participants completed the full version of the psychosis-proneness scales and inclusion in the current study was based on their scores on the full version using cut-offs scores obtained from a previous large-sample study (Kerns and Berenbaum, 2000).

There were 54 people in the social anhedonia (SocAnh) group (35 women, mean age = 18.75, S.D. = 1.65, 77% Caucasian) who scored above 1.96 standard deviations above the same-sex mean on the Revised Social Anhedonia Scale. There were 27 people in the perceptual aberration–magical ideation (PerMag) group (16 women, mean age = 18.4, S.D. = 0.58, 85% Caucasian) who scored above 1.96 standard deviations above the same-sex mean on the Perceptual Aberration or Magical Ideation scales or had a summed, standardized score from the Perceptual Aberration and Magical Ideation scales above 3.0. People who qualified for both the SocAnh and PerMag group were excluded. There were 304 people in the control group (180 women, mean age = 18.7, S.D. = 1.02, 76% Caucasian) who scored less than 0.5 standard deviations below the mean on the Revised Social Anhedonia Scale, Perceptual Aberration Scale, and Magical Ideation Scale. There were no significant between group differences on any demographic variable. People who didn't meet criteria for the SocAnh, PerMag, or control group were excluded from all analyses ( $n=282$ ).

### 2.2. Measures

#### 2.2.1. Psychosis-proneness scales

Participants completed the Revised Social Anhedonia Scale (RSAS; Eckblad et al., 1982), which is designed to measure lack of relationships and lack of pleasure from relationships (e.g., "Having close friends is not as important as many people say."). They also completed the Perceptual Aberration Scale (PerAb; Chapman et al., 1978) and the Magical Ideation Scale (MagicId; Eckblad and Chapman, 1983), which are designed to measure psychotic-like distortions and unusual beliefs respectively. In addition, participants completed the Chapman Infrequency Scale (Chapman and Chapman, 1983) to screen for careless or invalid responses. Based on previous research (Chapman et al., 1994), those who endorsed 3 or more items on this 13-item, true-false scale were eliminated from analyses. The 118-items from these four scales were presented to participants in random order. Individuals who score high on RSAS are at an increased risk of developing a schizophrenia-spectrum disorder (Gooding et al., 2005; Kwapil, 1998), and those who score high on the PerAb and MagicId have an increased risk for developing psychosis (Chapman et al., 1994).

#### 2.2.2. Following Affective States Test (Gasper and Bramesfeld, 2006)

To measure attention to positive and negative emotions, participants completed the FAST. The FAST is comprised of four subscales: Focus on Positive Feelings, Ignore Positive Feelings, Focus on Negative Feelings, and Ignore Negative Feelings. Gasper and Bramesfeld (2006) reported that all four of the FAST subscales show convergent validity with a number of different published emotion trait measures. For example, the Focus on Positive Feeling subscale was positively associated with the Emotional Attention subscale of the Trait Meta Mood Scale (TMMS); in contrast, the Ignore Positive and Ignore Negative subscales were negatively associated with the Emotional Attention subscale of the TMMS (Salovey et al., 1995). In the current study, internal consistencies were comparable to those reported by Gasper and Bramesfeld (2006), ranging from  $\alpha=0.64$  to 0.68. One person in the SocAnh group and two people in the control group did not complete the FAST due to equipment failure. To determine whether there were differences in attention to emotions between the SocAnh, PerMag, and control groups, two composite scores were calculated. A composite score of "attention to positive emotion" was calculated by subtracting the standardized scores from the Ignore Positive subscale from the Focus on Positive subscale, and a composite score of "attention to negative emotion" was calculated by subtracting the standardized scores from the Ignore Negative subscale from the Focus on Negative subscale. We also explored whether for either positive or negative emotions there were any group differences either for only focusing on emotion or for only ignoring emotion.

