

Psychotic-like experiences in help-seeking adolescents

Catone, Gennaro; Marotta, Roberta; Pisano, Simone; Lennox, Belinda; Carotenuto, Marco; Gritti, Antonella; Pascotto, Antonio; Broome, Matthew R

DOI:

[10.1177/0020764017733765](https://doi.org/10.1177/0020764017733765)

[10.1177/0020764017733765](https://doi.org/10.1177/0020764017733765)

License:

None: All rights reserved

Document Version

Peer reviewed version

Citation for published version (Harvard):

Catone, G, Marotta, R, Pisano, S, Lennox, B, Carotenuto, M, Gritti, A, Pascotto, A & Broome, MR 2017, 'Psychotic-like experiences in help-seeking adolescents: Dimensional exploration and association with different forms of bullying victimization – A developmental social psychiatry perspective', *International Journal of Social Psychiatry*, vol. 63, no. 8, pp. 752-762. <https://doi.org/10.1177/0020764017733765>, <https://doi.org/10.1177/0020764017733765>

[Link to publication on Research at Birmingham portal](#)

Publisher Rights Statement:

Final Version of Record available at: <http://dx.doi.org/10.1177/0020764017733765>

General rights

Unless a licence is specified above, all rights (including copyright and moral rights) in this document are retained by the authors and/or the copyright holders. The express permission of the copyright holder must be obtained for any use of this material other than for purposes permitted by law.

- Users may freely distribute the URL that is used to identify this publication.
- Users may download and/or print one copy of the publication from the University of Birmingham research portal for the purpose of private study or non-commercial research.
- User may use extracts from the document in line with the concept of 'fair dealing' under the Copyright, Designs and Patents Act 1988 (?)
- Users may not further distribute the material nor use it for the purposes of commercial gain.

Where a licence is displayed above, please note the terms and conditions of the licence govern your use of this document.

When citing, please reference the published version.

Take down policy

While the University of Birmingham exercises care and attention in making items available there are rare occasions when an item has been uploaded in error or has been deemed to be commercially or otherwise sensitive.

If you believe that this is the case for this document, please contact UBIRA@lists.bham.ac.uk providing details and we will remove access to the work immediately and investigate.

PSYCHOTIC LIKE EXPERIENCES IN HELP SEEKING ADOLESCENTS: DIMENSIONAL EXPLORATION AND ASSOCIATION WITH DIFFERENT FORMS OF BULLYING VICTIMIZATION. A *DEVELOPMENTAL SOCIAL PSYCHIATRY* PERSPECTIVE.

Gennaro Catone^{a,b*}, Roberta Marotta^{a*}, Simone Pisano^{a*}, Belinda Lennox^{c,d}, Marco Carotenuto^a, Antonella Gritti^b, Antonio Pascotto^{a**}, Matthew R Broome^{e**}.

a Department of Mental and Physical Health and Preventive Medicine, Campania University “Luigi Vanvitelli” Naples – Italy

b Faculty of Educational Science, Suor Orsola Benicasa University – Naples – Italy

c Department of Psychiatry, University of Oxford – Oxford - UK

d Oxford Health NHS Foundation Trust, Oxford, UK

e Institute for Mental Health, University of Birmingham, Birmingham, UK

Corresponding author: Dott. Gennaro Catone, child and adolescent psychiatrist. catoge@libero.it, Via Pansini 5 80100 Naples – Italy

- *Authors contributed equally to the paper
- ** Joint last authors

INTRODUCTION

Psychotic symptoms experienced by a part of the healthy population without frank disorder are named Psychotic Like Experiences (PLEs). The prevalence of PLEs was found to be 7.2 % in the general population and in adolescence it is higher (Kelleher & Cannon, 2011; Linscott & van Os, 2013). PLEs have been described as “continuous” and dimensional, and hence in opposition to traditional categorical means of structuring symptoms and disorders (Daneluzzo et al., 2009).

Several dimensions of psychotic experiences have been examined in community samples such as paranoia and hallucinations and thoughts problems (Bebbington et al., 2013; Dominguez, Wichers, Lieb, Wittchen, & van Os, 2011; Gritti et al., 2014; Sharifi, Sajjadifar, & Amini, 2008); recently this has been extended also for other psychotic dimensions (i.e. negative symptoms, cognitive disorganization) (Taylor, Freeman, & Ronald, 2016). Several studies have demonstrated that PLEs experienced in childhood or adolescence may increase the risk of developing psychotic disorders subsequently (Poulton et al., 2000; Wong, Freeman, & Hughes, 2014). PLEs have been described largely as transitional and time limited but 20% of people could experience persistence and 7% could develop psychotic disorder (Kaymaz et al., 2012). In adolescence, specific PLEs have been found to be distinct, separated in two components (positive *vs* negative), and quite heterogeneous in type and combination displayed (Ronald et al., 2014). Several studies demonstrated that PLEs tend to decrease with age (Bartels-Velthuis, van de Willige, Jenner, van Os, & Wiersma, 2011; De Loore et al., 2011; Dominguez et al., 2011; Mackie, Castellanos-Ryan, & Conrod, 2011); in fact self-report psychotic experiences have been found higher in childhood (9 – 12 years) than adolescence (13 – 18 years) and adult age (Kelleher et al., 2012). Many studies reported that females were more likely to experience psychotic symptoms, especially paranoid ideation, conceptual disorganization and perceptual anomalies (Armando et al., 2010; Brandizzi et al., 2014). Moreover PLEs have been largely described such as associated with anxiety and depression symptoms (Johns et al., 2004; Varghese et al., 2011).

