

## Discrimination and delusional ideation

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**Background** In the UK and The Netherlands, people with high rates of psychosis are chronically exposed to discrimination.

**Aims** To test whether perceived discrimination is associated longitudinally with onset of psychosis.

**Method** A 3-year prospective study of cohorts with no history of psychosis and differential rates of reported discrimination on the basis of age, gender, disability, appearance, skin colour or ethnicity and sexual orientation was conducted in the Dutch general population ( $n=4076$ ). The main outcome was onset of psychotic symptoms (delusions and hallucinations).

**Results** The rate of delusional ideation was 0.5% ( $n=19$ ) in those who did not report discrimination, 0.9% ( $n=4$ ) in those who reported discrimination in one domain, and 2.7% ( $n=3$ ) in those who reported discrimination in more than one domain (exact  $P=0.027$ ). This association remained after adjustment for possible confounders. No association was found between baseline discrimination and onset of hallucinatory experiences.

**Conclusions** Perceived discrimination may induce delusional ideation and thus contribute to the high observed rates of psychotic disorder in exposed minority populations.

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There are consistent reports of high rates of affective and non-affective psychotic disorder and psychotic and psychosis-like symptoms in groups of people of African and Caribbean origin in the UK and The Netherlands (Harrison *et al*, 1988; Selten & Sijben, 1994; Sharpley & Peters, 1999; Johns *et al*, 2002). These populations are subject to racial discrimination (Chahal & Julienne, 1999) and there are claims that the association between ethnic group and psychosis is confounded by racial discrimination (Littlewood & Lipsedge, 1997; Boydell *et al*, 2001). A national UK study has reported increased rates of common mental disorder and psychosis in those who say they have been the victims of racial discrimination (Karlsen & Nazroo, 2002). However, a large study in the USA has shown that perceived discrimination is commonplace, and although people who described themselves as 'US non-Hispanic Black' are more likely to suffer from discrimination, it was perceived discrimination itself, not discrimination linked to ethnic group, that was associated with non-psychotic mental illness (Kessler *et al*, 1999). The same may apply to psychotic illness. Psychosis-like phenomena such as delusional ideation and isolated hallucinations are prevalent in the general population (van Os *et al*, 2000) and constitute a risk factor for the development of clinical psychotic disorders (Poulton *et al*, 2000; van Os *et al*, 2001). Immigrant groups with high rates of psychotic disorder, such as African-Caribbeans living in the UK (Harrison *et al*, 1988), also have higher rates of these psychosis-like phenomena (Sharpley & Peters, 1999; Johns *et al*, 2002). A theory that integrates these findings is that chronic experience of discrimination, regardless of ethnic group, might give rise to a paranoid attributional style and higher rates of psychosis-like phenomena, which put individuals at risk of developing clinical psychotic states (McKenzie *et al*, 1995; Gilvarry *et al*,

1999). However, a direct link between discrimination and psychotic phenomena needs to be made if such a theory is to be entertained.

Our hypothesis was that people who reported that they had been the subject of perceived discrimination would be more likely subsequently to develop psychotic symptoms, regardless of their ethnic origin. We tested this hypothesis using data from a longitudinal, random population sample of 7076 individuals interviewed for the presence of psychotic symptoms.

## METHOD

### Sample

This study is a part of The Netherlands Mental Health Survey and Incidence Study (NEMESIS), a longitudinal study of the prevalence, incidence, course and consequences of psychiatric disorders in the Dutch general population (van Os *et al*, 2000, 2001). The local ethics committee approved the study proposal. Participants were contacted at three points in time: 1996 (baseline), 1997 ( $T_1$ , assessing the period between baseline and  $T_1$ ) and 1999 ( $T_2$ , assessing the period between  $T_1$  and  $T_2$ ). A multi-stage, stratified, random sampling procedure was used to identify the sample. First, 90 municipalities were sampled randomly. Second, households were randomly selected. Third, the individual living in the household with the most recent birthday and aged between 18–64 years was asked to participate. Those living in institutions, including psychiatric hospitals, were not included in the sampling frame. Only those fluent in Dutch could participate so the proportion from ethnic minorities was limited. All participants received an introductory letter from the Ministry of Health.

