Perceived stress and psychosis: The effect of perceived stress on psychotic-like experiences in a community sample of adolescents

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Aims: Psychotic-like experiences (PLE) are sub-threshold, non-clinical forms of psychosis which can place an individual at greater risk of development of a psychotic disorder. Subtypes of PLE have also been shown to exist (bizarre experiences, persecutory ideation, perceptual abnormalities and magical thinking). Perceived stress relates to how two individuals may deal with the same objectively stressful event in different ways. The objective of our study was to investigate the extent to which perceived stress is associated with PLE in a community sample of adolescents, whether certain subtypes of PLE correlate more with perceived stress than others and to explore the role of depression with these associations.

Methods: A total of 655 students completed the community assessment of psychic experiences (CAPE) and perceived stress scale (PSS). Pearson’s correlation was used to investigate the relationship between PSS and CAPE and also between perceived stress and the four subtypes of PLE. Regression then explored the effect of perceived stress on PLE when accounting for depressive symptomatology.

Results: Positive correlation was found between PSS and total CAPE ($r = 0.405, P = 0.000$). Positive significant correlation was also found between PSS and each subtype of PLE, with persecutory ideation correlating the strongest and magical thinking the least. Perceived stress was significantly associated with PLE even after adjusting for depression.

Conclusions: We recommend that more regular screening of perceived stress in adolescent populations could lead to earlier recognition of PLE. Early treatment has shown to reduce rates of transition to psychosis, and so could benefit our adolescent community in the future.

KEYWORDS
CAPE, perceived stress, psychosis, psychotic-like experiences

1 | INTRODUCTION

Psychotic-like experiences (PLE) are a sub-threshold, non-clinical forms of psychosis that occur in non-help-seeking, community populations. These differ from experiences found in groups in clinical settings, which have been previously called “At Risk Mental State,” “Ultra High Risk” or “Clinical High Risk” groups (Cannon et al., 2008; Fusar-Poli et al., 2013; Nelson et al., 2013).

PLEs have been shown to exist on a continuum with more serious, clinically relevant psychotic disorders such as schizophrenia (Kelleher & Cannon, 2011; Myers, 2011; Wiesjahn, Brabban, Jung, Gebauer, & Lincoln, 2014; Yung et al., 2009). Evidence for this is that they share many socioenvironmental risk factors such as psychological stress (Collip et al., 2013) and low socio-economic status (Binbay et al., 2011). PLEs are also clinically important in their own right as they can be distressing, and if managed incorrectly, can progress into clinical psychosis (Chapman & Chapman, 1980; Cougnard et al., 2007;
Hanssen, Bak, Bijl, Vollebergh, & Os, 2005; Kelleher & Cannon, 2011; Van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009; Verdoux & van Os, 2002). For example, the 2012 meta-analysis by Kaymaz et al., found that the yearly risk of conversion to clinical psychosis was 3.5 times higher in those who had PLEs than in those who had not.

Research by Yung et al., 2009 found that four different subtypes of PLE exist. These are bizarre experiences, persecutory ideation, perceptual abnormalities, and magical thinking. This is similar to findings by other authors who found similar subtypes (Armando et al., 2010; Barragan, Laurens, Navarro, & Obiols, 2011; Wigman et al., 2009). The study found strong correlations between depressive symptoms and bizarre experiences, persecutory ideation and perceptual abnormalities, but much weaker association between depressive symptoms and magical thinking. It is also possible that not all PLEs confer the same risk for development of clinical psychotic disorders.

Psychological stress is a risk factor for both schizophrenia and PLEs (Campbell & Morrison, 2007; Green, Girshkin, Teroganova, & Quíde, 2014). It is defined as the extent to which an individual’s life situations outweigh their ability to cope (Lazarus, 1966). This encompasses two aspects: appraisal and coping. Perceived stress is a more recent concept which takes into account how two people may appraise and cope with the same objectively stressful event in different ways.

A possible pathway for the relationship between perceived stress and PLEs may be a direct one. That is, perceived stress may lead to the development or worsening of PLEs, or PLEs may be themselves stressful. It is also possible that the association may be mediated by other factors such as depression. Depression is associated with perceived stress (Lee, 2012) and has been shown to be a significant risk factor for both PLEs and clinical psychosis (Armando et al., 2010; Barragan et al., 2011; Yung et al., 2007). It may therefore confound any relationship between perceived stress and psychosis. Further mediators may include other objectively stressful factors such as low socioeconomic status, anxiety, poor physical health, or childhood trauma, all of which may increase perceived stress.