Socio-environmental factors are associated with the extended psychotic phenotype, for example stress exposure has been associated with the persistence of PLEs (Wigman et al., 2012). Bullying is a specific stressful event that has been repeatedly associated with mental health complaints (Y. S. Kim, Koh, & Leventhal, 2005; Zwierzyńska, Wolke, & Lereya, 2013) and has been repeatedly associated with the onset of psychotic continuum manifestations in a social/psychological informed perspective (G. Catone et al., 2015; Moffa et al., 2017). In fact, a social event with the feature of stress may lead to the development of psychotic symptoms.

Bullying is defined a repeated aggressive behavior against a victim who cannot easily defend himself. Different types of bullying were described: direct (verbal, physical) and indirect (social, covert) (Espelage & Swearer, 2004). Direct bullying such as physical acts (punching, kicking, shoving) and verbal acts (insults, threats, intimidation) have been largely studied; whereas indirect forms were less investigated. Covert victimization refers to social manipulation and includes exclusion of peers from a group or activity, spreading rumors or incites someone to bullying towards a victim (Marini, Dane, Bosacki, & Ylc, 2006). Large epidemiological surveys have examined the reduction of physical aggression over time with the possibility that aggression was replaced by covert form of victimizations. Moreover, physical aggression was classically associated with males, whereas relational forms of aggression were attributed mainly to females (Juvonen & Graham, 2014).

Studying PLEs could add information to the understanding of psychosis, and PLEs are more evident in children and adolescents. Several prior studies have addressed this in community samples (Yung et al., 2009). However, few studies have focused on a clinical young sample. Brandizzi et al. described attenuated PLEs in 171 help - seeking adolescents. They found four dimensions of psychotic symptoms ("Conceptual Disorganization and Suspiciousness", "Perceptual Abnormalities", "Bizarre Experiences", and "Magical Ideation) alternately age and / or psychopathology and functioning related (Brandizzi et al., 2014); while Kline et al. studied the

association between PLEs and clinical distress in sixty-six adolescents and young adults receiving mental health services (Kline et al., 2014). Ames et al. found an high prevalence of PLEs in a sample of forty children (age 8 - 14), referred to a community Child and Adolescent Mental Health Service; PLEs were associated with several factors such as: emotional problems, cognitive biases and negative life events (Ames et al., 2014). In Italian samples, Pontillo et al. found that children aged 8-17 years with PLEs had more impairment in global, social and role functioning (Pontillo, De Luca, Pucciari, Vicari, & Armando, 2016). Armando et al. examined 1882 undergraduate students, they found different subtype of PLEs in this sample (bizarre experiences, perceptual abnormalities, persecutory ideas and grandiosity) associated with depression, distress and low functioning (Armando et al., 2010) and in another study the same research group associated a specific psychotic experiences with socio – demographic variables or alcohol and drug misuse (Armando et al., 2012). Furthermore, to the best of our knowledge, no studies have attempted to investigate which kind of bullying (direct or indirect) is most pertinent to the risk of developing specific PLEs (positive, negative), a potentially important step on the path to frank disorder and impairment of function. Findings may have important theoretical and clinical/preventive implication.

Therefore, the first aim of this study was to accurately describe PLEs in a clinical sample of help seeking adolescents and the second aim was to test for a specific association between specific types of bullying and specific psychotic experiences. In detail, we tested the hypothesis that PLEs were common in this age period and that the individual PLEs weakly correlate with one another, thus they could present independently each of each other (Ronald et al., 2014). Moreover, we examined the hypothesis that specific types of bullying may be independently associated with specific type of PLEs. Finally, the third aim was to observe differences in PLEs and bullying victimization by gender and age band (early adolescence – late adolescence, please see method section for further details). We would test the hypotheses that physical bullying is more prevalent in males and early childhood whereas relational bullying is more prevalent in females and late childhood. We would

also test the hypotheses that PLEs were more frequent in early adolescence and in female participants.

METHODS

Study design, setting and participants

The study design was observational and cross sectional. The setting was the Complex Unit (CU) of Child and Adolescent Neuropsychiatry of the Department of Mental Health, Physical and Preventive Medicine, Second University of Naples, Naples, Italy (please see the online supplementary material for further information). Participants were consecutive help-seeking adolescents referred to the CU. They were included in the current study if they were aged between 12 to 18 years and found to suffer from PLEs after the administration of a screening instrument. Exclusion criteria were: 1) diagnosis of intellectual disability, autism spectrum disorder, or the patient had a known diagnosis of psychosis or schizophrenia; 2) presence of genetic, neurological or sensory disease; 3) adolescents who were taking psychotropic drugs. All the participants and their parents gave their written informed consent before starting the interviews. Their participation was voluntary and they could cancel their participation at any time without justification. Data collection was carried out by self –interviews and questionnaires scales, supervised by GC and RM. Interviews took place during and in depth psychiatric assessment with the participant and their parents. The ethical committee of the Second University of Naples approved the study (N.499/29 April 2016).

Measures

Screening instrument: We used the Adolescent Psychotic-Like Symptom Screener (APSS) as a screening instrument for PLEs. The APSS is a “rapid”, 7-item questionnaire with three possible answers: No (0) Maybe (0.5) Yes (1). The cut-off to be at risk for PLEs was a score >2 . The APSS had good sensitivity and specificity in identifying young adolescent with PLEs. In particular, the

questions relating to auditory hallucinations, visual hallucinations and paranoid thoughts have demonstrated a good predictive power for PLEs (Kelleher, Harley, Murtagh, & Cannon, 2011).