A total of 7076 participants were enlisted at baseline. The response rate was 69.7%. No difference in psychiatric morbidity based on the 12-item General Health Questionnaire (GHQ-12; Goldberg, 1978) was found between responders and non-responders. At  $T_1$ , 5618 persons participated; this reduced to 4848 at  $T_2$ .

### Risk-set

We were interested in whether perceived discrimination at baseline was associated with psychotic symptoms at 3-year follow-up. Because of this, we restricted our sample to those individuals who at baseline

had a lifetime rating of no psychotic symptoms (or psychosis-like experiences) on all the individual items of a psychosis screening interview and had been interviewed for the presence of psychotic symptoms at  $T_2$ . This was done for three reasons. First, this skewed the sample towards individuals with true first-ever occurrence of psychotic experiences at  $T_2$ . Second, it decreased bias due to the influence of baseline psychotic or psychosis-like symptoms on the reporting of discrimination (for example, individuals with paranoid symptoms may perceive, and report, more discrimination). Finally, it reduced the possibility of reversed causality, i.e. 'strange' individuals with psychosis-like symptoms being the subject of discrimination. Our risk-set included 5838 persons at baseline. Of these, 4067 (70%) were interviewed at  $T_2$ .

### Instruments

The participants were interviewed at home with the Composite International Diagnostic Interview (CIDI), version 1.1 (Smeets & Dingemans, 1993) at baseline,  $T_1$  and  $T_2$ . The CIDI generates DSM-III-R diagnoses (American Psychiatric Association, 1987) and is designed for trained interviewers who are not clinicians. Interviewers read out questions in a standardised way and record respondents' answers, making the CIDI essentially a self-report instrument. The CIDI psychosis section consists of 17 core psychosis items (G1-G13, G15, G16, G20 and G21). These psychosis items correspond to classic psychotic symptoms, including persecution, thought interference, auditory hallucinations and passivity phenomena. Both clinically relevant stressful psychotic experiences and subclinical psychosis-like experiences are rated by the CIDI (van Os *et al*, 2000). For example, the experience of sometimes hearing a friendly voice in the absence of any secondary delusional ideation would be rated as a non-clinical psychosis-like experience, whereas the experience of hostile voices for which the person was seeking help because of distress would be rated as a clinical symptom. Personality tests completed at baseline were the Rosenberg Self-Esteem Scale, a ten-item, four-point Likert scale yielding a global self-esteem score (Rosenberg, 1965), the 14-item Groningen Neuroticism Scale (Ormel, 1980) and a five-item mastery scale indicating locus of control (Pearlin & Schooler, 1978).

### Final assessment of incident psychotic symptoms

As psychotic symptoms may be difficult to diagnose by lay interviewers, further clinical interviews, guided by the findings of the CIDI interview on psychotic symptoms, were conducted over the telephone by an experienced clinician (psychiatrist, senior psychiatric trainee or psychologist) with all individuals who had evidence of psychosis on any of the CIDI psychosis items at  $T_2$  (Krabbendam *et al*, 2002). The proportion of eligible individuals at  $T_2$  who were successfully reinterviewed by the clinician was 74.4%.

The  $T_2$  diagnosis of psychotic symptoms by clinicians at telephone interview was made using the three items of the Brief Psychiatric Rating Scale (BPRS): 'unusual thought content', 'hallucinations' and 'conceptual disorganisation' (Overall & Gorham, 1962). Each symptom was scored on a range from 1 (absent) to 7 (very severe). The BPRS items 'unusual thought content' and 'hallucinations' represent the positive symptoms for psychosis. Delusional ideation was defined as a rating greater than 1 for the BPRS 'unusual thought content' item; presence of hallucinations as a rating greater than 1 for the BPRS item 'hallucinations'.

