Adult Report of Imaginary Companion Play and Adversity in Childhood: Relations to Concurrent Prodromal Symptom Report

Childhood imaginary companion (CIC) play has been argued to be a form of early hallucination experience[1], but no studies have investigated whether it predicts later adult hallucination experiences in the form of prodromal symptoms. Our aim was to relate adult university students' report of CIC play to the reporting of different prodromal symptoms, taking into account childhood adverse experiences, which have been shown to predict prodromal symptoms in adulthood[2].

Method

Data were gathered as part of an online survey conducted at a UK Higher Education Institution examining the social and emotional wellbeing of university students (SoWise).

This study reports on a subset of the measures from the SoWise survey using a purposive sub-sample of participants for analysis. Participants over the age of 24 were excluded for two reasons: 1) prodromal symptoms are known to occur from the onset of puberty to the early 20s[3] and 2) recall of imaginary companions is likely to be compromised with age. The final sample consisted of 278 (196 females) students aged 18–24 years (M = 20.38, SD = 1.56). Sociodemographic data included age, gender, and parental socioeconomic status.

CIC engagement was determined by the Imaginary Companion Questionnaire[4], defining CICs as follows: *An imaginary friend can be classified as completely invisible, OR a doll or toy that you had given a personality to and played with for over 3 months*.

Participants were asked if they remembered having a CIC and if so what characteristics they exhibited (e.g. age, gender, humour).

The screening measure for prodromal symptoms of psychosis was the Prodromal Questionaire-16[5] (PQ-16). This self-report measure includes 16 true/false items, nine assessing hallucinations/perceptual abnormalities, five assessing unusual thought content/delusional ideas/paranoia, and two assessing negative symptoms.

Finally, the Childhood Experience of Care and Abuse Questionnaire[6] (CECA-Q) was used as a retrospective self-report measure of childhood adversity before the age of 17. The scale consists of questions on parental loss, neglect, apathy, and physical/sexual abuse. An adverse experiences subscale was created using questions from the CECA-Q. Reports of physical and sexual abuse were consolidated into a 0–4 scale indicating severity of childhood adverse experiences (marked, moderate, mild, little or none). The 0–4 score was collapsed to a dichotomous variable representing marked/moderate abuse, or mild/little/no abuse reported[7].

Results

Of the 278 students, 224 reported on CIC status. 62 (22%) reported CIC play, with one removed because the CIC was described as a result of psychosis. There were no age effects t (1, 222) = -.88, p = .381, but females X^2(1, N = 224) = 4.96, p = .026 reported significantly more CIC play.

The PQ-16 was completed by 218 (56 male) participants, reporting a range of 0–15 symptoms (M = 4.53, SD = 3.59). No gender t (1, 216) = -.54, p = .590, or age r = .07, p = .331 differences were found.

The relationship between CIC status, prodromal symptoms, and adverse childhood experiences was measured using three Poisson regressions with 1) hallucinations/perceptual abnormality, 2) unusual thought content/delusional ideas/paranoia, and 3) negative prodromal symptoms reported as the outcome variables. CIC status and high/low adversity in childhood were entered as predictor variables. Gender and socioeconomic status were covariates. An interaction term was also entered.

Those reporting no CIC (NIC) in childhood in the hallucination model reported 53% less prodromal hallucination symptoms in comparison to the CIC group, Exp (B) .473 (95% CI, -1.216 to -.283); this was a significant predictor, $p = .002$. Those reporting low adversity in the hallucination model also reported 58% less prodromal symptoms than those with high adversity scores, Exp (B) .423 (95% CI, -1.194 to -.528); this was also significant, $p < .001$. Furthermore there was a significant interaction, Exp (B) 1.935 (95% CI, .137 to 1.183); $p = .013$. Those reporting both CIC and high adversity reported 94% more prodromal symptoms.

