

Psychotic Experiences in the Adaptation Process to a New Social Environment



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SUMMARY

Objective: To evaluate the association between psychotic experiences (PEs) and social stress and discrimination during adaptation to a new social context.

Method: First-term university students (n: 164) were screened to determine if they had had any PEs, social adaptation-related stress, and/or perceived discrimination in the prior six months. The positive dimension of the Community Assessment of Psychic Experiences (CAPE) was used to define PEs. Social relations and discrimination in the students' new social contexts (both narrow (i.e., their class) and wider (i.e., urban environment)) were screened with relevant questionnaires regarding social capital and discrimination. Responders were classified as either the "High CAPE" group (first and second quartiles; n: 82) or the "Low CAPE" group (third and fourth quartiles; n: 82), which was used as the baseline/control group. Analyses included associations between these two groups and social stress, discrimination, and demographic/non-demographic variables. Results were re-analyzed after excluding irregular students and regrouping with the first and fourth quartiles in CAPE.

Results: High CAPE scores were associated with perceived discrimination in narrow and wider social environments (adjusted β : 0.08; 95% CI: 0.01-0.11), and with adaptation-related stress in narrow social environment (adjusted β : 0.02; 95% CI: 0.01-0.05). In addition, high CAPE scores were associated with smoking and lower maternal educational level. Associations were stronger when the data was re-analyzed based on the first and fourth quartiles. However, associations between discrimination, social stress, and high CAPE scores were attenuated after exclusion of irregular students.

Conclusion: Adaptation-related social stress and perceived discrimination in a new social context may increase the risk of PEs. This particular association seems to be more prominent in groups with higher social stress (e.g., those with academic failure or high perceived discrimination).

Keywords: psychosis, stress, discrimination, social environment, social capital

INTRODUCTION

Delusions (e.g., thoughts of being followed, being spied on, and being laughed at by others) and hallucinations (e.g., hearing voices and seeing things that are not present) are typically seen in patients with psychiatric disorders; however, attenuated forms can also be found in the non-clinical general population (Alptekin et al. 2009, Binbay et al. 2012b). When such

thoughts and perceptions are not clinically relevant, they are referred to as 'psychotic experiences' (Kelleher and Cannon 2011, van Os 2012, van Os and Linscott 2012). In the general population, one in every four individuals may report at least one psychotic experience in his or her lifetime (Binbay et al. 2012b). The prevalence of clinically relevant psychotic experiences ranges from 3% to 8% (Alptekin et al. 2009, Binbay et al. 2012b, Linscott and van Os 2013).

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Psychotic experiences are mostly transient, and they typically peak during adolescence and decrease with age (Linscott and van Os 2013, van Os 2014). They are most prevalently seen in individuals between the ages of 15 and 25 years (van Os 2012, Linscott and van Os 2013). These transient and developmental phenomena, which can indicate a predisposition to psychosis, may become permanent with exposure to certain environmental factors; this can progress into a psychotic disorder requiring treatment (van Os and Linscott 2012, Linscott and van Os 2013, van Os 2014).

Psychotic experiences are associated with urbanicity, urban social life, and adaptation to an urban environment (Allardyce and Boydell 2006, Linscott and van Os 2013). City living is relatively more complicated and intense than rural living, which can lead to higher cognitive stimuli of social defeat, discrimination, and threat in ordinary life. It has been hypothesized that city living may lead to delusional types of cognitive schemas in particular individuals (March et al. 2008, van Winkel et al. 2008, Binbay et al. 2012b, Selten et al. 2013). Furthermore, psychosocial stress such as military recruitment, belonging to an ethnic or sexual minority, and social defeat may lead to triggering, repetition, and persistence of psychotic experiences (Stefanis et al. 2007, van Winkel et al. 2008, Das-Munshi et al. 2012, Gevonden et al. 2014). Similarly, beginning one's first year in a university can be regarded as a social stress. Going to a university represents a transition period from adolescence to adulthood, in which most individuals leave their familiar social and family environment for the first time to join both a new urban context and a new social environment (i.e., the university class). Furthermore, entrance to this particular new social context comes after an examination that is highly competitive (Yildirim et al. 2007).