Bullying: Bullying victimization was assessed using the Multidimensional Peer Victimization Scale (MPVS). The MPVS is a 16 items questionnaire with three possible answers: Not at all (0), Once (1), More than once (2). MPVS is constituted by four subscales: 1) Physical victimization scale; 2) Verbal victimization scale; 3) Social manipulation scale and 4) Attacks on property scale. Total score and scale scores are computed by summing item responses. Scores on the total scale have a possible range of 0 to 32; scores on each of the four subscales have a possible range of 0 to 8. Higher scores reflect more victimization. The MPVS showed a good reliability and validity to measure bullying victimization (Mynard & Joseph, 2000). This tool has been already used and validated in an Italian sample (Carraro, Scarpa, Paggiaro, & Ventura, 2011; Scarpa, Carraro, Gobbi, & Nart, 2012).

PLEs: We used the Specific Psychotic Experiences Questionnaire (SPEQ) to assess the PLEs in the sample. Six types of psychotic experiences compose the SPEQ: paranoia, hallucinations, cognitive disorganization, grandiosity and anhedonia (all assessed via self-report), and negative symptoms (via parent report). All subscales demonstrated good to excellent internal consistency ($r = .77 - .93$), and test-retest reliability ($r = .65 - .74$) after 9 months of follow up in a general population sample of monozygotic and dizygotic twins (Twins Early Development Study - TEDS) (Pisano et al., 2015; Ronald et al., 2014).

Depression: The Children's Depression Inventory (CDI) was used to assess depression in the sample. The CDI is composed by 27 items within a score between 0-2 points. Cut – off score is settled on 19 points. The CDI is widely used for assessing depressive symptoms in children and adolescents aged 8–17 years, and has good internal consistency (Cronbach's $\alpha = 0.80$) (Kovacs, 1985).

Anxiety: Multidimensional Anxiety Scale for Children (MASC) was used to evaluate anxiety in the sample. The MASC is composed by 39 items with four possible answers: Never true for me (0), Rarely true for me (1), Sometimes true for me (2), Often true for me (3). Higher score reflects higher level of anxiety. MASC provides a reliable and valid depiction of the configuration of anxiety, showing good internal reliability (March, Parker, Sullivan, Stallings, & Conners, 1997).

Statistical Analysis

The data processing has used software for statistical analysis, *The Statistical Package for the Social Sciences*, (IBM SPSS Statistics for Windows, Version 20.0 Armonk, NY:IBM Corp) and *STATA* (Version 11.2 StataCorp, College Station, Texas).

Descriptive statistics (means, standard deviations, ranges and frequency distributions) were used to describe the sample and to assess his socio-demographics and clinical characteristics. Univariate ANOVA were used to assess significant mean variations of bullying victimization total scores and subscales and PLEs subscales, the covariate were: a) sex (1: male; 2: female) and b) age bands (1: early adolescence 144 - 168 months; 2: late adolescence 169 – 211 months). A series of Bravais-Pearson correlations within 1) the PLEs scales and between 2) the PLEs scales and the victimization sub-scales were performed. Linear regression models were used to test the predictive power of the type of bullying victimization on the type of PLEs, with regressions being performed only between variables (PLEs: dependent variables DVs; Victimizations: independent variables IVs) with correlation coefficient ranging from 0.3 to 0.7 (moderate correlation) and from 0.7 to 1 (strong correlation), with a significant *p* value (in the previous correlation analyses). The results were crude coefficients that have been controlled for by several confounders: sex, age, depression and anxiety symptoms and other types of victimization (beyond the independent variable) (for regressions diagnostics see the online supplementary material).

RESULTS

Descriptives

The sample consisted of 50 patients, 24 males (48%) and 26 females (52%), total number of people screened to obtain 50 participants was 324 (15,4%). HS not positive to PLEs did not differ significantly in terms of age and gender from those PLEs positive. The mean age was 170 months (± 18.4). Fig. 1 and Fig. 2 show the distribution of the different PLEs and the different types of bullying victimization in our sample. The mean of total MPVS was 17,1 ($\pm 7,5$); the four MPVS subscales showed the following means: verbal bullying 6,1 ($\pm 2,5$), social manipulation 4,6 ($\pm 2,2$), attack property 3,8 ($\pm 2,2$) and physical bullying 2,4 ($\pm 2,4$) SPEQ scales means were: Paranoia 34,6 ($\pm 17,5$, range 0 - 62), Hallucinations 15,5 ($\pm 8,9$, range 2-36), Grandiosity 7,4 ($\pm 5,8$, range 0-24), Cognitive disorganization 7,1 ($\pm 2,7$, range 1-11), anhedonia 25,2 ($\pm 9,4$ range 6-46) and negative symptoms 13,3 ($\pm 6,9$). CDI mean was 17,6 ($\pm 7,2$, range 3-32) whereas the MASC mean was 49,8 ($\pm 19,7$). Other descriptive are in the online supplementary material (please see also tab. 1 and 2 of the online supplementary material).

Correlation between PLEs and types of victimizations and PLES

The first correlation analysis among the six PLEs dimensions is shown in Table 1. As hypothesized, the various psychotic symptoms tend to correlate weakly to moderately with each other. The only moderate correlations (> 0.3) were between AVHs and Cognitive symptoms (0.334, $p < 0.05$), Anhedonia and cognitive symptoms (0.339, $p < 0.05$), paranoia and negative symptoms (0.336, $p < 0.05$) and AVHs and negative symptoms (0.382, $p < 0.01$). Interestingly, Grandiosity correlated negatively with all other psychotic dimensions. The second correlation analysis between PLEs scales and victimization scales are shown in table 2. Paranoia shows moderate and significant correlations with verbal bullying (0.628, $p < 0.01$) and social manipulation (0.477, $p < 0.01$); Grandiosity is significantly correlated with physical bullying (0.376, $p < 0.01$) whereas negative

symptoms showed moderate and significant correlation with verbal bullying (0.341, $p < 0.05$); A significant correlation is found also for social manipulation and negative symptoms ($p < 0.05$) but with weak coefficient correlation (0.287). Total bullying was correlated with Paranoia and Negative symptoms.

