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ORIGINAL PAPER

Mild psychotic experiences among ethnic minority and majority adolescents and the role of ethnic density

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Abstract
Purpose Despite evidence of the increased risk of psychotic disorders among ethnic minority adults, little is known about the effect of ethnic minority status to mild psychotic experiences among adolescents. This study investigated mild psychotic experiences in ethnic minority and majority adolescents in a Dutch representative general population sample, and tested the ethnic density effect in the classroom.
Methods The CAPE was used to assess mild psychotic experiences among Dutch ($n = 3{,}606$) and non-Western ethnic minority pupils ($n = 769$).
Results Ethnic minority adolescents showed higher levels of grandiosity and delusions than their ethnic majority peers, whereas no differences were found for hallucinations, paranormal beliefs and paranoia between both groups of adolescents. The ethnic density effect was partly confirmed for the ethnic majority: a decrease of ethnic majority pupils in class increased their feelings of paranoia.
Conclusions Because only some dimensions of mild psychotic experiences were affected by ethnic minority status or the interaction between ethnic minority status and ethnic class composition, our findings emphasize that mild psychotic experiences are multifactorial in origin, with different underlying processes.

Keywords Mild psychotic experiences · CAPE · Ethnic minority status · Adolescence · Ethnic density

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Introduction

The alarming differences in rates of psychotic disorders between the ethnic minority and majority [1–4] call for a thorough understanding of the antecedents and social circumstances under which psychotic symptoms develop. The current study addresses these issues by shifting the focus from adults to adolescents and taking into account the possible effects of ethnic density. More specifically, using a representative sample of adolescents throughout the Netherlands, this study investigated differences in mild psychotic experiences between ethnic minority and majority adolescents taking ethnic school class composition into account. Little is known about differences in mild psychotic experiences between ethnic minority and majority adolescents. Only two studies investigated psychotic-like experiences in ethnic minority and majority youths revealing that ethnic minority status increases the risk of these experiences [5, 6]. Next, although previous studies found that ethnic minority adults living in neighborhoods with a high proportion of co-ethnics show lower risks of psychotic disorders than ethnic minority adults living in areas with a much smaller proportion of co-ethnics [7–10], the relation between ethnic school class

density and mild psychotic experiences in adolescents has, to our knowledge, never been investigated. Studying ethnic density in the school class may be especially important since this is a context in which adolescents spend a large proportion of their time [11] and former studies showed an effect of ethnic school class density on both perceived discrimination and mental health problems [11, 12].

Method

Data collection and sample

For the current study, the Dutch Health Behavior in School-Aged Children (HBSC) data were used which were collected in the fall of 2005. The HBSC study is a large cross-national adolescent population study providing key insights into health-related behaviors of young people in 38 European countries, the US, Canada and Israel [13]. For the current study, only the Dutch data were used. Following international HBSC protocol, a random sample of 137 schools was selected out of all secondary education schools in the Netherlands (proportional to urbanization strata, and excluding schools for special education or schools with a restricted number of grades). Of the eligible schools, 64 (47 %) schools agreed on participation. The participating and non-participating schools did not differ significantly in terms of school level, urbanization and percentage of ethnic minority pupils [14]. All pupils within the classes were asked to participate, yielding a response rate of 93 %, with non-response primarily due to sick leave [14].

Only pupils in classes with more than six pupils were included in our sample, to ensure the effect of the social factors, which resulted in an exclusion of 0.7 % of the adolescents (33 pupils). Thus, class sizes varied from 7 to 32 pupils per class ($M = 21$, SD 5.54). Next, only pupils with a Dutch native or non-Western ethnic background were selected for the current study. Pupils with a Western ethnic background other than Dutch (265 pupils, 5.7 %) were excluded from the study. Ethnic minority status was ascribed when the father, mother or both parents of the adolescent were born in a non-Western country. The sample included 3,606 (82.4 %) ethnic Dutch and 769 (17.6 %) non-Western ethnic minority pupils (including 228 (5.2 %) Moroccan, 182 (4.2 %) Turkish, 178 (4.1 %) Surinamese or Antillean, and 181 (4.1 %) other non-Western pupils). Pupils without an indication of ethnic background were deleted from the sample (0.6 %). This resulted in a total sample of 4,375 pupils. Gender was equally distributed over the sample (50.0 % were female) and the mean age of the adolescents was 14.08 (SD 1.3; ranging from 10 to 18 years). The number of pupils aged below 12 and over 16 was very small (0.2 and 2.4 %, respectively).