Even though there are several ways to evaluate social environment, one of the most widely used tools is the measurement of social capital (McKenzie et al. 2002). Social capital refers to the 'glue' that keeps society together, and is used to describe social relationships within groups (Putnam et al. 1993, Harpham et al. 2002). Sub-dimensions of social capital include trust, cohesion, and social control within groups or between groups (Harpham et al. 2002). The association between urban environment and psychotic disorders is partially related to the levels of social capital in the neighborhood (Harpham et al. 2002, McKenzie et al. 2002, March et al. 2008). Social capital as an indicator of the 'within group' environment may be operating as a buffer of dopamine function in the presence of psychotic experiences; without social capital, individuals with psychotic experiences may transition to having a psychotic disorder (Allardyce and Boydell 2006, March et al. 2008). The levels of social capital of individuals within a particular group may be a direct or indirect reflection of social stress in the adaptation process to that particular social environment (March et al. 2008).

Perceived discrimination and exclusion in a social environment are a source of social stress that may trigger psychotic experiences (Janssen et al. 2003, Oh et al. 2014). Chronic and long-term discrimination may impact one's interpretation of ordinary experiences and lead to paranoid attributions (Selten et al. 2013).

This article evaluates the probable association between psychotic experiences and social stress and social discrimination in the process of adapting to a new social environment (i.e., metropolitan life and university education).

METHODS

This cross-sectional study included first term students who responded to the questionnaire who began their university education in 2013-2014 academic year in the Faculty of Medicine of Dokuz Eylul University (n: 311). Individuals between 18 and 20 years of age were included in the study, while students older than 20 years (n: 8) were excluded. This study was approved by the local ethics committee and by the administration of the institution. Data for the study was based on self-report questionnaires that were distributed in a closed envelope and collected the following day in March 2014.

The questionnaire was comprised of four parts. The first part included questions regarding sociodemographic characteristics (e.g., sex, age, parental levels of education, place of longest residency). The second part included questions regarding any previous psychiatric complaint, need for help, admission to mental health services, any history of mental health disorders in the family (parents and siblings), smoking habits, alcohol consumption, and cannabis abuse.

Community Assessment of Psychic Experiences

The third part included self-report questions from the Community Assessment of Psychic Experiences (CAPE) which has 20 questions on positive psychotic experiences, 14 questions on negative psychotic experiences, and 8 questions on depressive experiences (Stefanis et al. 2002). Each question measures the frequency of the experience, where 1 indicates 'never', 2 indicates 'sometimes', 3 indicates 'often,' and 4 indicates 'nearly always'. The CAPE has been used in various studies with both clinical and non-clinical populations (Konings et al. 2006, Fonseca-Pedrero et al. 2012, Alemany et al. 2014). It has previously been translated and adapted into Turkish (van Os et al. 2014, Saka et al. 2015).

The positive dimension of the CAPE screens delusional or hallucination-like experiences (e.g. "Do you ever feel as if people seem to drop hints about you or say things with a double meaning?"), and the total score lies between 20 and 80 (Stefanis et al. 2002). A higher total score indicates that the person has had a greater number of psychotic experiences (Alemany et al. 2015). The prevalence of psychotic

experiences is measured as follows, where 0 indicates never or sometimes, and 1 indicates often or nearly always (Stefanis et al. 2002, Alemany et al. 2014).

Assessment of Social Context

To assess social context and adaptation, the fourth section included 14 questions regarding urban life in Izmir (the wider social environment), the university class (the narrow social environment), and perceived discrimination in the class and in urban life. Questions were adapted from a social capital questionnaire that was used to determine the association between extended psychosis phenotype and the social environment at the neighborhood level (Sampson et al. 1997, Binbay et al. 2012b).