Association of PLEs by type of victimization

Linear regression between verbal bullying ($C=3.45, C.I.=1.48 - 5.43, p < 0.001$) and paranoia and social manipulation ($C=2.34, C.I.=0.20 - 4.49, p < 0.01$) and paranoia shows significant association, which remain after controlling for confounders (sex, age, anxiety, depression and other forms of victimization, except for verbal bullying in the regression between social manipulation and paranoia) (see table 3). The linear regression performed between physical bullying and grandiosity display a positive unadjusted coefficient but controlling for other victimizations reduced the significance of the association ($C=0.67, C.I.=0.28-1.63, p > 0.05$) (Table 3 of the online supplementary material). The linear regression between verbal bullying and negative symptom showed a positive crude coefficient but the significance of this association receded after controlling for depression and other victimizations ($C=0.78, C.I.=0.15-1.71, p > 0.05$) (Table 4 of the online supplementary material). Finally, Table 5 and 6 of the online supplementary material showed positive and significant regressions between total scale of bullying and Paranoia ($C=1.41, C.I.=0.80-2.92, p < 0.01$) and Negative symptoms ($C=0.31, C.I.=0.03-0.59, p < 0.05$) as outcome.

Variance for sex and age band

Table 4 shows the mean differences within the sample divided for sex and age band (age band 1, early adolescence EA (24 subjects, 48%): 144-168 months; Age band 2, late adolescence LA (26 subjects, 52%): 169-211 months) for MPVS total score and sub – scales and SPEQ sub - scales. Males were more likely to experience physical bullying and suffer from grandiosity. LAs were

more likely to be involved in social manipulation victimization and suffer from psychotic negative symptoms, whereas EA from grandiosity.

DISCUSSION

This is one of the few studies that have selected a help-seeking (HS) population from a child psychiatry service. It confirms that PLEs are quite common in a HS population, independent of presenting complaint and reason for referral (derived by the fact that the screening procedure was conducted in a heterogeneous and transversal way to specialized clinics). Our data showed that paranoia was the psychotic experience most common, followed in turn by anhedonia, AVHs, negative symptoms, grandiosity and cognitive disorganization. Comparing these data with those that emerged from other studies using the SPEQ, paranoia and anhedonia were again the most common experience (12,1 SD 10.58 and 16, 3 SD 7,9). Our figures were higher than those found in other studies (Ronald et al., 2014; Shakoor et al., 2016; Sieradzka et al., 2014). This was probably due to the different nature of the sample (clinical-HS *vs* community, epidemiological sample). Secondly, we confirmed the hypothesis that PLEs did not strongly correlate between themselves. Therefore, in an adolescent HS population having one type of psychotic experience did not necessarily mean having other kinds of experiences; there was heterogeneity in type and combination of experiences manifested (Ronald et al., 2014).

Our regression analyses have indicated that particular types of bullying predicted different PLEs. We used a study design with post-hoc analyses, without baseline hypothesis. This was due to the lack of previous studies on the topic. The foremost result concerned paranoia that was strongly predicted by verbal bullying and social manipulation. Recently paranoia ideation and suspiciousness have been associated with both psychological and physical bullying (Masillo et al., 2017) and our results put in detail that verbal and social victimization were mostly linked to paranoia. Therefore, both direct and indirect bullying was associated with persecutory ideas and this result could be expected given the presence of numerous studies that have testified this association (G. Catone et

al., 2015). Verbal victimization refers to name - calling, teasing, insults and threats. Social manipulation included the spreading of rumors or social exclusion. They usually represent the most common forms of victimization. It is somewhat intuitive that all types of bullying determine low personal efficacy, distress, mistrust and poor peer relationship but it is more likely that verbal threats and social exclusion are more prone to cause feelings of rejection, derision and judgment. Recent theories of psychosis suggest the role of emotional factors as the substrate from which the paranoia emerges, in particular from interpersonal worry and social anxiety (Bebbington et al., 2013). Interpersonal sensitivity, the concern about rejection from others, has been recognized hierarchically as a precursor of paranoia and several studies have noted the association between social anxiety and paranoid thoughts in young adults and adolescents (Armando et al., 2013; Pisano et al., 2015). Indeed, one of the most frequent symptoms of paranoia is precisely the idea that others are talking about them (ideas of reference). Intense and repetitive bullying victimization (in particular verbal bullying and social manipulation) may elicit or reinforce negative ideas about the self, the others and the world. The particular associations that emerged from our data could support the hypothesis of a link between the content of stressful experiences and psychotic symptoms (the *thematic link*) (G Catone et al., 2016).

Physical bullying was associated with ideas of grandiosity (in association with other victimizations). Physical victimization refers, for example, to being kicked and/or punched. Males were classically more involved in these actions and were more likely to suffer from grandiosity. In addition, both factors are more common in younger age. However, this kind of bullying involves an imbalance of power, especially in physical strength. It is likely that the victims tend to develop a sense of inferiority related to the concepts of strength, recognition of one's limits as well as a sense of low self-efficacy and importance. Compensatory psychological mechanisms could occur to cope these feelings, for example the developing of an “elevated sense of self” (Falukozi & Addington, 2012). In this regard we could recall the psychodynamic concept of the “denial” that is a well recognize psychotic defense mechanism of reconstruction of outer reality. Furthermore, from the

psychodynamically and developmentally informed perspective, the physical abuse has an extremely high traumatic potential and this interacts with developmental stage (in adulthood the effects appear to be different). We could speculate about the possibility that some individuals, victims of physical bullying, may shift from one dimension of narcissistic¹ vulnerability towards a narcissistic grandiosity (Pincus, Cain, & Wright, 2014). However, further studies are needed to reach such conclusions with the need to include in the assessment questionnaires or interviews focused on the analysis of defence mechanisms.