Mild psychotic experiences

The Community Assessment of Psychotic Experiences (CAPE) positive experiences subscale (20 self-reported items) was used to assess mild psychotic experiences [15, 16]. The CAPE was developed to study self-reports of lifetime psychotic experiences [17] and assesses (a) frequency and (b) distress associated with the experience both on a four-point scale (0 = never/not distressed to 3 = nearly always/very distressed). A recent Dutch general population study among adolescents identified a five-dimensional structure of the CAPE [18], distinguishing subscales on hallucinations (e.g., hearing voices when alone), delusions (e.g., thoughts in your head are not your own), paranoia (e.g., feelings of a conspiracy against you), grandiosity (e.g., you are destined to be someone very important), and paranormal beliefs (e.g., telepathic beliefs). To confirm the 5-factor structure, a Confirmatory Factor Analysis (CFA) was carried out in Mplus version 6 [19]. Consistent with Wigman, Vollebergh and colleagues [18], CAPE items were defined as ordinal and estimation was done with weighted least squares (WLSMV). Replicating their findings, the five-factor model showed a sufficient fit to the data (CFI = 0.97; RMSEA = 0.037; $\chi^2 = 1153.27$; $df = 160$). The standardized factor loadings were all significant and ranged from 0.53 to 0.87. As expected with a model assessing closely related constructs, the correlations between the factors were high (between 0.42 and 0.84). To assess the reliability of the factor measurement, the reliability coefficient (ρ) was calculated.[1] For hallucinations and delusion, the ρ was good to excellent ($\rho = 0.92$ and $\rho = 0.78$, respectively). For paranoia, grandiosity, and paranormal beliefs, reliability was lower but acceptable ($\rho = 0.69$; $\rho = 0.66$; $\rho = 0.69$, respectively). A 'frequency score' (sum of all frequency items, not dichotomized) and a 'distress score' (sum of all distress items, not dichotomized) were calculated for every subdimension. For the 'distress score', adolescents who did not report any lifetime psychotic experiences on the specific subdimension were excluded.

Proportion of ethnic minorities in the class

Since the distinct non-Western ethnic groups were very small compared to the Dutch reference group, a measure of ethnic density was used in which the percentage of non-Western pupils per class was assessed. The median of ethnic minority pupils per class was 7 % [interquartile range (IQR) = 0.18]. For ethnic majority pupils, the

[1] The reliability coefficient (ρ) is considered a dependable estimator of multicomponent instrument reliability, and preferable over the Cronbach's α, see [20].

proportion of ethnic minorities in their class ranged from 0.00 to 0.96 with a median of 5.3 % (IQR = 0.11). For ethnic minority pupils, the proportion of ethnic minorities in their class ranged from 0.03 to 1.00, with a median of 67 % (IQR = 0.75).

Confounders

The educational level of pupils was assessed by the pupils' report of the type of school they attended. Level of education ranged from lower pre-vocational education (24.0 %), lower to intermediate general education (30.7 %), higher general education (25.1 %), and pre-university secondary education (19.8 %). Observed family wealth was assessed by the question 'how well off is your family?'. The answers ranged from 0 (not well off) to 4 (quite well off) with a mean of 2.15 (SD 0.74). Age, gender, educational level and family wealth were taken as control variables at the student level. Class size was accounted for at the class level. To enhance interpretation, all continuous control measures were centered at the sample mean.

Missing data

There were 7.5 % missing values on the CAPE. However, none of the respondents had more than four missing answers on the 20-item CAPE scale. For the respondents with missing answers, the mean of the other items was used for imputation. Students with no reliable indication of ethnic background were deleted from the sample (0.6 %). Missing data on other variables did not exceed 1.6 %. The data were not MCAR (Little's MCAR $\chi^2 = 301{,}237$ (2,179), $p = 0.00$). However, the assumption for MAR did hold. The maximum likelihood (ML) estimation method in Mplus was used to both complete and incomplete cases to calculate log likelihood, resulting in unbiased parameter estimates, even with MAR data.

Analyses

A structural model which specified the relationship between ethnic minority status and the five mild psychotic experiences was tested. Next, both a main effect of the proportion of ethnic minority pupils in class and an interaction between ethnic minority status and this ethnic class composition was added to the model to establish whether the ethnic density of the class conditions the relationship between ethnic minority status and mild psychotic experiences. As the data contained pupils within classes, a multilevel factor model was estimated with separate within (pupil level) and between (class level) covariance matrixes [21]. This resulted in estimation of a multilevel multivariate factor model with five latent dependent variables. All analyses were carried out in Mplus version 6 [19]. Throughout the analyses, CAPE items were treated as continuous and robust maximum likelihood (MLR; robust to non-normality and non-independence of observations) estimation was used.