A mediation analysis was run using Strata-15 and the PARAMED module using the bootstrap method. The relationship between CIC status and hallucination symptoms was mediated by childhood adversity where the total effect was significant (Estimate = 1.36, CI, 1.11 to 1.68) $p = .003$, as well as the natural direct effect (Estimate = 1.25, CI, 1.02 to 1.54) $p = .032$, and the natural indirect effect (Estimate = 1.09, CI, 1.02 to 1.16) $p = .007$.

There were no main effects of CIC status in the model predicting unusual thought content symptoms, $p = .088$. Those reporting low adversity scores reported 40% less

prodromal symptoms than those reporting high adversity, Exp (B) .601 (95% CI, -.914 to -.104); this was significant, $p = .017$. No significant interaction was found, $p = .338$.

In the third regression looking at negative symptoms, there was no significant contribution of CIC status, $p = .306$; however those reporting low adversity reported 47% less prodromal symptoms than those with high adversity in childhood, Exp (B) .527 (95% CI, -1.172 to -.111), $p = .018$. There was no interaction, $p = .333$.

Adults with a CIC were more likely to report high adversity, X^2 (1, N = 224) = 8.32, $p = .004$. See table 1 for descriptive statistics for all variables.

Discussion

Reporting concurrent prodromal symptoms of hallucination/perceptual abnormality was associated with self-report of CICs. CIC status did not predict report of unusual thought content or negative symptoms. Childhood adversity, however, related to all three types of prodromal symptoms and mediated the relationship between CICs and hallucination/perceptual symptoms.

These findings are in line with previous research suggesting that having a CIC should be considered a form of non-pathological hallucination-like-experience[8] that may impact adult experiences[9]. Although CIC status was predictive of prodromal symptom report of hallucination/perceptual abnormality, childhood adversity predicted all three components of the prodromal symptoms, and both mediated and moderated the hallucination/perceptual abnormality symptom relationship between CIC status and prodromal symptom report. This is consistent with literature on trauma and its relationship with prodromal symptoms[10]. Because the sample was typical, no predictions could be made about pathology. Future research, therefore, might focus on how life

events mediate the relationship between pathological and non-pathological hallucinations, as CICs are known to be a positive form of play that relate to better social cognition[11].

Several interpretations of the results are possible. Firstly, children's experiences with typical hallucination-like experiences in the form of interacting with a CIC may become prone to experience prodromal symptoms of hallucination with the addition of life stressors. Secondly, children with CICs may become accustomed to speaking about imaginary invisible beings or voices throughout their development, and would be more likely to report these symptoms than their peers.

Limitations of the survey design were mitigated through the use of reliable and valid measures appropriate to the population. It would be useful to incorporate longitudinal design to find out more about the prodromal symptom trajectory of CIC individuals from childhood to adulthood. The regressions did show dispersion in the sample; however these parametric tests have been shown to be robust against violations of assumptions[12].

In summary, this research is consistent with the developmental perspective of the continuum of hallucination from pathological to non-pathological, and supports the notion that CICs may be a form of hallucination-like-experience which, particularly when combined with adversity, may influence the trajectory of prodromal hallucination report.

Ethical Statement The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human subjects were approved by University of Huddersfield ethics review board. Approval number: .

Consent Statement Written consent was obtained from all subjects

Author Details at Time Work was Carried out Corresponding author**:** Paige E. Davis M.Sc., Ph.D., Senior Lecturer in Developmental Psychology, University of Huddersfield, United Kingdom. Current information: Lecturer in Developmental Psychology, York St. John University, Psychology Department, Lord Mayor's Walk, York, YO31 7EX. p.davis1@yorksj.ac.uk; Lisa A. D. Webster Ph.D., Senior Lecturer in Health Psychology, Leeds Trinity University, United Kingdom; Charles Fernyhough Ph.D., Professor, Durham University, United Kingdom; Kevin Ralston Ph.D., Lecturer in Sociology, York St. John University, United Kingdom; Helen J. Stain, Ph.D., Professor, Leeds Trinity University, United Kingdom; Susanna Kola-Palmer Ph.D., Senior Lecturer in Health Psychology, University of Huddersfield, United Kingdom.