Verbal bullying predicted negative symptoms and the onset of lack of energy and interests and social isolation behaviors. However, controlling for depressive symptoms and other victimizations reduced the significance of the association. It is difficult to disentangle this kind of relationship because the parent-rated negative symptoms scale showed a positive moderate correlation with parent-rated depression in the SPEQ validation sample (Ronald et al., 2014). Verbal bullying and depression may act synergistically or as links on a causal chain in determining the onset of negative symptoms of psychosis. Certainly, a decline in psychosocial functioning is a consequence of bullying (Nansel et al., 2004; Scholte, Engels, Overbeek, de Kemp, & Haselager, 2007) and precedes and accompanies the negative symptoms of psychosis (K. R. Kim et al., 2013). Verbal bullying can have a damaging effect such as low self-esteem, chronic stress, anxiety and dislike of school. Therefore, these factors, together with depression, could be considered as risk factors for psychotic negative symptoms.

A dissonant result concerns the anhedonia dimension, which correlates negatively with all the domains of bullying both direct and indirect. Previously, anhedonia has been found slightly correlated with bullying victimization (Shakoor et al., 2016) but surprisingly in our study the two dimension correlated in inverse fashion. Probably the construct of anhedonia is more closely linked

¹ Narcissism: one's capacity to maintain a relatively positive self-image through a variety of self-regulation, affect-regulation, and interpersonal processes, and it underlies individuals' needs for validation and admiration, as well as the motivation to overtly and covertly seek out self-enhancement experiences from the social environment.

to endogenous factors rather than environmental events, but further studies are needed to shed light on this association.

Data on the differences for gender and age band showed interesting results. As previously described in the literature, males were more involved in physical bullying behaviors (Espelage, Bosworth, & Simon, 2001). We did not find any difference for relational victimization regarding gender. Knight et al. showed that sex difference in verbal victimization were less consistent than physical (Knight, Guthrie, Page, & Fabes, 2002), and other studies found no differences between male and females in indirect bullying (Crick & Grotpeter, 1995; Prinstein, Boergers, & Vernberg, 2001). Conversely, social manipulation was higher in the LA group. From a developmental perspective, this result could be interpreted in terms of considering personal and environmental aspects. First, relational bullying involves heightened cognitive and perspective taking abilities and knowledge of interpersonal dynamics. Secondly the development of more highly social cognition, from childhood to adolescence, may explain the increase of indirect bullying with age. In addition, with age, there is a change in the nature of social interactions and importance and function of the peer group (greater intimacy, self-disclosure) (Espelage & Swearer, 2004).

We have shown that, among PLEs, grandiosity was more likely in males and in early adolescence, Conversely older adolescents were more prone to suffer from negative psychotic symptoms. Ziermans also found that grandiosity was higher in male and negative symptoms were more likely experienced with increasing age, highlighting symptoms clusters that could vary by sex and age, and the progressive impairment in neuropsychological domains with age (Ziermans, 2013). In our sample, older adolescents may experience more severe psychological impairment and association with anxiety or depressive problems that could enhance negative symptoms.

CONCLUSION

We would emphasize the theoretical and clinical implications of this study. Understanding that the various forms of victimization may be differently associated with particular psychotic symptoms could help to unravel which psychological mechanisms underlie the relationship between a traumatic event such as bullying and dimensional PLEs and to clarify the pathogenesis of some very common symptoms such as paranoia, hallucinations and negative symptoms of psychosis. In fact, several pathways may be involved and an indirect effect (via affective dimensions or symptoms) has been suggested (Fisher et al., 2013; Moffa et al., 2017). Therefore, a careful study of the psychological impact of physical or verbal aggression or covert forms of bullying is needed. In a psychotherapeutic setting, specialists should focus on the content of the verbal offenses or the consequences of the evaluation of self and others after a physical dispute, social exclusion, or an attack on property, in the treatment of psychosis. It is indeed not impossible that different beliefs, feelings or defensive mechanisms evolve from different types of victimizations. From a preventive perspective, mental health prevention program including detection of psychotic risk should include both primary community and school based intervention for bullying phenomena and secondary and selective effective interventions for adolescents involved in bullying episodes.

Finally, we would outline the limitations of this study. First, the lack of a control group precluded us to draw firm conclusions on the prevalence and relationship between PLES and bullying. Secondly the cross – sectional design of the study provided information on characteristics associated with the outcome and no indication of the sequence of events and if exposure occurred before, after or during the onset of the outcome. Data were collected by self-report questionnaires and it is known that the prevalence of PLEs tends to increase with this way of data gathering (van Os & Reininghaus, 2016). Furthermore, people with PLEs may have been less accurate in recalling incidents of bullying or exaggerate the same. We tried to overcome these difficulties with an assessment one-to-one and using multiple items questionnaires and scales of intensity rather than the single questions. However other studies are needed to confirm our results.

Acknowledgements

Gennaro Catone would thank the Maudsley Philosophy Group Charitable Trust which funded this study with a small grant.

Competing Interests

The authors declare that they have no competing interests.

Availability of data and materials

The dataset used will be available from the corresponding author on reasonable request.

Compliance with ethical standard

The study was in accordance with the 1964 Helsinki declaration and its later amendments.

Consent for publication

All authors read and approved the study. The manuscript is original and has not already been published. It is not currently under review by another journal.