Results

Descriptives

Table 1 shows the distribution of all studied variables for both non-Western ethnic minorities and the ethnic Dutch majority. Ethnic minority pupils were older and more likely to be a girl than ethnic majority pupils. Also, the average educational level as well as the perceived family wealth was lower in ethnic minority compared to majority pupils. Ethnic minority pupils showed higher levels of delusion and grandiosity than pupils belonging to the ethnic majority, but no differences in distress scores were found for all subdimensions of the CAPE.

Ethnic minority status and mild psychotic experiences

A multivariate multilevel factor model with multiple latent dependent variables was estimated to investigate the relationship between ethnic minority status and mild psychotic experiences. Prior to this, the intraclass correlation (ICC) was estimated for the five latent dependent variables in the measurement model. The ICC indicates the proportion of the variance in the latent variable at the class level. For Hallucinations, the ICC was 0.055, with $p < 0.05$. The ICC's for delusion (0.044), paranoia (0.043), grandiosity (0.049) and paranormal beliefs (0.036) were significant as well ($p < 0.05$), allowing multilevel model estimation.

Model 1 in Table 2 estimated the main effects at the student level, while accounting for the nesting of pupils in classes. The relationship between ethnic minority status and delusion and grandiosity was significant and positive when age, sex, educational level, and family wealth were taken into account, indicating that ethnic minority adolescents showed higher levels of both delusion and grandiosity than adolescents from the ethnic majority. The same analysis distinguishing between ethnic minorities from different ethnic backgrounds (i.e., Moroccan, Turkish and Surinamese/Antillean) was conducted to explore whether similar differences in mild psychotic experiences between the ethnic minority and majority were revealed for ethnic minority adolescents originating from different ethnic backgrounds. Compared to the ethnic majority, adolescents with a Surinamese/Antillean ethnic background showed equally high levels of mild psychotic experiences, while

Table 1 Distribution of all variables for ethnic majority and minority pupils

	Ethnic majority (n = 3,606) M/% (SD)	Ethnic minority (n = 769) M/% (SD)	Test
Age (range 10–18)	13.90 (1.30)	14.15 (1.34)	$t = -4.8$; $p < 0.00$
Female (% girls)	49.2 %	54.1 %	$\chi = 6.2$; $p = 0.01$
Education (range 0–3)	1.52 (1.03)	0.94 (1.00)	$t = 14.1$; $p < 0.00$
Family wealth (range 0–4)	2.19 (0.73)	1.95 (0.78)	$t = 8.1$; $p < 0.00$
Hallucination (range 0–9)	0.59 (1.23)	0.67 (1.44)	$t = -1.6$; $p = 0.12$
Distress hallucination (range 0–9)	1.11 (1.61)	1.11 (1.80)	$t = 0.1$; $p = 0.95$
Delusion (range 0–24)	1.93 (2.61)	2.70 (3.30)	$t = -7.0$; $p < 0.00$
Distress delusion (range 0–24)	1.38 (2.22)	1.56 (2.69)	$t = -1.6$; $p = 0.11$
Paranoia (range 0–15)	2.92 (2.06)	2.97 (2.34)	$t = -0.6$; $p = 0.56$
Distress paranoia (range 0–15)	1.91 (2.17)	1.88 (2.41)	$t = 0.4$; $p = 0.70$
Grandiosity (range 0–6)	0.77 (1.16)	1.17 (1.41)	$t = -8.3$; $p < 0.00$
Distress grandiosity (range 0–6)	0.47 (0.94)	0.44 (0.95)	$t = 0.5$; $p = 0.62$
Paranormal Beliefs (range 0–6)	0.97 (1.33)	0.95 (1.32)	$t = 0.2$; $p = 0.80$
Distress paranormal Beliefs (range 0–6)	0.42 (0.90)	0.39 (0.94)	$t = 0.5$; $p = 0.61$

Turkish adolescents showed higher scores on delusions ($b = 0.06$; $p < 0.05$) and lower scores on paranormal beliefs ($b = -0.13$; $p < 0.05$). Adolescents with a Moroccan ethnic background also reported lower levels of paranormal beliefs ($b = -0.12$; $p < 0.05$), as well as lower levels of hallucinations ($b = -0.10$; $p < 0.05$) and paranoia ($b = -0.07$; $p < 0.05$) than ethnic majority adolescents.