### Perceived discrimination

At the baseline interview, participants were asked if they had experienced discrimination over the past year because of their skin colour or ethnicity; gender; age; appearance; disability; or sexual orientation. Participants answered 'yes' or 'no' to each of the six questions.

### Statistical analysis

The rate of onset of delusional ideation was tabulated as a function of level of baseline perceived discrimination and statistically evaluated using Fisher's exact test. Adjustment for confounders was made using logistic regression in the STATA statistical program (StataCorp, 2001), yielding odds ratios. Perceived discrimination score was analysed as a three-level variable: 0, no discrimination (86%); 1, reported discrimination in one domain (11%); 2, reported discrimination in more than one domain (3%).

The following confounders of the association between perceived discrimination and psychosis were selected *a priori*,

guided by the literature: gender, age (five groups), urbanicity of place of residence (three levels), level of education (four levels), unemployment, single marital status and presence of any baseline CIDI-generated DSM-III-R diagnosis. Level of education, unemployment and single marital status are risk factors for psychotic illness that could arguably also be associated with higher rates of discrimination from others (i.e. reversed causality). Because psychotic illness may be preceded by non-psychotic illness and there are increased rates of discrimination in people with any mental health problems, we adjusted for the presence of any DSM-III-R diagnosis at baseline and, to increase sensitivity, for the presence of CIDI depressive symptoms E1 (persistent low mood over a period of 2 weeks) and E2 (persistent low mood over a period of 2 years). In order to take into account the effect of personality traits that might facilitate reporting of discrimination or the development of paranoid attributions, we also corrected for baseline self-esteem, neuroticism and locus of control.

The NEMESIS study had no precise measures of ethnicity and, as explained above, those who could not speak Dutch fluently were excluded. Country of birth was used as proxy of minority status, defined dichotomously as 0, 'born in The Netherlands', and 1, 'other'. However, as none of the 213 individuals born outside The Netherlands had BPRS presence of hallucinations and only one had evidence of BPRS delusional ideation, the proxy measure of minority status was not adjusted for in the analyses.

### Missing data sensitivity analyses

As not all of the eligible participants at  $T_2$  who had displayed evidence of psychosis were interviewed again (the clinical re-interview rate at  $T_2$  was 74.4%, as described above), we conducted analyses to examine whether differential attrition could have biased any findings. This was done by multiple imputation of missing values of perceived discrimination at baseline ( $n=4$  missing) and BPRS delusional ideation and hallucinatory experiences at  $T_2$  ( $n=1793$  missing) using the HOTDECK command in STATA. The HOTDECK procedure is used several times within a multiple imputation sequence since missing data are imputed stochastically rather than deterministically. One thousand imputation

**Table 1** Baseline experience of discrimination during the preceding year related to age, gender, minority status, urbanicity of residence, level of education, unemployment, baseline diagnosis and single marital status

	Discrimination score						$\chi^2$	d.f.
	0		1		2			
	n	%	n	%	n	%		
Total	3521	86	432	11	114	3		
Gender								
Male	1708	89	170	9	45	2		
Female	1813	85	262	12	69	3	15.8***	2
Age (years)								
18–24	218	81	37	14	13	5		
25–34	900	86	110	11	32	3		
35–44	981	87	122	11	26	2		
45–54	801	86	99	11	30	3		
55–64	621	89	64	9	13	2	13.4	8
Minority status								
Born in Netherlands	3346	87	401	10	103	3		
Other	175	81	31	14	11	5	8.0*	2
Urbanicity								
Lowest	640	90	67	9	7	1		
Middle	1643	87	198	10	50	3		
Highest	1238	85	167	11	57	4	18.3**	4
Level of education								
Lowest	1062	84	156	12	46	4		
Medium low	278	87	32	10	8	3		
Medium high	1290	87	152	10	38	3		
Highest	852	89	84	9	19	2	14.5*	6
Employment status								
Unemployed/disabled	141	67	52	25	18	8		
Other	3380	88	380	10	96	2	77.3***	2
Marital status								
Never been married	797	81	146	15	46	5		
Other	2724	88	286	9	68	2	42.4***	2
Any baseline diagnosis								
No DSM–III–R diagnosis	2337	89	230	9	52	2		
DSM–III–R diagnosis	1184	82	202	14	62	4	47.0***	2

Discrimination score: 0, no discrimination; 1, reported discrimination in one domain; 2, reported discrimination in more than one domain.