Thus, the aim of this study was to investigate the extent to which perceived stress is a risk factor for PLE, as well as any possible differences in correlation between PLE subtypes. We also aimed to investigate the role of depression as a possible confounding variable in this relationship.

We hypothesised that:

- There will be correlation between perceived stress and PLE.
- Correlation will be higher between perceived stress and bizarre experiences, perceptual abnormalities and persecutory ideation than for magical thinking.
- Depression will be associated with perceived stress and PLE.

2 | METHODS

2.1 | Sample

In the western metropolitan region of Melbourne, 60 secondary schools were asked for permission to sample their Year 10 students. Each student provided written assent to participate in the study, a parent or guardian was then asked for written consent to allow their child to take part.

Questionnaire items were taken by the students in classrooms with a specialist supervisor present to answer any queries. Questionnaires were then collected and entered manually to SPSS. The study was approved by the research and ethics committees at the University of Melbourne, Victorian Department of Education and the Catholic Education Office.

2.2 | Instruments

PLE were assessed using the Community Assessment of Psychic Experiences (CAPE). This is a 42-item self-report questionnaire that measures PLE on two scales over the past 12 months: frequency (1 = never, 4 = nearly always) and associated distress (1 = not distressed, 4 = very distressed). Factor loading was used in a study by Yung et al. (2009) to identify which items of the CAPE contributed to each subtype of PLE. These results were used to identify the subtypes of CAPE in this report.

The Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983) was used to measure perceived stress levels within the sample. This is a 14-item self-report questionnaire that measures subjective evaluation of stressful events and situations over the past month. It consists of seven positively and seven negatively phrased items. The total score is reached by reversing the negative items (0 = 4, 1 = 3, 2 = 2, etc) and summing the responses to each item. Items 4, 5, 6, 7, 9, 10 and 13 are the positive items.

Depressive symptomatology was measured using the Centre of Epidemiological Studies Depression Scale (CES-D Scale) (Radloff, 1977). This is a short, 20-item self-report instrument that measures depressive symptoms over the past week. Participants are asked to rate how often they felt each item on a scale between rarely/not at all (less than 1 day per week), to nearly always (5 to 7 days a week). Total scores range from 0 to 60, with higher scores indicating more symptoms.

2.3 | Data Analysis

SPSS version 22 for Windows (SPSS Inc., Chicago, Illinois) was used to conduct analyses. Once the data had been screened for missing values, continuous variables were tested for normality. Any skewed variables were log-transformed.

Descriptive statistics were used to find the mean, median, SD and inter-quartile ranges for both age and sex of the data set. Pearson’s correlation was used to assess the relationship between total scores on the CAPE and PSS and between each subtype of PLE. Linear regression was then used to assess this relationship when accounting for depressive symptomatology.

3 | RESULTS

A total of 655 students returned questionnaires, a response rate of 74.9%. A total of 614 of the participants returned the CAPE and 607 candidates returned the PSS. Although some questionnaires were
4 | DISCUSSION

As hypothesised, we found significant correlation between perceived stress and PLE, and each of the subtypes of PLE. Also consistent with our hypothesis, magical thinking was less strongly associated with perceived stress than the other PLE subtypes. Perceived stress was significantly associated with PLE even after adjusting for depression.

Previous studies have shown that certain subtypes of PLE, specifically persecutory ideation, have been associated with high levels of distress, depressive symptoms and poor functioning (Armando et al., 2010; Wigman et al., 2012; Yung et al., 2009). Consistent with this, we found that, although there was significantly positive correlation between all subtypes of PLE and perceived stress, Persecutory ideation showed the strongest correlation. Magical thinking correlated the least of the four subtypes. This is also true of other studies, where it has correlated the least with negative/depressive symptoms (Armando et al., 2010; Yung et al., 2009). The similarity in trend for the correlation between the subtypes of PLE with perceived stress and negative/depressive symptoms suggests that while we have shown that perceived stress is a significant risk factor for PLE, depression may play a close role in this relationship.

| Model | Unstandardized coefficients | B | SE | t     | Sig.  |
|-------|-----------------------------|---|----|------|------|
|       | Constant                    | 21.216 | 0.671 | 31.628 | 0.000 |
|       | Total PSS                   | 0.108 | 0.036 | 3.020 | 0.003 |
|       | Natural log CES-D           | 2.407 | 0.332 | 7.260 | 0.000 |

Abbreviation: CAPE, community assessment of psychic experiences; CES-D, centre of epidemiological studies depression; PSS, perceived stress scale.