#### 2.2.3. Judgment of risk likelihood task (Gasper and Clore, 2000)

To assess the extent to which participants thought negative events were going to take place in the future, we used the judgment of risk likelihood task developed by Gasper and Clore (2000). On this task, participants were presented with four negative events (e.g., "How likely is it that something valuable will be stolen this year?") and asked to rate the likelihood of each event happening to them compared to the average college student on an 11-point scale (0 = extremely unlikely to 10 = extremely likely). Cronbach's  $\alpha$  for the judgment of risk measure was 0.73. Two people in the SocAnh group and two people in the control group did not complete the judgment of risk task due to equipment failure.

#### 2.2.4. Mood

To assess current mood and its effect on judgment of risk likelihood, participants were shown eight positively and eight negatively valenced words with both high (e.g., elated, anger) and low arousal levels (e.g. serene, sad). They were asked, "How are you feeling right now?" and were given a 5-point scale (1 = not at all to 5 = very strongly) to respond. These words have been used frequently in previous research to assess self-reported mood (e.g., Barrett, 2004). Cronbach's  $\alpha$  for the positive mood items was 0.77 and for the negative mood items was 0.80. To avoid bringing participants' attention to their moods before making judgments of risk, the mood ratings were given after the judgment of risk task.

#### 2.2.5. Temporal Experience of Pleasure Scale (Gard et al., 2006)

The TEPS is designed to measure individual differences in anticipatory (e.g., "I get so excited the night before a major holiday, I can hardly sleep.") and consummatory pleasure (e.g., "A hot cup of coffee or tea on a cold morning is very satisfying to me."). Participants are instructed to decide how true each statement is for them in general using a 6-point Likert scale (1 = very false for me to 6 = very true for me).

Gard et al. (2006) reported that both subscales show convergent validity because they were significantly correlated with scores on the Behavioral Activation Scale (Carver and White, 1994) and Fawcett–Clark Pleasure Scale (Fawcett et al., 1983). In addition, the researchers reported that the Anticipatory subscale, but not the Consummatory subscale, was associated with the Questionnaire upon Mental Imagery Scale (Betts, 1909), which assesses the ability to imagine certain situations. Also, they reported that the Consummatory subscale, but not the Anticipatory subscale, was associated with the Positive Affect scale of the PANAS. We found internal consistencies comparable to those reported by Gard et al. (2006) for the anticipatory (Cronbach's  $\alpha=0.66$ ) and consummatory (Cronbach's  $\alpha=0.63$ ) subscales.

2.3. Procedure

After informed consent was obtained, participants completed the psychosis proneness scales, FAST, TEPS, the judgment of risk task, and the mood rating. All measures were administered through E-prime computer software ("Eprime," 2006). This research project was approved by the University's institutional review board, and all procedures were consistent with the principles of ethical conduct of human research.

3. Results

3.1. Attention to positive emotion

First, we examined whether the groups differed in attention to positive emotions. Results revealed that the SocAnh group reported that they paid significantly less attention to positive emotions compared to the control group,  $t(353) = 4.34, p < 0.01, r = 0.23$ . As can be seen in Table 1 and in Fig. 1, the SocAnh group reported both decreased focusing on and increased ignoring of positive emotions. In contrast, there were no significant differences between the PerMag and control groups in attention to positive emotion,  $t(327) = 1.2, p = 0.23, r = 0.07$ , or between the SocAnh and PerMag groups,  $t(78) = 1.5, p = 0.14, r = 0.18$ . Thus, as hypothesized, social anhedonia is uniquely associated with decreased attention to positive emotion.

3.2. Attention to negative emotion

Next, we examined whether the groups differed on attention to negative emotions. Results revealed that the PerMag group reported that they paid significantly more attention to negative emotions compared to the control group,  $t(327) = 4.23, p < 0.01, r = 0.23$ . As can be seen in Table 1 and in Fig. 2, the PerMag group reported both increased focusing on and decreased ignoring of negative emotions. In addition, the PerMag group also reported paying more attention to negative emotions than the SocAnh group,  $t(78) = 2.05, p < 0.05, r = 0.23$ . Thus, as hypothesized, the PerMag group reported that they paid significantly more attention to negative emotions. In addition, the SocAnh group also reported paying significantly more attention to negative emotions than the control group,  $t(353) = 2.21, p < 0.05, r = 0.12$ . However, as discussed below, this was moderated by an interaction with attention type (focusing versus ignoring).