Funding

The Maudsley Philosophy Group Charitable Trust supported this research project with a small grant to Gennaro Catone.

REFERENCES

- Ames, C. S., Jolley, S., Laurens, K. R., Maddox, L., Corrigall, R., Browning, S., . . . Kuipers, E. (2014). Modelling psychosocial influences on the distress and impairment caused by psychotic like experiences in children and adolescents. *Eur Child Adolesc Psychiatry, 23*(8), 715-722.
- Armando, M., Lin, A., Girardi, P., Righetti, V., Dario, C., Saba, R., . . . Fiori Nastro, P. (2013). Prevalence of psychotic-like experiences in young adults with social anxiety disorder and correlation with affective dysregulation. *J Nerv Ment Dis, 201*(12), 1053-1059. doi:10.1097/NMD.0000000000000050
- Armando, M., Nelson, B., Yung, A. R., Ross, M., Birchwood, M., Girardi, P., & Fiori Nastro, P. (2010). Psychotic-like experiences and correlation with distress and depressive symptoms in a community sample of adolescents and young adults. *Schizophr Res, 119*(1-3), 258-265. doi:10.1016/j.schres.2010.03.001
- Armando, M., Saba, R., Monducci, E., Papaleo, F., Dario, C., Righetti, V., . . . Fiori Nastro, P. (2012). [Subtypes of psychotic-like experiences in a community sample of young adults: socio-demographic correlates and substance use]. *Riv Psichiatr, 47*(5), 424-431. doi:10.1708/1175.13033
- Bartels-Velthuis, A. A., van de Willige, G., Jenner, J. A., van Os, J., & Wiersma, D. (2011). Course of auditory vocal hallucinations in childhood: 5-year follow-up study. *Br J Psychiatry, 199*(4), 296-302. doi:10.1192/bjp.bp.110.086918
- Bebbington, P. E., McBride, O., Steel, C., Kuipers, E., Radovanovic, M., Brugha, T., . . . Freeman, D. (2013). The structure of paranoia in the general population. *Br J Psychiatry, 202*, 419-427. doi:10.1192/bjp.bp.112.119032

- Brandizzi, M., Schultze-Lutter, F., Masillo, A., Lanna, A., Curto, M., Lindau, J. F., . . . Fiori Nastro, P. (2014). Self-reported attenuated psychotic-like experiences in help-seeking adolescents and their association with age, functioning and psychopathology. *Schizophr Res*, *160*(1-3), 110-117. doi:10.1016/j.schres.2014.10.005
- Carraro, A., Scarpa, S., Paggiaro, A., & Ventura, L. (2011). Un contributo alla validazione italiana della scala multidimensionale di vittimizzazione tra pari. *Giornale Italiano di Psicologia*, *1*, 177-188.
- Catone, G., Marwaha, S., Kuipers, E., Lennox, B., Freeman, D., Bebbington, P., & Broome, M. (2015). Bullying victimisation and risk of psychotic phenomena: analyses of British national survey data. *Lancet Psychiatry*, *2*(7), 618-624. doi:10.1016/S2215-0366(15)00055-3
- Catone, G., Pisano, S., Broome, M., Fortes Lindau, J., Pascotto, A., & Gritti, A. (2016). Continuity between stressful experiences and delusion content in adolescent with psychotic disorder-a pilot study. *Scandinavian Journal of Child and Adolescent Psychiatry and Psychology*, *4*(1), 14-22.
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Dev*, *66*(3), 710-722. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/7789197>
- Daneluzzo, E., Stratta, P., Di Tommaso, S., Pacifico, R., Riccardi, I., & Rossi, A. (2009). Dimensional, non-taxonic latent structure of psychotic symptoms in a student sample. *Soc Psychiatry Psychiatr Epidemiol*, *44*(11), 911-916. doi:10.1007/s00127-009-0028-2
- De Loore, E., Gunther, N., Drukker, M., Feron, F., Sabbe, B., Deboutte, D., . . . Myin-Germeys, I. (2011). Persistence and outcome of auditory hallucinations in adolescence: a longitudinal general population study of 1800 individuals. *Schizophr Res*, *127*(1-3), 252-256. doi:10.1016/j.schres.2011.01.015
- Dominguez, M. D., Wichers, M., Lieb, R., Wittchen, H. U., & van Os, J. (2011). Evidence that onset of clinical psychosis is an outcome of progressively more persistent subclinical psychotic experiences: an 8-year cohort study. *Schizophr Bull*, *37*(1), 84-93. doi:10.1093/schbul/sbp022
- Espelage, D. L., Bosworth, K., & Simon, T. R. (2001). Short-term stability and prospective correlates of bullying in middle-school students: an examination of potential demographic, psychosocial, and environmental influences. *Violence Vict*, *16*(4), 411-426. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11506450>
- Espelage, D. L., & Swearer, S. M. (2004). *Bullying in American schools : a social-ecological perspective on prevention and intervention*. Mahwah, N.J.: L. Erlbaum Associates.
- Falukozi, E., & Addington, J. (2012). Impact of Trauma on Attenuated Psychotic Symptoms. *Psychosis*, *4*(3), 203-212. doi:10.1080/17522439.2011.62686712
- Fisher, H. L., Schreier, A., Zammit, S., Maughan, B., Munafo, M. R., Lewis, G., & Wolke, D. (2013). Pathways between childhood victimization and psychosis-like symptoms in the ALSPAC birth cohort. *Schizophr Bull*, *39*(5), 1045-1055. doi:10.1093/schbul/sbs088
- Gritti, A., Bravaccio, C., Signoriello, S., Salerno, F., Pisano, S., Catone, G., . . . Pascotto, A. (2014). Epidemiological study on behavioural and emotional problems in developmental age: prevalence in a sample of Italian children, based on parent and teacher reports. *Ital J Pediatr*, *40*(1), 19. doi:10.1186/1824-7288-40-19
- Johns, L. C., Cannon, M., Singleton, N., Murray, R. M., Farrell, M., Brugha, T., . . . Meltzer, H. (2004). Prevalence and correlates of self-reported psychotic symptoms in the British population. *Br J Psychiatry*, *185*, 298-305. doi:10.1192/bjp.185.4.298
- Juvonen, J., & Graham, S. (2014). Bullying in schools: the power of bullies and the plight of victims. *Annu Rev Psychol*, *65*, 159-185. doi:10.1146/annurev-psych-010213-115030
- Kaymaz, N., Drukker, M., Lieb, R., Wittchen, H. U., Werbeloff, N., Weiser, M., . . . van Os, J. (2012). Do subthreshold psychotic experiences predict clinical outcomes in unselected non-help-seeking population-based samples? A systematic review and meta-analysis, enriched with new results. *Psychol Med*, *42*(11), 2239-2253. doi:10.1017/S0033291711002911
- Kelleher, I., & Cannon, M. (2011). Psychotic-like experiences in the general population: characterizing a high-risk group for psychosis. *Psychol Med*, *41*(1), 1-6. doi:10.1017/S0033291710001005
- Kelleher, I., Connor, D., Clarke, M. C., Devlin, N., Harley, M., & Cannon, M. (2012). Prevalence of psychotic symptoms in childhood and adolescence: a systematic review and meta-analysis of population-based studies. *Psychol Med*, *42*(9), 1857-1863. doi:10.1017/S0033291711002960
- Kelleher, I., Harley, M., Murtagh, A., & Cannon, M. (2011). Are screening instruments valid for psychotic-like experiences? A validation study of screening questions for psychotic-like experiences using in-depth clinical interview. *Schizophr Bull*, *37*(2), 362-369. doi:10.1093/schbul/sbp057
- Kim, K. R., Song, Y. Y., Park, J. Y., Lee, E. H., Lee, M., Lee, S. Y., . . . Kwon, J. S. (2013). The relationship between psychosocial functioning and resilience and negative symptoms in individuals at ultra-high risk for psychosis. *Aust N Z J Psychiatry*, *47*(8), 762-771. doi:10.1177/0004867413488218
- Kim, Y. S., Koh, Y. J., & Leventhal, B. (2005). School bullying and suicidal risk in Korean middle school students. *Pediatrics*, *115*(2), 357-363. doi:10.1542/peds.2004-0902
- Kline, E., Thompson, E., Bussell, K., Pitts, S. C., Reeves, G., & Schiffman, J. (2014). Psychosis-like experiences and distress among adolescents using mental health services. *Schizophr Res*, *152*(2-3), 498-502. doi:10.1016/j.schres.2013.12.012
- Knight, G., Guthrie, I., Page, M., & Fabes, R. (2002). Emotional arousal and gender differences in aggression: A meta-analysis. *Aggress Behav*, *28*(5), 366-393.