References

[1] Pearson, D., Burrow, A., Fitzgerald, C., Green, K., Lee, G., Wise, N. Auditory hallucinations in normal child populations. Personality and Ind Diff [internet]. 2001 Jan [cited 2018 sept 15];31:401-407. Available from:

[2] Varese, F., Smeets, F., Drukker, M., Lieverse, R., Lataster, T., Viechtbauer, W., Read, J., van Os, J., & Bentall, R. (2012). Childhood adversities increase the risk of psychosis: A meta-analysis of patient-control, prospective- and cross-sectional cohort studies. *Schizophrenia Bulletin, 38(4),* 661-671. doi: 10.1093/schbul/sbs050

[3] Trotman, H. D., Holtzman, C. W., Ryan, A. T., Shapiro, D. I., MacDonald, A. N., Goulding, S. M., … Walker, E. F. (2013). The Development of Psychotic Disorders in Adolescence: A potential role for hormones. *Hormones and Behavior*, *64*(2), 411–419. http://doi.org/10.1016/j.yhbeh.2013.02.018

[4] Taylor, M., & Carlson, S. (1997). The relation between individual differences in fantasy and theory of mind. *Child Development, 68(3),* 436-455. doi: 10.2307/1131670

[5] Loewy, R., L., Bearden, C. E., Johnson, J. K., Raine, A., & Cannon, T. D. (2005). The prodromal questionnaire (PQ): Preliminary validation of a self-report screening measure for prodromal and psychotic syndromes. *Schizophrenia Research, 77(2-3),* 141-149. doi: 10.1016/j.schres.2005.02.009

[6] Bifulco, A., Brown, G. W., & Harris, T. O. (1994). Childhood experience of care and abuse (CECA): A retrospective interview measure. *Child Psychlogy and Psychiatry Allied Disciplines, 35(8),* 1419-1435. doi: 10.1111/j.1469-7610.1994.tb01284.x

[7] Bifulco, A., Moran, P.M., Ball, C., Jacobs, R., Baines, A., Bunn, A., & Cavagin, J. (2002). Childhood adversity, parental vulnerability and disorder: Examining inter-generational transmissions of risk. *Journal of Child Psychology and Psychiatry, 43(8),* 1075-1086.doi:10.1111/1469-7610.00234

[8] Fernyhough, C., Bland, K. A., & Meins, E., Coltheart, M. (2007). Imaginary companions and young children's responses to ambiguous auditory stimuli: Implications for typical and atypical development. *Journal of child psychology and psychiatry, 48(11),* 1094-1101

[9] Burbach, F., Roberts, G., Clinch, C., & Wise, N. (2012). Exploring the links between childhood imaginary companions and auditory hallucinations, *Psychosis, 6(1),* 38-49. doi:10.1080/17522439.2012.753934

[10] Thompson, J. L., Kelly, M., Kimhy, D., Harkavy-Friedman, J. M., Khan, S., Messinger, J. W., … Corcoran, C. (2009). Childhood Trauma and Prodromal Symptoms Among Individuals at Clinical High Risk for Psychosis. *Schizophrenia Research*, *108*(1-3), 176–181. http://doi.org/10.1016/j.schres.2008.12.005

[11] Giménez-Dasi, M., Pons, F., & Bender, P. (2016). Imaginary companions, theory of mind and emotion understanding in young children. *European Early Childhood Education Research Journal, 24(2),* 186-197. doi: 10.1080/1350293X.2014.919778 OR Taylor & Carlson???

[12] Tabachnick, B. G., & Fidel, L. S. (2007). Using Multivariate Statistics. Boston: Allyn and Bacon.

Compliance with Ethical Standards