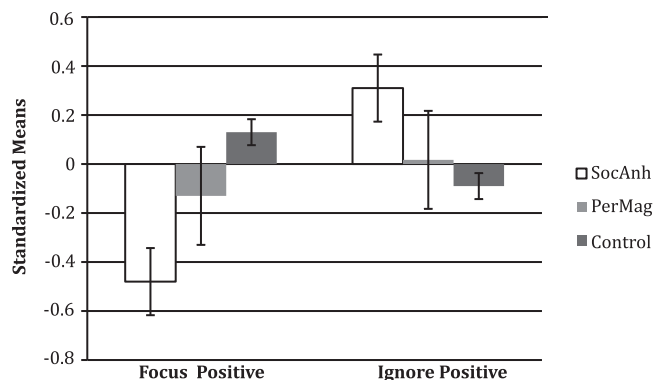
3.3. Focusing vs. ignoring negative emotion

Overall for attention to negative emotions, in a three (group: SocAnh vs. PerMag vs. Control) by two (attention type: focus vs. ignore) ANOVA, there was a significant group by attention type interaction,  $F(2, 379) = 10.16, p < 0.01$ . As can be seen in Table 1 and Fig. 2, the SocAnh group reported focusing on negative emotions more than the control group,  $t(353) = 5.04, p < 0.001, r = 0.26, r = 0.26$ . In addition, the SocAnh and

**Table 1**  
Means and standard deviations for questionnaires and task measures.

	SocAnh	PerMag	Control
<b>FAST</b>			
Focus on positive	20.18 (3.75)***	21.44 (5.51)	22.47 (3.43)
Ignore positive	10.09 (3.79)**	9.03 (4.66)	8.61 (3.75)
Focus on negative	17.41 (5.30)***	18.03 (4.62)***	13.87 (4.60)
Ignore negative	17.33 (4.54)	14.62 (3.13)*	16.35 (4.40)
<b>TEPS</b>			
Anticipatory pleasure	48.48 (7.95)*	51.44 (6.55)	50.69 (5.87)
Consummatory Pleasure	37.72 (5.55)*	40.96 (5.19)	39.46 (5.5)
Risk likelihood rating	20.33 (7.43) **	20.89 (7.00) *	17.56 (6.95)
Negative Mood	10.98 (9.60) *	16.44 (8.93) ***	8.54 (6.64)
Positive Mood	14.96 (7.44) **	16.19 (7.98)	18.05 (7.65)

Note: significant differences compared to control group: \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . FAST = Following Affective States Test. TEPS = Temporal Experience of Pleasure Scale.



**Fig. 1.** Standardized means for ratings of Focusing on Positive Feelings and Ignoring Positive Feelings for the SocAnh, PerMag, and Control groups.

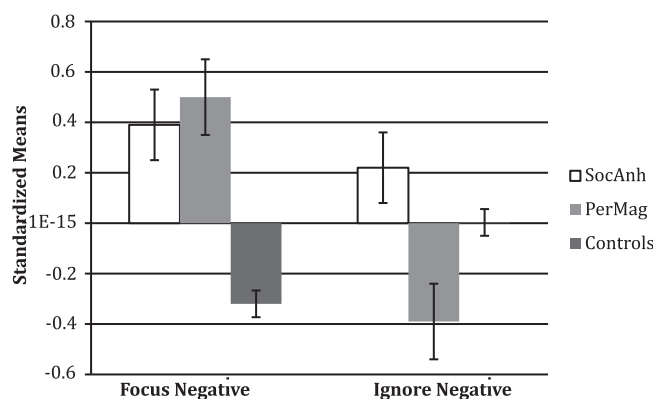
PerMag groups did not differ on focusing on negative emotions,  $t(78) = 0.52, p = 0.61, r = 0.06$ . In contrast, the SocAnh group also tended to report more ignoring of negative emotions, as the SocAnh group differing significantly from the PerMag group,  $t(78) = 2.78, p < 0.01, r = 0.30$ , and with a slight trend for a difference with controls,  $t(353) = 1.49, p = 0.14, r = 0.08$ . Hence, these results suggest that SocAnh is not always associated with increased attention to emotions, as they report increased focusing on but also increased ignoring of negative emotions.