The first seven (of 14) questions were devoted to the assessment of the social environment and social context in the narrow social environment (e.g. “People in this class are only interested in their own welfare”). These questions were coded from “strongly agree” (5) to “strongly disagree” (1). The total score could be anywhere between 7 and 35. Higher scores were representative of low adaptation and high social stress. Three questions were used to assess perceived discrimination and exclusion in the narrow environment (e.g. “Did you perceive any discrimination due to any of your personal features, including political view, sexual orientation, clothing, being a vegetarian, religious symbols, accent, etc., in the last six months in your class?”). Each question measured the frequency of the experience, and ranged from 0 ‘never’, to 1 ‘sometimes’, 2 ‘often,’ and 3 ‘nearly always;’ higher scores indicated social discrimination.

Only one question (“Adapting to the urban life in Izmir was difficult”) was used to evaluate the adaptation to wider social environment, and was coded from “strongly agree” (5) to “strongly disagree” (1). A low total score was representative of low social stress and high adaptation. Three questions were used to assess perceived discrimination and exclusion in the wider social environment (e.g. “Did you perceive any discrimination due to any of your personal features, including political view, sexual orientation, clothing, being a vegetarian, religious symbols, accent, etc., in the last six months in Izmir?”). Each question measured the frequency of the experience, and ranged from 0 ‘never’, to 1 ‘sometimes’, 2 ‘often,’ and 3 ‘nearly always;’ higher scores indicated social discrimination.

Grouping and Variables

Respondents were grouped into quartiles based on the median of the total CAPE score (Kirkwood and Sterne 2003, Özdemir 2006). Respondents in the first and second quartiles were grouped as “low CAPE,” and respondents in the third and fourth quartiles were grouped as “high CAPE.” Inter-group differences were evaluated using the low CAPE group as a reference.

Two sub-analyses were performed to determine the sensitivity of the results. All statistical analyses were repeated after excluding irregular students (e.g., second-year students due to faculty change, failure, or preparation class for English). In addition, as guided by previous work (Konings et al. 2006, Modinos et al. 2010, Alemany et al. 2015), the “low CAPE” and “high CAPE” groups were re-formed using only the first and fourth quartiles, respectively. All of the statistical analyses were repeated after this regrouping.

The categorical variables included gender, term in the university (‘first’ or ‘other,’ which includes irregular students), maternal level of education (<8 years, 8-11 years, and >11 years), place of longest residency (semi-urban [population <100,000] or urban [population >100,000]), any former psychiatric complaint (no/yes), any history of seeking mental help (no/yes), familial history of any mental disorder (no/yes), smoking (no/yes [almost regular daily use]), alcohol use (never/ at least once), and use of cannabis (never/at least once).

Continuous variables included the total scores of adaptation to wider and narrow social environments, perceived discrimination, and the positive dimension of CAPE.

Statistical Analyses

The chi-square and t-test were used for bivariate analyses. Multivariate associations were evaluated with a logistic test or a linear regression. Associations are presented as odds ratios (OR) or β with 95% confidence intervals (CI). Values of $p < 0.05$ were considered statistically significant. All analyses were carried out using SPSS version 15.0.

RESULTS

The rate of participation among first-term students was 56.6% (n: 183). After excluding incomplete questionnaires, 164 participants were included in this study, 53.1% of which were female. The endorsement rate of at least one item of the CAPE was 78.9% (n: 128) in the last six months. In all, 21.3% (n: 35) of the participants endorsed only one item, 14.6% (n: 24) endorsed two, 15.9% (n: 26) endorsed three, and 26.3% (n: 41) endorsed at least four items. Based on the median of the total CAPE positive score, half of the participants (n: 82) were in the low CAPE group, and the other half (n: 82) were in the high CAPE group.

