Coping as a mediator of stress and psychotic-like experiences

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Abstract

Background—There is evidence that individuals along the whole psychosis continuum have increased responsiveness to stress; however, coping responses to stressors have not been extensively explored in subthreshold psychotic symptoms.

Methods—In 454 undergraduates, psychotic-like experiences (PLEs) were evaluated using the positive items of the Prodromal Questionnaire. Perceived stress and traumatic life events were assessed using the Life Events Checklist and Perceived Stress Scale, and coping was measured using the Brief COPE. We also examined whether different coping styles mediated the relationship between perceived stress and PLEs, as well as whether different coping styles mediated the relationship between traumatic life events and PLEs.

Results—Both number of traumatic life events and current level of perceived stress were significantly associated with PLEs. These relationships were both mediated by higher levels of maladaptive coping.

Conclusions—Results have the potential to inform treatment strategies, as well as inform targets for exploration in longitudinal studies of those at risk for psychosis.

Keywords

psychosis; psychosocial stress; coping; trauma; psychotic-like experiences

1.1 Introduction

Psychosocial stress has been found to be a risk factor for various mental disorders, including psychotic disorders (1). There is evidence that individuals at greater risk for developing psychosis are more likely to have experienced traumatic life events in childhood (2), as well as to perceive events to be more stressful (3). Indeed, both cross-sectional studies and prospective studies suggest that childhood traumatic life events have a dose-dependent link to psychotic symptoms (4, 5). There also is some evidence that increased perceived stress

may contribute to this relationship in those at risk for psychosis (6) and those exhibiting subthreshold psychotic symptoms (3, 7). Though perceived stress and traumatic life events have long been studied in relation to psychosis risk (4, 8, 9), few studies have explored the potential contributions of coping to this association.

Coping is an action-oriented or intrapsychic effort to manage, master, tolerate, reduce, or minimize stressful events or a stressful environment (10). Categorizing coping responses is complex and varies with the measure used. Folkman and Lazarus (11) described coping strategies as either problem-focused (also called task-focused): attempting to change the individual's circumstances, or emotion-focused: attempting to change the individual's response to the circumstances. Many questionnaire-based assessments of coping rely on the distinction between approach and avoidance coping (12); however, categorizing avoidance as a coping style is problematic, as it can also be viewed in certain instances as a failure to cope but still indicates an acknowledgment and a type of response to a stressor (13). A more common approach in psychosis studies utilizes a distinction between adaptive and maladaptive coping styles, which incorporates many of the previous definitions of coping (15–17). Drug and alcohol use, self-blame, and denial fall into the maladaptive category, which are also captured by avoidance coping, while the adaptive category includes approach coping styles such as active coping, planning, and the use of emotional and instrumental support (12, 15). Studies have found that schizophrenia outpatients employ maladaptive coping styles significantly more often than non-psychiatric counterparts (16). Specifically, individuals with schizophrenia have been found to employ more emotion-focused coping and less task-focused coping (18, 19), significantly more distraction-based coping and worrying, as well as significantly less emotional expression and comforting cognition (e.g., self-encouragement and soothing thoughts) than non-psychiatric controls (20). Cumulatively, these findings suggest that schizophrenia patients rely on coping strategies that are either maladaptive and/or have the potential of exacerbating distress.

Few studies have been conducted on coping among individuals at ultra-high-risk (UHR) for developing psychosis, but in these few studies, UHR subjects were found to cope in similar ways to patients diagnosed with schizophrenia. UHR subjects used significantly fewer task-oriented and social diversion (i.e., engaging with others) coping methods and engaged in far more emotion-oriented coping compared to a non-clinical comparison group (21). Another study found that not only did UHR subjects use active coping styles less frequently than non-psychiatric controls, but also used active coping strategies significantly less than first episode schizophrenia patients (22). Additionally, several studies found that UHR individuals tend to engage in less adaptive coping and more maladaptive coping than non-psychiatric controls (17, 22, 23).