3.4. Judgment of risk ratings

We next examined whether the groups differed on the extent that current negative mood was correlated with judgment. Before reporting these correlations, we first present data on how the groups performed on the judgment of risk likelihood task. As can be seen in Table 1, both the SocAnh,  $t(352) = 2.68, p < 0.01, r = 0.14$ , and PerMag,  $t(327) = 2.37, p < 0.05, r = 0.13$ , groups had significantly higher risk likelihood ratings than the control group. There was no significant difference between risk ratings of the SocAnh and PerMag groups,  $t(77) = 0.28, p = 0.78, r = 0.03$ .

3.5. Current mood

Next, we examined whether the groups differed in current mood. For current positive mood, as can be seen in Table 1, the SocAnh group had significantly lower levels of positive mood than the control group,  $t(352) = 2.75, p < 0.01, r = 0.15$ . In contrast, there were no significant differences between the PerMag and control groups,  $t(327) = 1.21, p = 0.23, r = 0.07$ , or the SocAnh and PerMag groups,  $t(77) = 0.71, p = 0.48, r = 0.08$ , on levels of positive mood. For current negative mood, the PerMag group had significantly higher levels of negative



**Fig. 2.** Standardized means for ratings of Focusing on Negative Feelings and Ignoring Negative Feelings for the SocAnh, PerMag, and Control groups.



mood than both the control group,  $t(327) = 5.75$ ,  $p < 0.001$ ,  $r = 0.3$ , and the SocAnh group,  $t(77) = 2.51$ ,  $p < 0.05$ ,  $r = 0.28$ . In addition, the SocAnh group also had significantly higher levels of negative mood than the control group,  $t(352) = 2.27$ ,  $p < 0.05$ ,  $r = 0.12$ .

### 3.6. Correlation between judgment and negative mood

We next examined whether the groups differed in the extent to which judgments of risk likelihood of future negative events were correlated with current negative mood. As expected, for the control group, there was a significant relationship between judgment of risk and current negative mood ( $r = 0.38$ ,  $p < 0.001$ ), as people thought risky events were more likely when they were in a negative mood. A similar relationship was also found in the PerMag group ( $r = 0.42$ ,  $p < 0.05$ ). In contrast, for the SocAnh group, there was no correlation between judgment of risk and current negative mood ( $r = 0.00$ ,  $p = 0.99$ ).

Next, we examined whether the size of the association between judgment of risk of negative events and negative mood differed significantly between groups (Hays, 1988). Results revealed there were significant differences between the size of the correlations between the SocAnh and control groups,  $Z = 2.64$ ,  $p < 0.01$ , and between the SocAnh and PerMag groups,  $Z = 1.81$ ,  $p < 0.05$ . In contrast, there was no difference between the size of the correlations between the PerMag and control groups,  $Z = 0.22$ ,  $p = 0.41$ . Thus, the relationship between current negative mood and risk judgment was significantly smaller for the SocAnh group than for the PerMag or control groups (in addition, as expected based on previous research (Gasper and Clore, 2000), current positive mood was unassociated with judgment of risk in all three groups, SocAnh  $r = 0.14$ ; PerMag  $r = -0.14$ ; Controls  $r = -0.02$ ; note that, if anything, in the SocAnh group more positive emotion is associated with greater assessment of risk).