\* $P < 0.05$ ; \*\* $P = 0.01$ ; \*\*\* $P = 0.001$ .

sequences were run, yielding 1000 data-sets in which the average logistic regression effect size of perceived discrimination on delusional ideation and hallucinatory experience was estimated within the HOTDECK procedure. Imputation of missing values was stratified by the following important determinants: age, gender, urbanicity, unemployment, country of birth, single marital status, any DSM–III–R baseline diagnosis, and level of education.

## RESULTS

### Effect of perceived discrimination

The mean age of the risk-set at  $T_2$  was 41.4 years (s.d. 11.8), and 2144 (53%) were women. The rates of baseline perceived discrimination were: skin colour or ethnicity 75 (2%), gender 182 (4%), age 261 (6%), appearance 80 (2%), disability 77 (2%) and sexual preference 13 (0.3%). Gender, urbanicity, single marital status, educational level, unemployment and

baseline DSM–III–R diagnosis were associated with perceived discrimination (Table 1). The rate of delusional ideation was 0.5% in those who did not report discrimination, 0.9% in those who reported discrimination in one domain and 2.7% in those who reported it in more than one domain (exact  $P = 0.027$ ; OR=2.1, 95% CI 1.2–3.8). This association remained after adjustment for demographic variables, non-psychotic DSM–III–R diagnosis at baseline and indicators of premorbid social adjustment (OR=2.3, 95% CI 1.2–4.2); it also remained after adjustment for the previous confounders and additionally for baseline CIDI depressive symptoms E1 and E2, and the baseline personality measures of neuroticism, self-esteem and locus of control (OR=2.1, 95% CI 1.1–4.0). No association was found between baseline discrimination and onset of hallucinatory experiences.

Multiple imputation of both baseline discrimination and follow-up delusional ideation and hallucinatory experience revealed a similar effect of perceived discrimination at baseline on delusional ideation at follow-up (OR=1.9, 95% CI 1.1–3.4), and no effect on hallucinatory experiences (OR=1.2, 95% CI 0.5–2.9).

## DISCUSSION

The findings suggest that perceived discrimination predicts, in a dose–response fashion, incident delusional ideation.

### Study limitations

There are several methodological limitations. First, there were no suitable measures of ethnicity, and only individuals with sufficient proficiency in Dutch were included. This selection might have led to exclusion of members of minority groups with the lowest levels of acculturation and, possibly, with discrimination.

It could be argued that our findings may represent residual confounding by ethnic group (being exposed to more discrimination and having higher rates of psychosis). However, even when we restricted the sample to individuals who were born in The Netherlands and whose father and mother had both been born in The Netherlands (thus effectively excluding current immigrant groups living in The Netherlands), the effect size of perceived discrimination on delusional ideation was not reduced (OR=2.0, 95% CI 1.0–4.0). Another test

**Table 2** Odds ratios for the onset of psychosis at final assessment ( $T_2$ ) after experience of discrimination during the year preceding baseline measurement

	BPRS delusional ideation				BPRS hallucination			
	Presence		Absence		Presence		Absence	
	n	%	n	%	n	%	n	%
Baseline level of discrimination								
0	19	0.5	3485	99.5	19	0.5	3485	99.5
1	4	0.9	424	99.1	1	0.2	427	99.8
2	3	2.7	4	97.3	2	1.8	111	98.2
Fisher's exact test	P=0.027				P=0.13			
Odds ratio								
Linear trend <sup>1</sup> (95% CI)	2.1 (1.2–3.8)				1.3 (0.6–3.0)			
Trend adjusted <sup>2</sup> (95% CI)	2.3 (1.2–4.2)				1.2 (0.5–2.7)			

BPRS, Brief Psychiatric Rating Scale.