Furthermore, older pupils were found to experience lower levels of hallucination, whereas they reported higher levels of paranoia, grandiosity and paranormal beliefs (Model 1, Table 2). Next, girls reported significantly more symptoms on all dimensions, except for grandiosity and pupils at higher school levels reported fewer symptoms on hallucination, delusion, and paranoia. An increase of family wealth was significantly and negatively related to paranoia and paranormal beliefs, but significantly increased feelings of grandiosity. The variables age, sex, educational level, and family wealth were also controlled for in Model 2 and 3 but are not displayed in Table 2 due to the size of the models.

Model 2 in Table 2 includes the class level predictor proportion of ethnic minority pupils (Proportion EM). Results showed that an increase in the proportion of ethnic minority pupils in the class is related to an increase in symptoms of grandiosity and paranormal beliefs, while taking individual differences in mild psychotic experiences between the ethnic majority and minority into account. Differences between ethnic minority and majority adolescents on delusion and grandiosity remained significant and in the same direction. However, when controlling for the ethnic class composition, it was found that ethnic minority pupils experience fewer paranormal belief experiences compared to pupils belonging to the ethnic majority.

Ethnic density

In the last model, the moderation of the proportion of ethnic minority adolescents in the class on the relation between ethnic minority status and mild psychotic experiences was tested. To investigate moderation, the interaction terms were included. The findings are reported in Model 3, Table 2. The results showed a significant interaction for paranoia. Graphical representation of this interaction is provided in Fig. 1, showing that with an increasing proportion of ethnic minority pupils in class, pupils belonging to the ethnic majority show an significant increase in paranoia ($b = 0.16$; $p < 0.05$). For the ethnic minority, the decrease in mild psychotic experiences was minimal and not significant with $b = -0.05$; $p = 0.99$ (paranoia went from 0.06 to 0.02 on a 4-point scale). The effect is estimated for pupils of average age, educational level, family wealth and class size. Note that for the other dimensions hallucinations, delusion, grandiosity, and paranormal beliefs this same pattern exists, although not significant. An analog analysis distinguishing between ethnic minorities from different ethnic backgrounds (i.e., Moroccan, Turkish and Surinamese/Antillean) showed no interaction between the proportion of ethnic minorities in class and the subscales of mild psychotic experiences.

Discussion

Although ethnic minority adults have been found to show a higher risk of psychotic experiences than adults from the ethnic majority [1–3], our representative general population sample indicated only slightly higher levels of mild

Table 2 Multilevel multivariate regressions for the relationship between ethnic minority status (ethnic majority, $n = 3{,}606$; ethnic minority, $n = 769$) and mild psychotic experiences and the moderating effect of ethnic class composition

	Hallucination	Delusion	Paranoia	Grandiosity	Paranormal beliefs
Model 1					
Pupil level					
Ethnic minority	−0.00 (0.02)	0.06 (0.01)*	−0.02 (0.01)	0.20 (0.03)*	−0.04 (0.03)
Age	−0.02 (0.01)*	0.00 (0.00)	0.01 (0.00)*	0.04 (0.01)*	0.04 (0.01)*
Female	0.05 (0.01)*	0.04 (0.01)*	0.11 (0.01)*	−0.11 (0.02)*	0.22 (0.02)*
Education	−0.06 (0.01)*	−0.03 (0.01)*	−0.02 (0.01)*	−0.01 (0.01)	0.00 (0.11)
Observed wealth	0.00 (0.01)	0.01 (0.01)	−0.03 (0.01)*	0.08 (0.01)*	−0.05 (0.01)*
Deviance	128,811.04				
Model 2					
Pupil level					
Ethnic minority	−0.03 (0.03)	0.05 (0.02)*	−0.02 (0.02)	0.13 (0.04)*	−0.08 (0.03)*
Class level					
Proportion EM	0.07 (0.05)	0.02 (0.03)	0.02 (0.03)	0.16 (0.05)*	0.12 (0.06)*
Deviance	128,769.26				
Model 3					
Pupil level					
Ethnic minority	0.01 (0.04)	0.07 (0.02)*	0.03 (0.02)	0.18 (0.05)*	−0.03 (0.05)
Class level					
Proportion EM	0.19 (0.09)*	0.08 (0.05)	0.16 (0.65)*	0.29 (0.09)*	0.27 (0.11)*
Cross level					
Proportion EM × EM	−0.18 (0.09)	−0.09 (0.06)	−0.20 (0.07)*	−0.19 (0.11)	−0.21 (0.13)
Deviance	130,541.85				

Coefficients are unstandardized and on a 4-point scale. Standard errors are reported between parentheses. All control variables are centered at their sample mean. In model 2 and 3, control variables at the individual level are controlled for but not displayed; the same accounts for the (non-significant) effects of school class size