4.1 | Limitations

Due to the cross-sectional nature of our data we cannot be certain whether it is perceived stress that is a risk factor for PLE or vice versa. To examine this a longitudinal study would need to be done. Furthermore, all students in our cohort were from the same western metropolitan region of Melbourne, a region known to be relatively socially disadvantaged. Low social class and high numbers of stressful life events have been shown to correlate with increased scores on the PSS (Cohen et al., 1983) and so this may lead to higher PSS and CAPE scores than the general population. However other studies, such as that by Laurens, Hobbs, Sunderland, Green, and Mould (2012), found similar prevalence of PLE for their cohort that came from a range of socio-economic backgrounds, pointing to the role of perceived stress rather than psychological stress as a risk factor for PLE.

Another limitation of our study is that we did not include measures of other potentially confounding factors that may influence the association between PLE and perceived stress, such as anxiety, poor physical health or childhood trauma.

A further limitation is that both the CAPE and PSS were self-report items. This, combined with the low age of the cohort (mean age = 16.6 years) means that despite the specialist who was on hand in each classroom to answer queries there may have been some misinterpretation of items leading to overestimation of PLE. Other instruments for measuring PLE, such as the community assessment of at-risk mental state (Yung, Buckley, et al., 2005; Yung, Yung, et al., 2005) could have been used instead to counter this issue; however, this requires a trained interviewer, making it impractical in this case. Additionally, there is evidence of good correlation between the CAPE and interview rated PLE (Konings, Bak, Hanßsen, Van Os, & Krabben-dam, 2006).

4.2 | Significance for clinical practice

Despite the limitations of our study, the results have implication for clinical practice. There is current debate over the extent to which PLEs in the non-help seeking community sample predispose one to development of clinical psychosis. A study by Hanssen et al., 2005 found that 8% of those who experienced PLE had gone on to develop clinical psychosis 2 years later. Yung et al. (2009), speculated that displaying signs of certain subtypes of PLE may put one at greater risk of transition to clinical illness than others, namely bizarre experiences, persecutory ideation and to a lesser extent perceptual abnormalities, while magical thinking may infer no increased risk. Furthermore, risk of developing psychosis in “Ultra High Risk” or “Clinical High Risk” groups has been shown to be as high as 34.9% at 10 year follow-up (Fusar-Poli et al., 2013; Nelson et al., 2013).
In such clinical samples it has been demonstrated that cognitive therapies given to those displaying sub-threshold psychotic experiences significantly reduced the probability of being prescribed antipsychotic drugs over the next 3 years (Morrison et al., 2007) and also reduced the development of a psychotic disorder (Hutton & Taylor, 2014; Preti & Cella, 2010; van der Gaag et al., 2013). Such findings are relevant to PLEs due to the psychosis continuum within which they exist (Kelleher & Cannon, 2011; Myers, 2011; Wiesjahn et al., 2014; Yung et al., 2009).

If then, it is beneficial to treat sub-threshold psychotic experiences in clinical groups as early as possible to prevent progression to psychosis, and given the finding of correlation between PLE and perceived stress in this paper, should we not be doing more to screen for highly stressed adolescents in the population to identify PLE before they become clinically significant? If adolescents with high levels of perceived stress were to be acknowledged, recognition of PLE could be made at an earlier stage and treatment with cognitive therapies could be initiated before transition occurs in those displaying bizarre experiences, persecutory ideation or perceptual abnormalities. This has the potential to lead to lower levels of clinical psychosis in the population in the future. Of course, it would be wrong to over treat those who do not need it. Therefore it would be important to distinguish magical thinking from the other subtypes as these potentially healthy variants may never require treatment.

5 | CONCLUSION

The results of our study could prove clinically important in the future. Monitoring of perceived stress levels within the adolescent population is a possibility. There is the potential that, should adolescents be asked to complete the PSS at set points of development, for example, as part of the school curriculum, we could see much better outcomes for those displaying PLE through earlier onset of treatment for those who require it.

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