With the exception of maternal level of education, there was no difference in the sociodemographic features between groups (Table 1). The participants with higher maternal levels of education were in the low CAPE group (χ^2 : 7.1; $p=0.03$). On the other hand, there was no difference in the paternal level of education between groups (data not shown - χ^2 : 1.8; $p=0.41$).

Table 1. Sociodemographic features of the sample population in the low and high CAPE groups

	Low CAPE (n: 82)		High CAPE (n: 82)		Total (n: 164)		Statistics	p
	n	(%)	n	(%)	n	(%)		
Gender								
Male	39	(47.6)	38	(46.3)	77	(46.9)	$\chi^2=0.1$	0.87
Female	42	(52.4)	44	(53.7)	87	(53.1)		
Term in University								
First	67	(81.7)	65	(79.3)	132	(80.5)	$\chi^2=0.1$	0.69
Other*	15	(18.3)	17	(20.7)	32	(19.5)		
Maternal level of education								
<8 years	23	(28.1)	37	(45.1)	60	(36.6)	$\chi^2=7.1$	0.03
11 years	22	(26.8)	23	(28.1)	45	(27.4)		
>11 years	37	(45.1)	22	(26.8)	59	(36.0)		
Place of longest residency								
Semi-urban**	20	(24.4)	23	(28.1)	43	(26.2)	$\chi^2=0.3$	0.59
Urban	62	(75.6)	59	(71.9)	121	(73.8)		
	Mean	SD	Mean	SD	Mean	SD	Statistics	p
Age	19.6	(0.9)	19.8	(0.9)	19.7	(0.9)	t ₁₆₂ :-0.7	0.48

*Irregular students (e.g., second-year students due to faculty change, failure, or preparation class for English), **Semi-urban is population <100,000 and urban is population >100,000, SD: Standard deviation. CAPE: Community Assessment of Psychic Experiences

There was no difference between groups with regards to any former psychiatric complaint, any history of seeking mental help or admission, familial history of any mental disorder, and alcohol use (Table 2). While cannabis use was higher in high CAPE group, this difference was not significant. However, smoking was significantly higher in the high CAPE group when compared to the low CAPE group (χ^2 : 8.2; $p<0.05$).

Adaptation stress and perceived discrimination were significantly higher in the high CAPE group (Table 3). Although there was no difference between groups with regards to

adaptation to a wider social environment, perceived discrimination was higher in the high CAPE group.

Associations between multivariate variables and the two CAPE groups are presented in table 4. Respondents whose maternal level of education was greater than 11 years had lower odds of being in the high CAPE group (adjusted OR= 0.3; 95% CI= 0.1-0.8; $p<0.05$), while smoking was associated with being in the high CAPE group (adjusted OR=2.9; 95% CI =1.4-6.6; $p<0.05$). There was no association between groups and other sociodemographic and clinical variables.

Table 2. Psychosis-related risk factors of the sample population in the low and high CAPE groups

	Low CAPE (n: 82)		High CAPE (n: 82)		Total (n: 164)		Statistics	p
	n	(%)	n	(%)	n	(%)		
Psychiatric complaint								
None	60	(73.2)	55	(67.1)	115	(70.1)	$\chi^2=0.7$	0.39
At least once	22	(26.8)	27	(32.9)	49	(29.9)		
Psychiatric help-seeking								
None	66	(80.5)	67	(81.7)	133	(81.1)	$\chi^2=0.1$	0.84
At least once	16	(19.5)	15	(18.3)	31	(18.9)		
Family history								
None	63	(76.8)	60	(73.2)	123	(75.0)	$\chi^2=0.3$	0.59
At least one	19	(23.2)	22	(26.8)	41	(25.0)		
Smoking								
None	65	(79.3)	48	(58.5)	113	(68.9)	$\chi^2=8.2$	<0.05
At least once	17	(20.7)	34	(41.5)	51	(31.1)		
Alcohol use								
None	30	(36.6)	33	(40.2)	63	(38.4)	$\chi^2=0.2$	0.63
At least once	52	(63.4)	49	(59.8)	101	(61.6)		
Cannabis use								
None	76	(92.7)	71	(86.6)	147	(89.6)	$\chi^2=1.6$	0.20
At least once	6	(7.3)	11	(13.4)	17	(10.4)		