While only the most frequent and distressing psychotic symptoms are considered diagnostically relevant (24), limiting inclusion to only those individuals with diagnosable symptoms may in fact underrepresent the contribution of subthreshold psychotic symptoms to the liability for psychotic disorders (25). PLEs have been linked to risk for developing a psychotic disorder in the general population (24). Additionally, the risk factors for subclinical and clinical psychosis overlap significantly (26). Only one study has examined coping in the context of a continuum of psychosis, using subthreshold psychotic experiences

as a spectrum of psychotic risk. Lin and colleagues (27) found that emotion-focused coping was bi-directionally related to increased experience of subthreshold psychotic symptoms in a longitudinal study of a non-clinical sample of adolescents, such that more emotion-focused coping predicted increased PLEs, and increased PLEs predicted higher levels of emotion-focused coping. However, this study did not take into account perceived stress or trauma as additional variables that may affect symptoms, TLEs and perceived stress may actually be driving these relationships, as we have previously found both factors to influence PLEs (7). The aim of the present study was to determine the role of different coping strategies (adaptive/maladaptive) in mediating the relationship between TLEs and PLEs, and perceived stress and PLEs. We hypothesized that experiencing a greater number of TLEs and higher levels of perceived stress will be associated with significantly higher PLEs, as found in our previous studies (7). Additionally, we hypothesized that these relationships will be mediated by the use of maladaptive coping styles, but not adaptive coping styles. While our primary hypotheses focus on mediation, moderation will also be tested.

2.1 Methods

2.1.1 Participants and procedures

Four hundred and fifty four undergraduate students at Temple University participated and were recruited from an online subject pool as a requirement from various interdisciplinary courses. Questionnaires were completed online in the laboratory, with lab staff available to provide instructions and answer questions. The study was approved by the university's Institutional Review Board and all participants provided informed consent.

2.1.2 Instruments

PLEs were evaluated using the positive scale (45 items) of the full length, 92-item **Prodromal Questionnaire** (28). Focusing on the last month, individuals are asked whether they have experienced symptoms while not under the influence of drugs, alcohol, or medications. The variable of interest was the total number of PLEs endorsed. Endorsing 8 or more PLEs has been validated against the Structured Interview for Prodromal Syndromes (SIPS) in predicting psychosis risk syndromes with 90% sensitivity and 49% specificity (28, 29).

The **Perceived Stress Scale** (30) was used to evaluate perceived stress among participants. The scale measures perceived global stress, with a focus on the predictability and controllability of events in the past month (30). This scale has high concurrent and predictive validity with physical and psychiatric outcomes, moderate internal and test-retest reliability, and significant correlations with physiological measurements of stress (31–33). Significant differences in PSS scores have been found in ultra-high risk for psychosis groups vs. non-psychiatric controls, and has been correlated with additional perceived stress measurements, such as experience sampling methods (34, 35). The PSS sum score was used.

The **Life Events Checklist** (LEC) assessed traumatic life event (TLE) exposure (36). For each life event listed, subjects respond if the TLE: 1 (*happened to me*), 2 (*witnessed it*), 3 (*learned about it*), 4 (*not sure*) 5 (*does not apply*). Responses of 3, 4 and 5 were excluded,

consistent with previous studies and better test–retest reliability, as more proximal events are more closely associated with PTSD risk (36, 37). Responses of "1" for the first 16 TLEs were included as well as responses of "2" for scenarios where "1" was not a viable option or less likely to be related to PTSD outcome, e.g., sudden, violent death; sudden, unexpected death of someone close to you; and serious injury, harm, or death you caused to someone else (38, See Table 1). The "other" TLEs item was excluded from analyses, as additional information about the TLEs was not available, and thus has not been validated. The LEC has been shown to be adequate when evaluating consistency with the actual occurrence of events, has demonstrated good convergent validity, and has moderate temporal stability (36). Total number of TLEs was examined.