1. Unadjusted odds ratio: the summary increase in risk with one unit change in experience of discrimination.

2. Odds ratio adjusted for gender, age, urbanicity of place of residence, level of education, unemployment, single marital status and presence of any DSM-III-R diagnosis.

of this possible bias is to exclude reported discrimination on the basis of skin colour from the discrimination measure in the logistic regression. Excluding these individuals increased rather than decreased the adjusted OR (OR=2.5, 95% CI 1.3–4.8), again indicating that this bias was not operating. These limitations, therefore, should not undermine the main finding reported in this study that perceived discrimination at baseline is associated with onset of delusional ideation.

Second, as in all longitudinal population surveys, there was substantial attrition between baseline and  $T_2$ . However, detailed analyses of attrition in this sample suggest that attrition was largely random as far as baseline psychopathology is concerned (de Graaf *et al.*, 2000), justifying our method of multiple imputation as a means to conduct sensitivity analyses. *Post hoc* analyses with the main exposure in this study – perceived discrimination – confirmed the randomness of missing values: the mean baseline discrimination score in those who were interviewed at  $T_2$  was 0.17, s.d. 0.48 ( $n=4067$ ; proportion who reported discrimination at baseline in at least one domain 13.4%), and in those who were not interviewed 0.17, s.d. 0.48 ( $n=1767$ ; proportion who reported discrimination in at least one domain 13.4% – rounded figures coincidentally are similar).

Third, the measurement of perceived discrimination was not refined. Respondents were unable to report the frequency and degree of perceived discrimination,

whether this was day-to-day minor incidents or major life-altering incidents or assaults. In addition, our measure of perceived discrimination was broad and included a whole range of discriminatory perceptions, including gender and age. However, previous work has suggested that mental health variables are sensitive to perceived discrimination, regardless of type of discrimination (age, gender, racial, etc.) (Kessler *et al.*, 1999).

Fourth, the statistical resolution of the study was limited, with only 26 cases of onset of broadly defined delusional ideation, in 7 of which some degree of discrimination was reported at baseline. The effect of perceived discrimination was nevertheless statistically precise, and was present after stringent exclusion of all individuals who at baseline had evidence of any level of psychotic experiences that could have interfered with subjective report of discrimination. It is therefore unlikely that the association between perceived discrimination and psychosis was biased by psychosis-prone or psychosis-prodromal individuals reporting more discrimination.

In order to exclude the possibility of reversed causality (premorbid social and cognitive deficits associated with psychotic illness giving rise to discrimination), we adjusted for employment status, marital status and level of education, three variables that have been shown to be sensitive indicators of premorbid deficits in psychotic illness (van Os *et al.*, 1995).

Adjustment did not reduce the discrimination parameter and even increased it, making it unlikely that the effect of perceived discrimination is confounded to a large degree by premorbid social competence. Similarly, adjustment for non-psychotic diagnoses and symptoms as possible precursors of later psychotic illness also did not affect the results, nor did adjustment for possible confounding measures of personality.

### Possible mechanisms

Previous work has shown associations between perceived racial and non-racial discrimination and non-psychotic poor mental health (Kessler *et al.*, 1999; Mays & Cochran, 2001). A cross-sectional national study in the UK has demonstrated an association between perceived discrimination and the rate of psychotic and non-psychotic mental illness in non-White ethnic minority groups (Karlsen & Nazroo, 2002). Our study is, as far as we are aware, the first study to provide prospective evidence of a link between perceived discrimination and delusional ideation, suggestive of a causal link.