Table 3. Mean scores of adaptation-related stress and discrimination in the wider and narrow environment in the low and high CAPE groups

	Low CAPE (n: 82)		High CAPE (n: 82)		Total (n: 164)		Statistics	p
	Mean	SD	Mean	SD	Mean	SD		
Adaptation related stress (narrow)	17.0	(3.7)	19.0	(4.4)	18.0	(4.2)	t162:-3.1	<0.05
Discrimination (narrow)	0.2	(0.7)	0.9	(1.5)	0.5	(1.2)	t162:-3.4	<0.05
Adaptation related stress (wider)	2.4	(1.4)	2.5	(1.2)	2.4	(1.3)	t148:-0.7	0.48
Discrimination (narrow)	0.2	(0.7)	0.9	(1.5)	0.6	(1.2)	t162:-3.4	<0.05
CAPE-positive (last 6 months)	25.6	(2.5)	36.6	(6.1)	31.1	(7.2)	t162:-3.4	<0.05

SD: Standart deviation

Table 4. Adjusted odds ratios of associations between CAPE groups and sociodemographic and risk factors

	OR	95% CI	p	OR ^a	95% CI	p
Gender						
Male	ref	-		ref	-	
Female	1.1	(0.6-1.9)	0.87	1.4	(0.7-2.9)	0.30
Term in University						
First	ref	-		ref	-	
Other	1.2	(0.5-2.5)	0.69	0.9	(0.4-2.2)	0.84
Maternal level of education						
<8 years	ref	-		ref	-	
11 years	0.6	(0.3-1.4)	0.28	0.6	(0.2-1.5)	0.28
>11 years	0.4	(0.2-0.8)	<0.05	0.3	(0.1-0.8)	<0.05
Place of longest residency						
Semi-urban	ref	-		ref	-	
Urban	0.8	(0.4-1.7)	0.59	0.9	(0.4-1.9)	0.75
Psychiatric complaint						
None	ref	-		ref	-	
At least once	1.3	(0.7-2.6)	0.39	1.6	(0.6-4.1)	0.35
Psychiatric help-seeking						
None	ref	-		ref	-	
At least once	0.9	(0.4-2.0)	0.84	0.6	(0.2-1.8)	0.37
Family history						
None	ref	-		ref	-	
At least one	1.2	(0.6-2.5)	0.58	1.0	(0.5-2.2)	0.4
Smoking						
None	ref	-		ref	-	
At least once	2.7	(1.5-5.5)	<0.05	2.9	(1.4-6.6)	<0.05
Alcohol use						
None	ref	-		ref	-	
At least once	0.9	(0.5-1.8)	0.87	1.0	(0.4-2.2)	0.96
Cannabis use						
None	ref	-		ref	-	
At least once	1.9	(0.7-5.6)	0.20	1.8	(0.5-5.8)	0.36

^aAdjusted for age, gender, university term, and place of longest residency. ref: reference variable, OR: odds ratio, CI: confidence interval**Table 5.** Associations between CAPE groups and adaptation-related stress and discrimination in the wider and narrow environment

	β	95% CI	p	β ^a	95% CI	p
Adaptation related stress (narrow)	0.03	(0.01-0.05)	<0.05	0.02	(0.01-0.04)	<0.05
Discrimination (narrow)	0.11	(0.04-0.17)	<0.05	0.08	(0.01-0.15)	<0.05
Adaptation related stress (wider)	0.02	(-0.04-0.08)	0.48	0.03	(-0.04-0.09)	0.41
Discrimination (narrow)	0.11	(0.04-0.17)	<0.05	0.08	(0.01-0.15)	<0.05

^aAdjusted for age, gender, university term, and place of longest residency. CI: confidence interval

Associations between adaptation and discrimination in social environments and CAPE groups are presented in table 5. High CAPE scores were associated with adaptation stress in a narrow environment (adjusted $\beta = 0.02$; 95% CI= 0.01-0.04; $p < 0.05$), and also with perceived discrimination in wider and narrow social environments (adjusted $\beta = 0.08$; 95% CI= 0.01-0.15; $p < 0.05$).