EM ethnic minority

* $p < 0.05$, two-tailed test

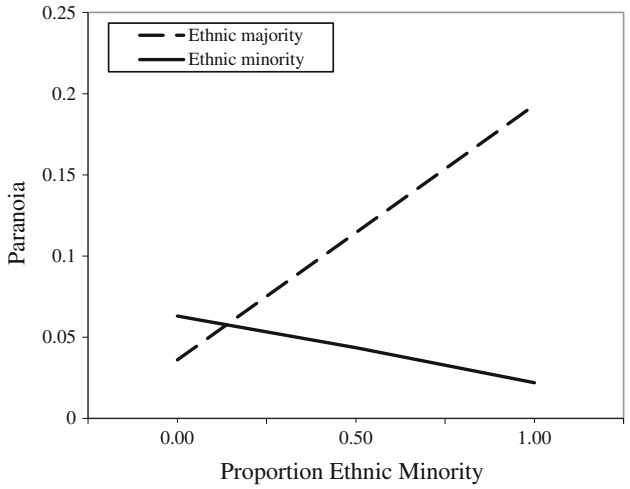

Fig. 1 The effect of the ethnic class composition on the relationship between ethnic minority status and paranoia

psychotic experiences in ethnic minority compared to majority adolescents and no differences in distress scores between ethnic majority and minority adolescents. More specifically, this study found higher levels of delusional thoughts and feelings of grandiosity in ethnic minority adolescents, whereas no differences were found for hallucinations, paranormal beliefs and paranoia between both groups of adolescents. Moreover, distinguishing between ethnic minority groups originating from different ethnic backgrounds, only adolescents from Turkish descent showed significantly higher levels of delusional thoughts and lower levels of paranormal beliefs than adolescents from the ethnic majority. Moroccan adolescents reported lower scores on paranormal beliefs, paranoia and hallucinations than their ethnic majority peers. The results of this study suggest an influence of the ethnic class composition on the impact of ethnic minority status on feelings of paranoia for ethnic majority pupils: a decrease of ethnic

majority pupils in a class was found to increase feelings of paranoia in pupils belonging to the ethnic majority.

Differences in mild psychotic experiences between adolescents belonging to the ethnic majority and minority were found for only two dimensions, grandiosity and delusion. The increased level of grandiosity and delusional symptoms in ethnic minority adolescents might be related to their relatively unfavorable position in society and more specifically to their experiences with discrimination. Former research indicated that facing discrimination can bolster and enhance an unrealistically positive and fragile sense of self [22, 23]. Moreover, experiencing discrimination and social adversity influences how people attribute (explain) daily events, and might generate a delusional attribution style for such events [24, 25]. Still, these results were only replicated for delusional experiences of adolescents with a Turkish ethnic background, while for Moroccan and Surinamese/Antillean adolescents no elevated levels of delusional experiences as well as grandiosity were found. Notwithstanding the possibility that these latter findings may be due to power problems, they do suggest that more research is necessary to be able to draw firm conclusions about the extent to which ethnic minority adolescents show an increased risk of grandiosity and delusions when compared with ethnic majority adolescents.

On the subscales for hallucination, paranoia and paranormal beliefs, no differences in mild psychotic experiences between ethnic majority and minority adolescents were found, which seems to be in contrast with previous research. However, since most former research made use of adult clinical populations [1, 4], our results might point out that possible ethnic minority effects within adolescent populations may only become visible when taking into account persistence or severity of the symptoms. This explanation may be in line with the only study in this field conducted among a general adolescent population. Wigman, van Winkel et al. [26] investigated longitudinal trajectories in the development of mild psychotic experiences, and only reported an increased risk for ethnic minority adolescents to develop a persistent trajectory, which included only two percent of the adolescents. This former study implied that although ethnic minority effects are modest, a small group of adolescents with a persistent trajectory of mild psychotic experiences is identifiable in which ethnic minorities are overrepresented.

The present findings showed an ethnic density effect for ethnic majority adolescents. For these adolescents, experiencing the socially defined dimension paranoia was affected by the ethnic composition of the class: with a decreasing proportion of ethnic majority pupils, an increase of paranoia for ethnic majority pupils was found. Paranoia is the only dimension of mild psychotic experiences that typically involves aversive experiences instigated by other people and social threat [27], like rejection by peers based on your appearance, feelings of people conspiring against you and/or feelings that people are not who they seem to be. Therefore, it is not strange that the ethnic class composition matters most for paranoia. However, the findings of this study suggest that the impact of ethnic minority status on mild psychotic experiences may not be influenced by the ethnic class composition. Although it cannot be ruled out that these findings are due to the relatively small sample size of the non-Western ethnic minority population, this finding might also be explained by the notion that ethnic minority adolescents are accustomed to being a numerical minority in their social contexts. In contrast, this may not be the case for ethnic majority members. The presence of a considerable number of ethnic minority pupils in their class might lead to feelings of social anxiety for ethnic majority pupils. In congruence with this idea, a recent experimental study demonstrated that even if objectively the power balance does not change, whites respond with more fear and anger toward ethnic outgroups when they perceive them as relatively increasing [28].