There is growing evidence that cognitive attributions play a part in the onset of psychotic symptoms such as delusions (Bentall *et al.*, 2001). Chronic experience of discrimination may have effects on attributions of daily events (Gilvarry *et al.*, 1999), thus facilitating an understandably paranoid attributional style (Sharpely & Peters, 1999). Such effects may be particularly important over a life course, thus forming a plausible explanation for the high observed rates in second-generation immigrants. Perceived discrimination (the exposure used in this study) does not have to be proved to reflect identifiable acts of discrimination. For the argument by which cognitive mechanisms result in psychosis this may not be relevant, as subjective perception of discrimination alone is the prerequisite for the development of a paranoid attributional style. As explained above, it is unlikely that our measure of discrimination was merely a measure of paranoid personality, as all individuals with any level of paranoid ideation at baseline (CIDI has four items measuring paranoid symptoms, G1, G2, G3 and G4, which are sensitive to picking up paranoid ideation; van Os *et al.*, 2000) were excluded from the study.

## Discrimination and contextual effects

If discrimination has a role in the onset of psychosis, it is likely to be modified by a range of contextual factors. Studies within the African American population show that the amount of discrimination that they encounter depends on how dark their skin is (Williams, 1999) and that more US non-Hispanic Blacks report often encountering day-to-day discrimination than do non-Hispanic Whites, with 'other' ethnic groups in between the two (Kessler *et al*, 1999). The impact of perceived discrimination on the risk of hypertension in African Americans depends on their social class and coping style. Ignoring discrimination raises the risk of hypertension in high-income African Americans but lowers the risk in those with low incomes (Krieger & Sidney, 1997). Mortality rates in US states have been shown to be associated with the degree to which Whites disrespect Blacks. Although the effect on Blacks was alarming and significant, there was also a demonstrable effect on Whites. High rates of racial disrespect in an area are thus associated with lower life expectancy for Whites and Blacks (Kennedy *et al*, 1997). Further work should attempt to take into account such contextual effects.

## Discrimination, ethnic group and psychosis

This study focused on the possible effect of perceived discrimination on the onset of delusional ideation, regardless of ethnic group, but could not establish to what degree the reported associations between minority ethnic group, psychotic disorder and psychotic symptoms are actually confounded by perceived discrimination. There is nevertheless validity to this supposition. First, the increase in the rate of psychotic illness in ethnic minority groups is not static: in electoral wards it has been shown to be related to the proportion of the ward population that are from ethnic minority groups. The incidence rate is lower when the proportion of the population from ethnic minorities is higher. These data are thought to reflect decreased exposure to, or increased protection from, racial discrimination in areas with relatively high proportions of ethnic minorities (Boydell *et al*, 2001). Second, it has been shown, albeit in a study of non-psychotic mental illness, that it was perceived discrimination itself and not ethnic group that was

## CLINICAL IMPLICATIONS

- Experience of discrimination may be a social risk factor for delusional ideation, but not for hallucinatory experiences.
- Reports of excess risk of psychosis among ethnic minorities may be confounded by experience of discrimination.
- Chronic experience of discrimination on the basis of appearance may have effects on attributions of daily events, facilitating an understandably paranoid attributional style.

## LIMITATIONS

- The incidence of psychosis was low and the statistical resolution limited.
- The exposure was based on perceived discrimination rather than observable acts of discrimination.
- The study focused on the effect of perceived discrimination on the onset of psychosis, but could not establish to what degree perceived discrimination confounds the association between ethnic minority group and psychosis.

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associated with poor mental health (Kessler *et al*, 1999). Third, the psychosis outcome in this study, delusional ideation, has been shown to be more prevalent in African-Caribbean people living in the UK (Sharpley & Peters, 1999), and it is a known risk factor for more severe psychotic states (Poulton *et al*, 2000). On the other hand, it is unlikely that discrimination is the sole factor contributing to the observed excess risk in ethnic minority groups. Higher rates of isolated hallucinations have also been reported in ethnic minority groups (Johns *et al*, 2002), but the results of the current study failed to find an effect of discrimination on hallucinatory experiences.

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