Irregular students made up 19.5% (n: 32) of the study population. After excluding these irregular students, the low and high CAPE groups included 67 and 65 participants, respectively. Repeating the bivariate and multivariate analyses after excluding the irregular students revealed no change in the results. There was a greater number of participants with a higher maternal level of education in the low CAPE group; this difference was nearly significant (χ^2 : 5.9; $p = 0.053$). Similarly, there was a nearly significant difference in the number of participants who smoked between groups (χ^2 : 3.3; $p = 0.07$). The low and high CAPE groups had similar mean levels of CAPE positive scores. As in the primary analyses, the high CAPE group had significantly higher levels of adaptation stress in the narrow social environment, and perceived significantly more discrimination in both the wider and the narrow environments. Multivariate analyses revealed that the odds of being in the high CAPE group was lower in participants with a higher maternal level of education (adjusted OR: 0.3; 95% CI: 0.1-0.8; $p < 0.05$). The significant association between high CAPE and smoking was attenuated and disappeared (adjusted OR: 2.2; 95% CI: 0.9-5.3; $p = 0.07$ – both results were similar). Furthermore, the associations between the high CAPE group and adaptation stress in the narrow social environment, and between the high CAPE group and discrimination in both the wider and the narrow environments were no longer significant ($p = 0.09$).

Overall, 31.1% (n: 51) and 21.9% (n: 36) of the participants were in the first and the fourth quartiles, respectively. When grouping was repeated based only on the first and the fourth quartiles, there were no differences between the low and high CAPE groups with respect to the sociodemographic (including maternal level of education) and non-demographic variables. Smoking (15.7% vs. 44.4%; χ^2 : 8.7; $p < 0.05$) and previous psychiatric complaints (15.6% vs. 38.9%; χ^2 : 6.0; $p < 0.05$) were higher in the high CAPE group. The proportions of irregular students in the new low and high CAPE groups were 21.6% and 22.2%, respectively. Adaptation stress in the narrow social environment, and discrimination in both the wider and the narrow social environments were significantly higher in the high CAPE group, and the difference was more prominent than it was in the main analysis (e.g., for discrimination in the narrow social environment and high CAPE group $t = -4.1$; $p < 0.001$). Multivariate analyses revealed that the odds of being in the high CAPE group were significantly higher with smoking and previous psychiatric complaints. The

associations between the high CAPE group and adaptation stress in the narrow social environment, and between the high CAPE group and discrimination in both the wider and narrow environments were also significant ($p < 0.05$).

DISCUSSION

This study evaluated the experiences of first-term university students in a new social environment using a self-rating scale. In addition, the relationship between subthreshold psychotic experiences and perceived stress and discrimination in this particular new social environment was examined. Results of this study suggest that social stress and discrimination during adaptation to a new environment may be related to higher rates of reported positive psychotic experiences. This relationship was significant among participants who reported higher stress and discrimination during adaptation to their new social environment. In addition, among irregular students, associations between stress adaptation to a new social environment and psychotic experiences were more significant than they were in regular students; the reason for this difference was not determined within the scope of this study.

The positive dimension of the CAPE provides relatively high prevalence rates (up to 70%) of positive psychotic experiences both in the general population and in clinical samples (Stefanis et al. 2002, Konings et al. 2006, Fonseca-Pedrero et al. 2012, Alemany et al. 2014). The prevalence of psychotic experiences varies with respect to age, related mental stress, and screening modalities (Linscott and van Os 2013). The prevalence of psychotic experiences in the general population may be as high as 25% (Binbay et al. 2012b). Further, psychotic experiences most often occur during puberty and typically decrease over time (van Os and Linscott 2012). Therefore, the high prevalence of psychotic experiences (as determined with the CAPE) in our study may be due to the age range of our participants (18-20 years).