Coping was assessed using the **Brief COPE**, a shortened version of the COPE questionnaire, which has been validated previously in non-psychiatric samples (39). Items were separated into seven types of coping comprised of two items each, each representing different ways of coping with stressful experiences utilized overall in the past six-month period. Two subscales were coded as targets for analysis: adaptive and maladaptive styles of coping, which have been previously used in the psychosis and UHR literature (15, 17). Adaptive coping included active coping, planning, use of emotional support, use of instrumental support, positive reframing, religion, and humor items. Maladaptive coping included venting, denial, substance use, behavioral disengagement, self-distraction, and self-blame items (see Table 2). Overall coping with daily stressors was the target of the measure.

2.1.3 Data Analysis

First, the PLEs variable was examined for normality by examining skewness and kurtosis values and through visual inspection of the data. Second, bivariate analyses using Pearsons correlations were conducted to determine 1. Whether the main independent variables (LEC and PSS) were associated with both the potential mediators (coping variables) and dependent variable (PLEs) and 2. Whether the potential mediators (coping variables) were associated with the main dependent variable (PLEs) (40). Only variables that met conditions 1 and 2 were examined in mediation models. Age and gender were tested at potential covariates by determining if they were associated with the main independent and dependent variables. Hayes' (41) PROCESS macro for SPSS was used for mediation analyses. The indirect effect was tested using a bootstrap estimation approach with 5000 samples. Mediation and moderation were conducted on total number of PLEs continuously. Significant mediation was determined by the 95% CI not including zero, as p values are not associated with this test (42).

3.1 Results

Demographic characteristics of the sample are presented in Table 3. No significant differences were found relating to gender ($p = .10$–$.52$), and age related only to number of TLEs ($p = .05$), but no other factors ($p = .11$–$.65$); therefore, these variables were not controlled for in analyses. Bivariate correlations were found to be significant between number of PLEs endorsed and perceived stress ($r = .49$, $p < .01$), total number of TLEs ($r = .28$, $p < .01$), use of adaptive coping styles ($r = .11$, $p = .02$), and use of maladaptive coping

styles ($r= .48$, $p< .01$). Maladaptive coping was significantly related to total number of TLEs ($r= .21$, $p< .01$) and perceived stress ($r= .57$, $p< .01$). Adaptive coping was significantly related to TLEs ($r= .11$, $p= .03$), but not to perceived stress ($r= −.05$, $p= .25$).

As Table 4 indicates, indirect bootstrapping results indicated that maladaptive coping mediated the relationship between perceived stress and PLEs, as well as the relationship between number of TLEs and PLEs. Adaptive coping did not mediate the relationship between TLEs and PLEs, as indicated by the CI including zero (See Table 4).

Maladaptive coping did not moderate the relationship between PLEs and TLEs [$F_{(1,454)}= .22$, $p= .64$] or perceived stress [$F_{(1,454)}= .02$, $p= .88$]. Similarly, adaptive coping also did not moderate the relationship between PLEs and TLEs [$F_{(1,454)}= .26$, $p= .61$] or perceived stress [$F_{(1,454)}= 1.51$, $p= .22$].

4.1 Discussion

This is the first study, to our knowledge, to determine that the relationship between stress (TLEs and perceived stress) and PLEs was mediated by increases in maladaptive coping. The significant mediation models indicate that while trauma exposure and perceived stress are related to PLEs, it is the use of maladaptive coping styles that may be driving greater risk for psychotic symptomology. Additionally, neither adaptive nor maladaptive coping moderated the relationship between stress (TLEs and perceived stress) and PLEs. These findings are consistent with previous studies that have found individuals experiencing positive psychotic symptomology to be more likely to use maladaptive coping styles (17, 22, 23, 27). However, the present study is the first to directly test whether coping mediates the previously found relationships between stress, traumatic life events in those experiencing subthreshold psychotic symptoms. These relationships should be examined in other samples with active psychotic symptoms, including UHR individuals and schizophrenia patients, to confirm findings.