The present research should be considered in the light of some limitations. First, in this study, being a member of a non-Western ethnic minority was defined as having at least one of your parents born in a non-Western country. As such, this definition excludes third and higher generation non-Western ethnic minority adolescents as well as includes those non-Western ethnic minority adolescents who do not ascribe themselves as a member of this ethnic minority group. Although this definition may not be appropriate for countries such as the UK and the US that have a long history of migration, it seems to adequately fit the Dutch migration context characterized by a relatively recent process of migration. More specifically, almost 98 % of the adolescents with a non-Western ethnic background in the Netherlands are a first- or second-generation immigrant [29]. Also, former Dutch research showed that between 76 and 90 % of the largest populations of non-Western born young adults categorizes him- or herself as a member of this non-Western population [30]. Together these findings implicate that our definition used to assess non-Western ethnic minority status is able to include the vast majority of these ethnic minority populations in the Netherlands. However, because of limited sample size, this study was not able to study mild psychotic experiences in ethnic minority adolescents originating from Western countries. Future studies may consider investigating this, especially because previous research in the Netherlands showed that in contrast to non-Western ethnic minority children, Western ethnic minority children show similar levels of both internalizing and externalizing problems as children belonging to the ethnic majority [31]. Thus, it remains to be seen whether ethnic minority effects may be

comparable for non-Western and Western ethnic minority populations.

Second, because the aim of this study was to assess a sample representative for the total Dutch population, the ethnic minority population was relatively small, which not only increased the possibility of a type 2 error but also made it impossible to use a measure of in-group density instead of ethnic minority proportion. In addition, we explored whether differences in mild psychotic experiences were comparable for different ethnic groups, but must take into consideration that these findings may be a reflection of the small sample sizes of the ethnic minority populations. Future research is warranted distinguishing between ethnic minority populations originating from different ethnic backgrounds. This research is especially important since our results suggested some remarkable differences between ethnic minority populations which do not seem in line with former research conducted in adult clinical populations [4, 32, 33].

Also, the effect of ethnic density might be stronger focusing on specific ethnic minority groups, and might have explained the absence of this effect in this study. However, Verkuyten and Thijs [12] found significant effects of ethnic class composition assessed by percentage of ethnic Dutch pupils in class on racist victimization for both Turkish and Moroccan ethnic minority pupils, which may be an indication of the importance of ethnic minority class proportion for the development of distinct ethnic minority populations. In addition, since the number of classes with a majority of ethnic minority pupils was limited in this study, results may have been even stronger using a sample of more ethnically mixed classes.

Third, at the time of data collection, the classes had been together for only 2 months at most. Still, influences of the ethnic class composition for the ethnic majority pupils were found, indicating that mechanisms of the social context can be present even after a short exposure. More generally, although the school class may be a highly important social context [11] and both this and former research has suggested an impact of ethnic school class density on the development of ethnic minority or majority pupils [11, 12], future studies should also investigate the impact of the ethnic composition of the neighborhood on adolescents' mild psychotic experiences. As such, these studies may generate more knowledge on the potentially different effects of school class and neighborhood density on adolescents' mild psychotic experiences.

Fourth, the study relied on pupils' self-reported mild psychotic experiences. Self-reports may lead to less accurate assessments of these symptoms than clinical interviews. For instance, former studies have suggested reporter biases in both self-, parent-, and teacher-reports of mental health problems for adolescents with a Moroccan ethnic background [34], which might to some extent explain the relatively low levels of mild psychotic experiences in these adolescents. However, it must also be noted that this approach is not susceptible to observer biases especially when inspecting the impact of ethnic minority status [35] and is much less time consuming than using clinical interviews. In addition, the CAPE seems suitable for use in this large-scale general population, since previous research has shown that for the assessment of these types of experiences both self-report and clinical interviews are reliable [17] and this study revealed an adequate fit of the factorial structure of the CAPE for adolescents belonging to the ethnic minority and majority.