In addition to age, there is a relationship between psychotic experiences and demographic variables, including socio-economic status and gender (Binbay et al. 2012b). In our current study, the only significant difference between the low and high CAPE groups was the maternal level of education. Maternal education is a wide-reaching negative indicator of social, familial, and economical characteristics (Galobardes et al. 2006). Another study conducted among university students reported no significant relationship between paternal education level and stress coping methods, while a higher maternal education level was related with positive social interactions between the students (Kaya et al. 2007). Similarly, a high maternal education level may reduce psychotic experiences, as these individuals are better at effectively dealing with social stress.

Published data shows that psychotic experiences are associated with exposures to the urban social environment (van Os et al. 2001, Krabbendam and van Os 2005, Binbay et al. 2012b, Linscott and van Os 2013). However, in our current study, there was no association between psychotic experiences and the urbanicity of the place where the participants resided the longest. One possible reason that we saw no association in our current study is that our participants had a low variation of exposure to urbanicity.

In general, psychotic experiences are mainly related to subthreshold and clinical depressive, anxious, and somatic disorders (van Os and Linscott 2012, Wigman et al. 2012a). In addition, subthreshold psychiatric complaints are often predictive of later onset psychotic experiences (Saeedi et al. 2007). In the current study, the difference between the first and the fourth quartiles with regards to those with former psychiatric complaints may be regarded as an indirect sign of this particular relation. Further, there may be a reporting or recall bias, in which participants preferred not to report, or were unable to remember their psychiatric complaints or seeking help for their complaints (Coughlin 1990, Delgado-Rodriguez and Llorca 2004). Also, while the majority of psychiatric symptoms emerge during adolescence, they often do not lead to impairment and require individuals to seek help until later in life (after adolescence) (Kessler et al. 2007). Therefore, our results may be biased by the age group of our participants, in that there was no difference between groups with regards to psychiatric complaints or seeking help.

Having first degree relatives with psychiatric disorders is one of the main risk factors for psychotic experiences and symptoms (Lichtenstein et al. 2009). A familial history may represent not only a genetic liability, but also a liability due to environmental exposure (Binbay et al. 2012a). Familial liability is associated with psychotic experiences that are classified by the CAPE positive dimension (Lataster et al. 2009, Wigman et al. 2012b). In our current study, there was no difference in family history between groups, which may be because the participants avoided sharing their family history or because they may have no information regarding their family history (recall or reporting bias) (Coughlin 1990, Khoury and Flanders 1995, Delgado-Rodriguez and Llorca 2004). On the other hand, our sample included only university students, particularly in a medical faculty. Such students have relatively higher academic achievement and better social functionality, which may indicate a similarity in genetic and familial liability. Such homogeneity in our sample population may have led to this indifference.

It has been reported that positive psychotic experiences are associated with alcohol and cannabis abuse (Alptekin et al. 2009, Linscott and van Os 2013). In our current study, although cannabis use was higher in the high CAPE group, the difference in cannabis use between groups was not significant.

This result contradicts many widely acknowledged findings on psychosis and cannabis (Kuepper et al. 2011, van Gastel et al. 2012). However, cannabis use in our current study is lower than that of studies reporting an association between psychosis and cannabis; further, the prevalence of cannabis abuse is relatively low in the general population of Turkey (Ogel et al. 2001). It has been reported that cannabis abuse may be as high as 44% in Europe, particularly among adolescents (Hibell et al. 2003). The rate of any cannabis use among students in Turkey is one of the lowest rates in Europe (Hibell et al. 2003, Ögel 2005). The relatively low prevalence of cannabis use in Turkey and the sample characteristics of our current study may be the reason why there is no difference in cannabis abuse between the high and low CAPE groups. Similar reasons may have affected our results regarding alcohol use. The rate of alcohol use in our current study is higher than those previously reported among university students in Turkey (Ozgur Ilhan et al. 2008, Erhan Deveci et al. 2010), yet, there was no difference in alcohol use between CAPE groups.