- Kovacs, M. (1985). The Children's Depression, Inventory (CDI). *Psychopharmacol Bull*, 21(4), 995-998. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/4089116>
- Linscott, R. J., & van Os, J. (2013). An updated and conservative systematic review and meta-analysis of epidemiological evidence on psychotic experiences in children and adults: on the pathway from proneness to persistence to dimensional expression across mental disorders. *Psychol Med*, 43(6), 1133-1149. doi:10.1017/S0033291712001626
- Mackie, C. J., Castellanos-Ryan, N., & Conrod, P. J. (2011). Developmental trajectories of psychotic-like experiences across adolescence: impact of victimization and substance use. *Psychol Med*, 41(1), 47-58. doi:10.1017/S0033291710000449
- March, J. S., Parker, J. D., Sullivan, K., Stallings, P., & Conners, C. K. (1997). The Multidimensional Anxiety Scale for Children (MASC): factor structure, reliability, and validity. *J Am Acad Child Adolesc Psychiatry*, 36(4), 554-565. doi:10.1097/00004583-199704000-00019
- Marini, Z. A., Dane, A. V., Bosacki, S. L., & Ylc, C. (2006). Direct and Indirect Bully-Victims: Differential Psychosocial Risk Factors Associated With Adolescents Involved in Bullying and Victimization. *Aggress Behav*, 32(6), pp. doi:10.1002/ab.20155
- Masillo, A., Valmaggia, L. R., Saba, R., Brandizzi, M., Lo Cascio, N., Telesforo, L., . . . Fiori Nastro, P. (2017). Interpersonal sensitivity, bullying victimization and paranoid ideation among help-seeking adolescents and young adults. *Early Interv Psychiatry*. doi:10.1111/eip.12447
- Moffa, G., Catone, G., Kuipers, J., Kuipers, E., Freeman, D., Marwaha, S., . . . Bebbington, P. (2017). Using Directed Acyclic Graphs in Epidemiological Research in Psychosis: An Analysis of the Role of Bullying in Psychosis. *Schizophr Bull*. doi:10.1093/schbul/sbx013
- Mynard, H., & Joseph, S. A. (2000). Development of the multidimensional peer victimization scale. *Aggressive behaviour*, 26, 169-178.
- Nansel, T. R., Craig, W., Overpeck, M. D., Saluja, G., Ruan, W. J., & Health Behaviour in School-aged Children Bullying Analyses Working, G. (2004). Cross-national consistency in the relationship between bullying behaviors and psychosocial adjustment. *Arch Pediatr Adolesc Med*, 158(8), 730-736. doi:10.1001/archpedi.158.8.730
- Pincus, A. L., Cain, N. M., & Wright, A. G. (2014). Narcissistic grandiosity and narcissistic vulnerability in psychotherapy. *Personal Disord*, 5(4), 439-443. doi:10.1037/per0000031
- Pisano, S., Catone, G., Pascotto, A., Iuliano, R., Tiano, C., Milone, A., . . . Gritti, A. (2015). Paranoid Thoughts in Adolescents with Social Anxiety Disorder. *Child Psychiatry Hum Dev*. doi:10.1007/s10578-015-0612-5
- Pontillo, M., De Luca, M., Pucciarini, M. L., Vicari, S., & Armando, M. (2016). All that glitters is not gold: prevalence and relevance of psychotic-like experiences in clinical sample of children and adolescents aged 8-17 years old. *Early Interv Psychiatry*. doi:10.1111/eip.12370
- Poulton, R., Caspi, A., Moffitt, T. E., Cannon, M., Murray, R., & Harrington, H. (2000). Children's self-reported psychotic symptoms and adult schizophreniform disorder: a 15-year longitudinal study. *Arch Gen Psychiatry*, 57(11), 1053-1058. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11074871>
- Prinstein, M. J., Boergers, J., & Vernberg, E. M. (2001). Overt and relational aggression in adolescents: social-psychological adjustment of aggressors and victims. *J Clin Child Psychol*, 30(4), 479-491. doi:10.1207/S15374424JCCP3004_05
- Ronald, A., Sieradzka, D., Cardno, A. G., Haworth, C. M., McGuire, P., & Freeman, D. (2014). Characterization of psychotic experiences in adolescence using the Specific Psychotic Experiences Questionnaire: findings from a study of 5000 16-year-old twins. *Schizophr Bull*, 40(4), 868-877. doi:10.1093/schbul/sbt106
- Scarpa, S., Carraro, A., Gobbi, E., & Nart, A. (2012). Peer-victimization during physical education and enjoyment of physical activity. *Percept Mot Skills*, 115(1), 319-324. doi:10.2466/06.05.10.PMS.115.4.319-324
- Scholte, R. H., Engels, R. C., Overbeek, G., de Kemp, R. A., & Haselager, G. J. (2007). Stability in bullying and victimization and its association with social adjustment in childhood and adolescence. *J Abnorm Child Psychol*, 35(2), 217-228. doi:10.1007/s10802-006-9074-3
- Shakoor, S., Zavos, H. M., Haworth, C. M., McGuire, P., Cardno, A. G., Freeman, D., & Ronald, A. (2016). Association between stressful life events and psychotic experiences in adolescence: evidence for gene-environment correlations. *Br J Psychiatry*, 208(6), 532-538. doi:10.1192/bjp.bp.114.159079
- Sharifi, V., Sajjadifar, A., & Amini, H. (2008). Psychotic-like ideations among a group of young normal subjects in Iran. *Int J Soc Psychiatry*, 54(5), 390-394. doi:10.1177/0020764008090287
- Sieradzka, D., Power, R. A., Freeman, D., Cardno, A. G., McGuire, P., Plomin, R., . . . Ronald, A. (2014). Are genetic risk factors for psychosis also associated with dimension-specific psychotic experiences in adolescence? *PLoS One*, 9(4), e94398. doi:10.1371/journal.pone.0094398
- Taylor, M. J., Freeman, D., & Ronald, A. (2016). Dimensional psychotic experiences in adolescence: Evidence from a taxometric study of a community-based sample. *Psychiatry Res*, 241, 35-42. doi:10.1016/j.psychres.2016.04.021
- van Os, J., & Reininghaus, U. (2016). Psychosis as a transdiagnostic and extended phenotype in the general population. *World Psychiatry*, 15(2), 118-124. doi:10.1002/wps.20310