Fifth, although we controlled for education level as well as perceived family wealth because these factors may confound the differences in mild psychotic experiences between ethnic minority and majority adolescents, we cannot rule out that the revealed differences in mild psychotic experiences between ethnic minority and majority adolescents were due to differences in other socio economic factors such as school-level or neighborhood-level deprivation. Related to this issue, in this study, no attempts have been made to explain the impact of ethnic minority status on mild psychotic experiences. As outlined above, differences on delusional thoughts and feelings of grandiosity in ethnic minority compared to majority adolescents might be accounted for by the increased likelihood of facing and perceiving discrimination and prejudices in the former population. Future research may investigate this, as well as explore the explanatory power of a family history of mental health problems and adolescent drug use for the association between ethnic minority status and mild psychotic experiences. Possibly, the potentially stressful experience of the process of migration might increase the risk of a family history of mental health problems and adolescent drug use [36], which subsequently could contribute to the presence of psychotic experiences in these young people [37].

Despite its limitations and qualifications and the necessity to replicate the findings in different ethnic minority populations throughout the world, the present study is one of the first to suggest that differences in mild psychotic experiences between ethnic majority and minority adolescents may be limited, although the latter population showed somewhat higher levels of both grandiosity and delusions (but equally high levels of distress). Furthermore, support was provided for the importance of the ethnic class composition for ethnic majority adolescents. For this group, an increased number of non-Western pupils in the class setting was linked to higher levels of paranoia, the dimension representative of social threat.

Given that only some dimensions of mild psychotic experiences were affected by ethnic minority status or the interaction between ethnic minority status and ethnic class composition, our findings emphasize that mild psychotic experiences are complex and multifactorial in origin, with different underlying processes [36]. Future research may bear these findings in mind in attempts to investigate the development and prevalence of mild psychotic experiences and their possible relation with the social context.