Contrary to hypotheses, increases in adaptive coping were significantly associated with increases in PLEs and increases in TLEs, although these associations were weak, both only accounting for .01% of the variance. While higher levels of adaptive coping were related to both TLEs and PLEs, this form of coping did not mediate the relationship between these two variables. These findings suggest that some individuals use adaptive coping strategies in conjunction with both TLEs and PLEs; however, these strategies do not appear to contribute to the TLEs-PLEs relationship. Our findings suggest that PLEs may act as stressful events to be coped with, leading to increases in adaptive coping following these experiences. Further, perceived stress and adaptive coping were not related, indicating that adaptive coping likely does not play a role in the relation between perceived stress and PLEs.

It is possible that what has previously been seen as greater perceived stress in individuals at risk for psychosis may actually indicate a decreased ability to activate or mobilize coping strategies. This could be due to either an inability to cope, poor forms of coping, or cognitive deficits leading individuals to misidentify stressful situations (e.g., evaluate neutral situations as stressful). Failure to properly cope with stressful life events due to increases in

perceived stress may contribute to or magnify the salience of stressors. Thus, the perception of a stressor becomes critical (12, 22). Events are filtered through the appraisals an individual applies to them (30) and are coped with based on that appraisal. If an objectively low-stress event appraised as high-stress, the individual may fail to cope, or employ a less effective coping strategy, perhaps due to a perceived lack of capacity to cope.

In this study, we confirm our previous findings connecting TLEs and perceived stress to subthreshold positive psychotic symptoms (7), and extend them to include coping style. Our sample is unlike most in ultra-high risk for psychosis research in that it is large and non-treatment-seeking, affording us more external validity for the general population. Though we examine an undergraduate population, which may lower generalizability, our university's population is quite large and diverse both demographically and socioeconomically, and is likely a valid subset of their same-age peers from the population at large.

A limitation to consider is the cross-sectional nature of the study, which relied on self-report, as well as retrospection (e.g., Life Events Checklist). This limits conclusions we can draw regarding directionality and causality of the relationships presented. Additionally, while no gender differences were found, it is worth noting that there were far more women than men in this sample. Although the amount of men was large enough to detect any potential differences, future studies should aim to have an even gender distribution. Further, while we assessed the primary coping strategies used in previous psychosis studies, evidence suggest that coping strategies may be more or less effective depending on the circumstance or context in which it is used (14). Future studies are necessary to examine real-time coping strategies among in psychosis spectrum populations, to further clarify our findings. Finally, though our non-clinical sample increases generalizability to the general population, it limits generalizability to clinical samples, and may contain more false-positives than would exist in other UHR samples (43).

Future studies should assess stress appraisals of individual TLEs, as well as which coping style is used in response to each individual TLE, rather than an estimated general coping style in individuals experiencing subthreshold positive psychotic symptoms. Additionally, other potentially relevant variables such as resilience should be examined, as resilience has been found to relate closely to coping (44).

4.1.1. Conclusions

Our findings have potentially important clinical implications for treatment, as treatments for psychosis could work to increase the use of adaptive coping styles, such as planning and positive reframing, and attempt to reduce maladaptive coping styles. Cognitive Behavioral Therapy (CBT) may be beneficial in those experiencing PLEs, especially when the treatment includes a component on teaching of coping strategies.

Acknowledgments

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Biographies

Arielle Ered is a second year graduate student in the clinical psychology and neuroscience doctoral programs at Temple University. Arielle received her BA from UCLA and worked in UCLA's department of psychiatry prior to starting at Temple, investigating recent-onset schizophrenia. Arielle's research interests include stress and emotion-cognition interactions in early and subthreshold psychosis.

Lauren E. Gibson, Ed.M., M.A. is a sixth year graduate student in the clinical program at Temple University completing her internship at the Maryland VA Health Care System. Before starting at Temple, she worked in the psychiatry department of Boston's Beth Israel Deaconess Medical Center and Harvard Medical School investigating schizophrenia spectrum disorders, particularly the early risk phase. She received her bachelor's degree from Ursinus College in psychology and Spanish, and master's degree from Harvard University in human development and psychology. Lauren is interested in the influence trauma has on major psychopathology, as well as risk factors for early psychosis.