- Varghese, D., Scott, J., Welham, J., Bor, W., Najman, J., O'Callaghan, M., . . . McGrath, J. (2011). Psychotic-like experiences in major depression and anxiety disorders: a population-based survey in young adults. *Schizophr Bull*, *37*(2), 389-393. doi:10.1093/schbul/sbp083
- Wigman, J. T., van Winkel, R., Ormel, J., Verhulst, F. C., van Os, J., & Vollebergh, W. A. (2012). Early trauma and familial risk in the development of the extended psychosis phenotype in adolescence. *Acta Psychiatr Scand*, *126*(4), 266-273. doi:10.1111/j.1600-0447.2012.01857.x
- Wong, K. K., Freeman, D., & Hughes, C. (2014). Suspicious young minds: paranoia and mistrust in 8- to 14-year-olds in the U.K. and Hong Kong. *Br J Psychiatry*, *205*(3), 221-229. doi:10.1192/bjp.bp.113.135467
- Yung, A. R., Nelson, B., Baker, K., Buckby, J. A., Baksheev, G., & Cosgrave, E. M. (2009). Psychotic-like experiences in a community sample of adolescents: implications for the continuum model of psychosis and prediction of schizophrenia. *Aust N Z J Psychiatry*, *43*(2), 118-128. doi:10.1080/00048670802607188
- Ziermans, T. B. (2013). Working memory capacity and psychotic-like experiences in a general population sample of adolescents and young adults. *Front Psychiatry*, *4*, 161. doi:10.3389/fpsy.2013.00161
- Zwierzynska, K., Wolke, D., & Lereya, T. S. (2013). Peer victimization in childhood and internalizing problems in adolescence: a prospective longitudinal study. *J Abnorm Child Psychol*, *41*(2), 309-323. doi:10.1007/s10802-012-9678-8