



## Clinical significance of auditory hallucinations in youth: Comparison between a general population and a help-seeking sample



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Dear editors,

During childhood and adolescence, AVH are mostly transient, pointing towards a possible benign or developmental nature. However, in some children and adolescents, AVH can lead to substantial suffering, are associated with significant behavioral problems, and may last for a longer period, even into adulthood (Bartels-Velthuis et al., 2010; Bartels-Velthuis et al., 2011; Bartels-Velthuis et al., 2016). When children and adolescents actually seek help for AVH, they represent a group with a high level of suffering, a reduced level of functioning and severe and/or comorbid psychopathology. In addition, time to treatment is substantial (Majjer et al., 2017). The present study aims to identify to what extent adolescents (aged 12–13 years) experiencing AVH in the general population might be in need for clinical care. In addition, we explored whether these adolescents could have been identified at earlier age (7–8 years) and how they function at age 18–19 years.

We compared two independent, previously described samples: a clinical sample of a help-seeking population (HSP) (originating from a naturalistic study with anonymized data of  $n = 207$  youngsters, aged 8–18 years) (Majjer et al., 2017) and a general population (GP) sample (originating from a case-control sample, followed in three waves: (i) baseline (T0;  $n = 694$  [ $n = 347$  with AVH], age 7/8 years); (ii) 5-year follow-up (T1;  $n = 337$  [ $n = 55$  with AVH], age 12/13 years) and (iii) 11-year follow-up (T2;  $n = 293$  [ $n = 15$  with AVH], age 18/19 years) (Bartels-Velthuis et al., 2010; Bartels-Velthuis et al., 2011; Bartels-Velthuis et al., 2016).

For the HSP-sample and the T0 and T1-GP samples, AVH were assessed with the Auditory Vocal Hallucination Rating Scale (AVHRS) (Bartels-Velthuis et al., 2012). An AVH severity index was composed conform previous analyses (Bartels-Velthuis et al., 2010). For the T2-GP sample, AVH was assessed with the AVHRS-Q (questionnaire) (Steenhuis et al. (in preparation); van de van de Willige et al., 2010). Parents of both the HSP and GP (T0 and T1) samples completed the Child Behavior Checklist (CBCL) (Achenbach, 1991) to assess problem behavior. Both total scores and internalizing, externalizing and eight syndrome scales were calculated (scoring normal = 0, subclinical = 1, clinical = 2). Participants of the T2-GP sample completed the Community Assessment of Psychic Experience (CAPE) (Konings et al., 2006), covering frequency and distress of positive, negative and

depressive experiences, and the Depression, Anxiety and Stress Scale (DASS-21) (Lovibond and Lovibond, 1995) assessing symptoms of anxiety, depression and stress. The T2 GP-sample was also assessed on social functioning with the Groningen Questionnaire about Social Behavior (GSVG-45) (de Jong and Van der Lubbe, 2001).

Analyses comprised (1) Comparison of the HSP- and T1 GP-samples, (2) Creating a 'need for care' measure by combining 'AVH-severity' and 'CBCL-total' z-scores, using means and standard deviations of the HSP sample, (3) Identifying adolescents with 'need for care' status in T1 GP-sample using the combined z-score with a threshold of  $\geq -1$  (as adolescents below this threshold did not require clinical care but, for example, only reassurance, see Majjer et al., 2017), (4) Comparison 'need for care' and 'no need for care' AVH adolescents at T1 as well as retrospectively at T0 and prospectively at T2 follow-up. Analyses were performed using IBM SPSS Statistics version 23.0 (descriptives, z-scores, *t*-tests and chi-square tests).

Mean age and gender of the HSP (12.3 years, SD 2.8, 40.2% males) and GP (12.8 years, SD 0.8, 35.8% males) samples did not differ significantly. The HSP-sample scored significantly higher on both AVH severity (HSP mean 6.86 (SD 2.40); GP mean 2.84; (SD1.98)) and CBCL total score (HSP mean 59.21 (SD 25.60); GP mean 30.34 (SD24.27)) (see Supplementary Table 1). Combined z-scores could be calculated for 62 (57.9%) cases of the HSP-sample due to missing data on either AVH-severity (17 missings (15.9%) and/or CBCL total (37 missings (34.6%)) scores. There were no significant differences in AVH-severity for CBCL completers and non-completers ( $t(71.991) = 71.991, p = .132$ ) or in CBCL-total between AVH completers and non-completers ( $t(68) = 0.839, p = .404$ ). In the HSP-sample, combined z-scores ranged from  $-2.16$  to  $1.27$ . In the T1 GP-sample, the combined z-scores ranged from  $-2.35$  to  $0.21$ .

Thirteen (23.6%) adolescents from the T1 GP-sample met the predefined 'need for care' criterion (see Table 1). Of these 13 adolescents with 'need for care' status at T1, nine already heard voices at T0, indicating that 69.2% of these adolescents had persistent AVH. Retrospectively, children with 'need for care' at T1, scored significantly higher on CBCL total and several subscales, but not on AVH-severity at age 7–8 years (T0) (see Supplementary Table 2). At T2, seven (of the thirteen) young adults with 'need for care' status at T1 could be assessed. Two of these seven young adults with 'need for care' status at T1 had persistent voices. At T2, those with 'need for care' at T1 reported significantly more depressive symptoms and higher distress (CAPE) and had significantly lower social functioning in their education (GSVG-45), compared to those without 'need for care' at T1 (see Supplementary Table 3).