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

References

1. Fearon P, Kirkbride JB, Morgan C, Dazzan P, Morgan K, Lloyd T et al (2006) Incidence of schizophrenia and other psychoses in ethnic minority groups: results from the MRC AESOP Study. Psychol Med 36:1541–1550
2. March D, Hatch SL, Susser E (2010) Psychosis in migrant and minority populations: prescriptions for scientific and social policy. Psychol Med 40:737–739
3. Selten JP, Cantor-Graae E (2005) Social defeat: risk factor for schizophrenia? Br J Psychiatry 187:101–102
4. Selten JP, Veen N, Feller W, Blom JD, Schols D, Camoenië W et al (2001) Incidence of psychotic disorders in immigrant groups to The Netherlands. Br J Psychiatry 178:367–372
5. Laurens KR, West SA, Murray RM, Hodgins S (2008) Psychotic-like experiences and other antecedents of schizophrenia in children aged 9–12 years: a comparison of ethnic and migrant groups in the United Kingdom. Psychol Med 38:1103–1111
6. Wigman JTW, van Winkel R, Raaijmakers QW, Ormel J, Verhulst FC, Reijneveld S et al (2011) Evidence for a persistent, environment-dependent and deteriorating subtype of subclinical psychotic experiences: a 6-year longitudinal general population study. Psychol Med 41:2317–2329
7. Veling W, Susser E, Van Os J, Mackenbach JP, Selten J-P, Hoek HW (2008) Ethnic density of neighborhoods and incidence of psychotic disorders among immigrants. Am J Psychiatry 165:66–73
8. Boydell J, van Os J, Mckenzie K, Allardyce J, Goel R, Mccreadie RG et al (2001) Incidence of schizophrenia in ethnic minorities in London: ecological study into interactions with environment. Br Med J 323:1–4
9. Pickett KE, Wilkinson RG (2008) People like us: ethnic group density effects on health. Ethnic Health 13:321–334
10. Stafford M, Becares L, Nazroo J (2009) Objective and perceived ethnic density and health: findings from a United Kingdom general population survey. Am J Epidemiol 170:484–493
11. Gieling M, Vollebergh W, van Dorsselaer S (2010) Ethnic density in school classes and adolescent mental health. Soc Psychiatry Psychiatr Epidemiol 45:639–646
12. Verkuyten M, Thijs J (2002) Racist victimization among children in The Netherlands: the effect of ethnic group and school. Ethnic Racial Stud 25:310–331
13. Currie C, Gabhainn SN, Godeau E, Roberts C, Smith R, Currie D, et al (2008) Inequalities in young people's health: health behaviour in school-aged children international report from the 2005/5006 survey
14. van Dorsselaer S, Zeijl E, van den Eeckhout S, ter Bogt T, Vollebergh WAM (2005) Rapport HBSC 2005: Gezondheid en welzijn van jongeren in Nederland (Report HBSC 2005: Health and wellbeing of youth in the Netherlands) Trimbos Instituut
15. Stefanis NC, Hanssen M, Smirnis NK, Avramopoulos D, Evdokimidis IK, Stefanis CN et al (2002) Evidence that three dimensions of psychosis have a distribution in the general population. Psychol Med 32:347–358
16. Peters ER, Joseph S, Garety P (1999) Measurement of delusional ideation in the normal population: introducing the PDI (Peters et al. Delusions Inventory). Schizophr Bull 25:553–557
17. Konings M, Bak M, Hanssen M, Van Os J, Krabbendam L (2006) Validity and reliability of the CAPE: a self-report instrument for the measurement of psychotic experiences in the general population. Acta Psychiatr Scand 114:55–61
18. Wigman JTW, Vollebergh WAM, Raaijmakers QW, Iedema J, van Dorsselaer S, Ormel J, Verhulst FC et al (2011) The structure of the extended psychosis phenotype in early adolescence—a cross-sample replication. Schizophr Bull 37:850–860
19. Muthén LK, Muthén BO (2010) Mplus User's Guide. Sixth Edition. Muthén & Muthén
20. Raykov T (2004) Behavioral scale reliability and measurement invariance evaluation using latent variable modeling. Behav Ther 35:299–331
21. Hox JJ (2010) Multilevel Analysis. Routledge, Techniques and Applications
22. Raskin R, Novacek J, Hogan R (1991) Narcissism, self-esteem, and defensive self-enhancement. J Pers 59:19–38
23. Twenge JM, Crocker J (2002) Race and self-esteem: meta-analyses comparing Whites, Blacks, Hispanics, Asians, and American Indians. Psychol Bull 128:371–408
24. Bentall RP, Fernyhough C (2008) Social predictors of psychotic experiences: specificity and psychological mechanisms. Schizophr Bull 34:1012–1020
25. Gilvarry CM, Walsh E, Samele C, Hutchinson G, Mallett R, Rabe-Hesketh S et al (1999) Life events, ethnicity and perceptions of discrimination in patients with severe mental illness. Soc Psychiatry Psychiatr Epidemiol 34(11):600–608
26. Wigman JTW, van Winkel R, Jacobs N, Wichers M, Derom C, Thiery E et al (2011) A twin study of genetic and environmental determinants of abnormal persistence of psychotic experiences in young adulthood. A J Med Genet 156B:546–552
27. Bentall RP, Corcoran R, Howard R, Blackwood N, Kinderman P (2001) Persecutory delusions: a review and theoretical integration. Clin Psychol Rev 21(8):1143–1192
28. Outten HR, Schmitt MT, Miller D, Garcia AL (2012) Feeling threatened about the future: whites' emotional reactions to anticipated ethnic demographic changes. Pers Soc Psychol Bull 38:14–25
29. CBS (2008) Verkenning niet-westerse derde generatie (exploration non-western third generation). Centraal Bureau voor de Statistiek, The Hague: the Netherlands
30. Stronks K, Kulu-Glasgow I, Agyemang C (2009) The utility of 'country of birth' for the classification of ethnic groups in health research: the Dutch experience. Ethnic Health 14:255–269
31. Reijneveld SA, Harland P, Brugman E, Verhulst FC, Verloove-Vanhorick SP (2005) Psychosocial problems among immigrant and non-immigrant children. Eur Child Adoles Psy 14:145–152
32. Vanheusden K, Mulder CL, Van der Ende J, Selten J-P, Van Lenthe FJ, Verhulst FC et al (2008) Associations between ethnicity and self-reported hallucinations in a population sample of young adults in The Netherlands. Psychol Med 38:1095–1102
33. Veling WA, Selten JP, Veen N, Laan W, Blom JD, Hoek HW (2006) Incidence of schizophrenia among ethnic minorities in the Netherlands: a four-year first-contact study. Schizophr Res 86:189–193
34. Stevens GWJM, Vollebergh WAM (2008) Mental health in migrant children. J Child Psychol Psychiatry 49:276–294

35. Linscott RJ, Marie D, Arnott KL, Clarke BL (2006) Over-representation of Maori New Zealanders among adolescents in a schizotypy taxon. Schizophr Res 84(2–3):289–296
36. Van Os J, Krabbendam L, Mying-Germers I, Delespaul P (2005) The schizophrenia environment. Curr Opin Psychiatry 18:141–145
37. Garety P, Gittins M, Jolley S, Bebbington P, Dunn G, Kuipers E et al (2013) Differences in cognitive and emotional processes between persecutory and grandiose delusions. Schizophr Bull 39:629–639