Seth D. Maxwell is the Research Coordinator for Dr. Lauren Ellman's lab in the Department of Psychology at Temple University, where he contributes to studies of risk factors for major psychopathology. He is pursuing a Master's in Public Health with a concentration in Applied Biostatistics at Temple's College of Public Health.

Shanna Cooper, M.A. is currently a fifth year doctoral candidate in the clinical psychology and neuroscience programs at Temple University. Prior to her graduate work, she worked on a number of projects investigating schizophrenia spectrum disorders at the San Francisco VA and the University of California, San Francisco. She received her bachelor's degree from the University of Minnesota and her first master's degree from San Francisco State University. Shanna incorporates behavioral, cognitive, and neuroimaging methods to explore the relations between cognition and emotion in those at risk for a psychotic disorder.

Lauren M. Ellman, Ph.D. is an Associate Professor in the Clinical area of the Psychology department at Temple University. Generally, Dr. Ellman's research focuses on two vulnerable periods of development in the prediction of schizophrenia and related disorders, the prenatal period and adolescence/young adulthood. This research is aimed at determining risk factors for schizophrenia in order to ultimately identify those who are vulnerable to developing the disorder and intervene at early stages to prevent the onset of serious psychiatric symptoms.

Table 1

Life Events Checklist items

Life Events Checklist
1. Natural disaster
2. Fire or explosion
3. Transportation accident
4. Serious accident at work, home, or during recreational activity
5. Exposure to toxic substance
6. Physical assault
7. Assault with a weapon
8. Sexual assault
9. Other unwanted or uncomfortable sexual experience
10. Combat or exposure to a war-zone (in the military or as a civilian)
11. Captivity
12. Life-threatening illness or injury
13. Severe human suffering
14. Sudden violent death
15. Sudden accidental death
16. Serious injury, harm, or death you caused to someone else
17. Other very stressful event or experience

Table 2

Brief COPE items for adaptive and maladaptive coping

Adaptive Coping	Maladaptive Coping
Active Coping	Venting
Planning	Denial
Use of Emotional Support	Substance Use
Use of Instrumental Support	Behavioral Disengagement
Positive Reframing	Self-distraction
Acceptance	Self-blame
Religion	
Humor	

Table 3

Demographics and clinical characteristics

	Overall sample (n=454)
Male, n (%)	103 (23%)
Age (years), mean (SD) [range]	20.04 (2.31) [18–34]
Ethnicity, Hispanic n (%)	38 (8%)
Race n (%)	
American Indian/Alaska Native	2 (1%)
Asian	78 (17%)
Native Hawaiian/Pacific Islander	3 (1%)
Black/African American	86 (19%)
White	261 (57%)
Biracial	24 (5%)
Total APPS score, mean (SD) [range]	9.82 (7.56) [0–44]
Total distressing APPS score, mean (SD) [range]	4.17 (5.20) [0–28]
Total PSS score, mean (SD) [range]	25.33 (8.64) [2–55]
Total number of traumas endorsed, mean (SD) [range]	1.98 (1.78) [0–10]
Adaptive Coping, mean (SD) [range]	4.71 (1.14) [2–7.75]
Maladaptive Coping, mean (SD) [range]	3.46 (0.90) [2–6.5]

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Table 4

Indirect effect of stress and attenuated positive psychotic symptoms (APPS) through coping

Number of attenuated positive psychotic symptoms (APPS) endorsed (n=454)					
IV	*Mediator*	*Effect*	*SE*	*LLCI*	*ULCI*
Number of TLEs	Maladaptive Coping	.3809	.1054	.1903	.6092
Perceived Stress	Maladaptive Coping	.1454	.0291	.0901	.2046
Number of TLEs	Adaptive Coping	.0363	.0274	−.0003	.1135