By comparing a HSP-sample with a GP-sample of adolescents with AVH, we could provide the estimation that nearly a quarter of adolescents with AVH in the general population might actually be in need of clinical care. From as early as 7 and 8 years of age, these children stood out from their peers with regard to problem behavior, but not necessarily to AVH severity. This information is helpful in understanding the clinical significance of AVH in youth in the general population. To specify, clinicians should be aware that approximately one in four adolescent voice hearers might need clinical care. Also, caregivers should always perform a broad clinical assessment when encountering children and adolescents with AVH. Our data suggest that, even from

**Table 1**  
Comparison 'need for care' versus 'no need for care' subgroups within GP T1 sample.

|                                      | Need for care & AVH |                | No need for care & AVH |                | Statistics  |                 | p value |
|--------------------------------------|---------------------|----------------|------------------------|----------------|-------------|-----------------|---------|
|                                      | N (%)               | Mean (SD)      | N                      | Mean (SD)      | t-test (df) | Chi-square (df) |         |
| Age (years)                          | 13                  | 13.00 (0.65)   | 42                     | 13.00 (0.633)  | 1.314 (53)  |                 | 0.194   |
| Gender (male)                        | 6 (46.2)            |                | 18 (42.9)              |                | 0.206 (53)  |                 | 0.838   |
| AVH severity index                   | 13                  | 4.00 (2.22)    | 42                     | 2.00 (1.618)   | -3.782 (53) |                 | <0.001  |
| CBCL total score                     | 13                  | 60.00 (23.643) | 40                     | 19.00 (14.074) | -7.564 (51) |                 | <0.001  |
| CBCL range (N clinical) <sup>a</sup> |                     |                |                        |                |             |                 |         |
| Total <sup>c</sup>                   | 11 (84.6)           | 2.00 (0.599)   | 2 (4.8)                | 0.00 (0.543)   |             | 33.990 (2)      | <0.001  |
| Internalizing <sup>b</sup>           | 10 (76.9)           | 2.00 (0.768)   | 4 (9.5)                | 0.00 (0.666)   |             | 23.270 (2)      | <0.001  |
| Externalizing <sup>c</sup>           | 7 (53.8)            | 2.00 (0.768)   | 2 (4.8)                | 0.00 (0.463)   |             | 30.026 (2)      | <0.001  |
| Social withdrawal <sup>b</sup>       | 1 (7.7)             | 0.00 (0.555)   | 0 (0.0)                | 0.00 (0.156)   |             | 3.499 (2)       | 0.174   |
| Somatic complaints <sup>b</sup>      | 6 (46.2)            | 1.00 (0.954)   | 2 (4.8)                | 0.00 (0.495)   |             | 15.210 (2)      | <0.001  |
| Anxious/depressed <sup>b</sup>       | 4 (30.8)            | 0.00 (0.927)   | 1 (2.4)                | 0.00 (0.400)   |             | 10.854 (2)      | 0.004   |
| Social problem <sup>b</sup>          | 3 (23.1)            | 1.00 (0.832)   | 3 (7.1)                | 0.00 (0.527)   |             | 17.444 (2)      | <0.001  |
| Thought problems <sup>c</sup>        | 4 (30.8)            | 0.00 (0.927)   | 1 (2.4)                | 0.00 (0.379)   |             | 11.479 (2)      | 0.003   |
| Attention problems <sup>c</sup>      | 6 (46.2)            | 1.00 (0.954)   | 0 (0.0)                | 0.00 (0.00)    |             | 28.991 (2)      | <0.001  |
| Rule-breaking behavior <sup>b</sup>  | 3 (23.1)            | 0.00 (0.877)   | 2 (4.8)                | 0.00 (0.436)   |             | 3.891 (1)       | 0.049   |
| Aggressive behavior <sup>c</sup>     | 3 (23.1)            | 0.00 (0.877)   | 0 (0.0)                | 0.00 (0.158)   |             | 10.797 (2)      | 0.005   |

<sup>a</sup> Total 'need for care' N = 13 & total 'no need for care' N = 42.

<sup>b</sup> Total 'no need for care' N = 41.

<sup>c</sup> Total 'no need for care' N = 40.

young age, AVH can be regarded as a signal of a vulnerable population, which may be in need of care for a broader spectrum of problems than AVH alone. Future research regarding AVH in youth might profit from explicitly implementing a broader assessment of distress and need for care, to better understand the origin of their suffering, with the aim of developing tailored support.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.schres.2018.07.027>.

#### Conflict of interest

None.

#### Contributors

Author Kim Majjer initiated this collaboration. Authors Kim Majjer, Laura Steenhuis and Rosa Lotgering managed the data and undertook the statistical analysis. Authors Kim Majjer, Laura Steenhuis and Agna Bartels wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

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