### 3.7. Anticipatory versus consummatory pleasure

Next, we examined whether there were any group differences in anticipatory vs. consummatory pleasure. First, in a 3 (Group: SocAnh vs. PerMag vs. Control)  $\times$  2 (Subscale: Anticipatory vs. Consummatory subscale) repeated measures ANOVA, there was a significant main effect for group,  $F(2, 382) = 4.76$ ,  $p < 0.01$ , but not a significant Group  $\times$  subscale interaction,  $F(2, 382) = 0.25$ ,  $p = 0.78$ . As can be seen in Table 1, further analyses revealed that the SocAnh group significantly differed from controls on both the anticipatory,  $t(356) = 2.4$ ,  $p < 0.05$ ,  $r = 0.13$ , and consummatory,  $t(356) = 2.14$ ,  $p < 0.05$ ,  $r = 0.11$ , subscales. Also, as can be seen in Table 1, there was a trend for the SocAnh group to differ from the PerMag group on the anticipatory subscale,  $t(79) = 1.67$ ,  $p = 0.10$ ,  $r = 0.18$ , but the SocAnh group did differ significantly from the PerMag group on the consummatory subscale,  $t(79) = 2.53$ ,  $p < 0.05$ ,  $r = 0.27$ . There were no significant differences between the PerMag group and control group on either the anticipatory,  $t(329) = 0.63$ ,  $p = 0.53$ ,  $r = 0.03$ , or consummatory subscales,  $t(329) = 1.36$ ,  $p = 0.17$ ,  $r = 0.07$ .

Given group differences in types of pleasure, we next examined whether group differences in pleasure could statistically account for group differences in attention to emotions. We conducted regression analyses with both anticipatory and consummatory pleasure scales as predictors of each FAST subscale. In these analyses, all previously reported group differences on the FAST were still significant. This suggests that group differences in attention to emotions may not be accounted for by the experience of pleasure.

In addition, given group differences in current mood, we also re-ran all analyses using multiple regression in which we entered both current positive and current negative mood as predictors of each FAST subscale as well as each TEPS subscale. In these analyses, all previously reported group differences were still significant. This suggests that group

differences in attention to emotions and the experience of pleasure may not be accounted for by current mood.

## 4. Discussion

The current research found that different schizotypy facets, SocAnh and PerMag, were associated with distinct emotion traits. Overall, the results for SocAnh are consistent with the view that SocAnh is associated with a decrease in attention to and experience of positive emotions. In contrast, the results for PerMag seem consistent with the view that PerMag is associated with increased attention to negative emotions. These results could have implications for the nature of these schizotypy facets.

Overall, in this study, SocAnh seemed to be associated with a decrease in attention to and experience of positive emotions. For example, SocAnh was associated with both decreased focusing on and increased ignoring of positive emotions. At the same time SocAnh was associated with decreases in both anticipatory and consummatory pleasure. The current research seems consistent with some previous research suggesting a general diminution in positive emotional experience in people with elevated SocAnh. For example, SocAnh is associated with decreased positive emotion for both social and non-social situations (Kerns et al., 2008). In addition, a decrease in positive emotional experience has been associated with anhedonia in people with schizophrenia (Horan et al., 2010). Hence, overall, SocAnh appears to be related to a general decrease in positive emotional experience.

In contrast, the current results are somewhat inconsistent with a previous schizophrenia study, which found that SocAnh was only significantly associated with anticipatory and not consummatory pleasure (Gard et al., 2007). However, that study did report that both anticipatory and consummatory pleasure were associated with physical anhedonia in people with schizophrenia. Future research on SocAnh in people at-risk for schizophrenia-spectrum disorders could examine other measures of anticipatory and consummatory pleasure, including task measures (Treadway et al., 2009) or experience sampling measures (Brown et al., 2007; Gard, et al., 2007).

Another issue for future research is to examine whether decreased attention to positive emotions plays a role in decreased experience of positive emotion in anhedonia. Previous research has found that affect intensity is in part related to attentive cognitive processing that enhances and sustains the intensity of experienced emotion (Barrett et al., 2007; Larsen et al., 1996). This suggests the possibility that decreased attention to positive emotions could in part contribute to decreased positive affect in people with anhedonia. Interestingly, a recent schizophrenia ERP study found evidence of intact early processing of positive stimuli but impaired late processing (Horan et al., 2010). This impaired late processing could reflect a diminished attention to positive emotional experience. Future research could examine whether decreased attention to positive emotional experiences contributes to decreased self-reported positive affect in anhedonia and potentially whether increasing attention to positive emotional experiences decreases anhedonia.

There were some other potentially interesting findings suggesting that SocAnh might be associated with emotion traits beyond simply a diminution of positive emotional experience. For instance, although SocAnh was associated with increased focusing on negative emotions, SocAnh also tended to be associated with increased ignoring of negative emotions. In addition, people with elevated SocAnh unexpectedly did not exhibit the expected correlation between current negative mood and judgment. It is possible that this finding can be accounted for by the fact the SocAnh was also associated with ignoring negative emotions more than PerMag (as well as a trend for differences between SocAnh and control participants). Overall, these results suggest that SocAnh might also in some instances be associated with decreased attention to negative emotions and that

SocAnh might be associated with some emotion traits beyond only decreased positive emotion. Broader emotion deficits in anhedonia is also consistent with some previous research suggesting poor controlled processing of both positive and negative emotions in SocAnh (Martin and Kerns, 2010). In addition, this is also consistent with some evidence that anhedonia in schizophrenia is associated with poor sustained representation of both positive and negative emotional information (Heerey and Gold, 2007). One issue for future research is to continue to examine whether SocAnh is associated with decreased attention to and decreased influence of both positive and negative emotions and whether this might contribute to social deficits in SocAnh.

In the current study, in contrast to finding that SocAnh was associated with decreased attention to positive emotions, PerMag was associated with increased attention to negative emotions. Previous research has reported that PerMag is associated with increased attention to emotions (Kerns, 2005; Berenbaum et al., 2006) and with reporting being overly influenced by their emotions (Cicero and Kerns, 2010). However, previous research did not distinguish between attention to positive versus attention to negative emotions. In the current study, we found that PerMag was specifically associated with increased attention to only negative emotions. Hence, the current research suggests that people with PerMag might have unusual beliefs and have unusual experiences in part because they pay too much attention to their negative emotions. This is consistent with some previous research finding that increased attention to emotions is associated with increased magical thinking (Berenbaum et al., 2009).

Although we found that PerMag was associated with increased attention to negative emotions, we also found that both the PerMag and control groups exhibited the same significant relationship between current negative mood and their judgment. Hence, in this study, although PerMag participants reported paying more attention to negative information than control participants, both PerMag and control participants appeared to be equally influenced by negative affect. This suggests that although PerMag participants think they pay more attention to negative emotions than control participants, their self-report for attention to negative emotions may be somewhat inaccurate. Such discrepancies between people's beliefs assessed on trait measures with their actual on-line emotional experience have been found in multiple research areas (Robinson and Clore, 2002). However, perhaps the PerMag group actually does tend to pay more attention to negative emotions than controls, but this was not evident in the current study on the judgment of risk likelihood task because negative mood might have a large effect in control participants on that task. Previous research has found that when people believe their negative emotions may not be informative, then they are likely to remove the influence of negative emotion on their judgment (Gasper and Clore, 1998; Gasper and Clore, 2000). Therefore, future research could examine whether PerMag participants exhibit an increased influence of negative mood on judgment in situations where control participants are likely to remove the suspected spurious influence of negative emotion.

There are several limitations to the current research. All of our measures relied upon self-report. We did attempt to examine emotion functioning in ways other than only relying on questionnaires that assess emotion traits as we examined the relationship between current mood and judgment. Nevertheless, even those measures involved self-report (e.g., self-reported risk likelihood). It will be important for future research on these emotion traits in schizotypy to incorporate behavioral and physiological measures. Another limitation is that our participants were college students and were not a clinically identified sample. Previous research has found that college students with extremely elevated SocAnh and PerMag are at increased risk of schizophrenia-spectrum disorders and psychotic disorders (Chapman et al., 1994; Kwapil, 1998; Gooding et al., 2005).

However, it will be important for future research to examine emotion traits in people with schizophrenia-spectrum disorders.

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