There is a complex association between smoking and psychosis (Üneri et al. 2006). Several findings indicate that those with psychosis are more prone to smoking, as it can alleviate anxiety and enhance cognitive functions (Üneri et al. 2006, Gage and Munafo 2015a). On the other hand, some studies report a possible association between smoking and psychotic experiences (Saha et al. 2011, Gage and Munafo 2015b). It has been reported that smoking is associated with psychotic experiences independent of cannabis abuse and almost with a similar effect size (van Gastel et al. 2013). Further, rates of smoking are higher among individuals having subthreshold experiences and in ultra-high risk groups (Gupta and Mittal 2014). In addition, it is well-known that smoking increases with psychosocial stress (Lawless et al. 2015). In our current study, the relatively high smoking rate in the high CAPE group may be associated with both the psychosocial stress of a new social environment and its ability to alleviate anxiety, which often accompanies psychotic experiences.

Psychotic experiences are associated with an urban environment, particularly neighborhoods with lower social capital and higher poverty (Allardyce and Boydell 2006, Linscott and van Os 2013). Social discrimination is also associated with psychotic experiences and disorders (Veling et al. 2007, Veling et al. 2008, Gevonden et al. 2014, Oh et al. 2014). In our current study, there was no difference between the high and low CAPE groups with regards to adaptation to a wider social environment. However, the high CAPE group, particularly the fourth quartile, had higher levels of social discrimination and adaptation stress in both wider and narrow social environments.

Perceived discrimination and related stress can change with the peer group (Pascoe and Smart Richman 2009). The

university class may represent a more important social environment for the first term students with their peer group than does the urban area. It is important to note that when irregular students were excluded from the sample, the association between psychotic experiences and social adaptation stress did not become any more significant. Therefore, irregular students may have higher levels of social stress and perceived discrimination. In addition, their irregularity may be related to their former maladaptation to the university context. On the other hand, a university education, particularly medical faculty, is achieved only after a highly competitive examination, and such an achievement may provide higher levels of self-esteem to regular first term students, which in turn would decrease social stress. Perceived discrimination may change from context to sub-context and from one social status to another social group. In addition, the majority of the sample in our study originated from urban areas, which led to low social stress in adapting to their new urban lives.

The association between psychosis and adapting to a new social environment is most likely moderated by social cognition and cognitive functions (Allardyce and Boydell 2006). Academic achievement is an indicator of overall cognitive functions (Robbins et al. 2004). There was no association between social adaptation and psychotic experiences in our current study, which may in part be related to the relatively high cognitive functions of the sample.

Social capital, which is also an index of intragroup relations, may act as a buffer between social stress and dopamine (Allardyce and Boydell 2006, March et al. 2008). Individuals who grew up in social environments with low social capital may develop schemas of insecure environment and genetic liability, which may transition into a psychotic disorder. Also, high social capital may protect individuals with a genetic liability from transitioning into a psychotic disorder, since social capital may reduce their false interpretations of the social context (Allardyce and Boydell 2006, March et al. 2008). In addition, there may be a reverse causation: a genetic predisposition may lead to higher levels of perceived discrimination, and of difficulties in coping with problems which subsequently may cause stress that is related to adapting to a new social environment. Particular models of social stress, including adaptation to a new social environment (e.g., first term in a university) may lead to the emergence, repetition, and/or persistence of psychotic experiences (van Winkel et al. 2008).

In analyses performed after the exclusion of irregular students, the attenuated association between the high and low CAPE groups and social stress and discrimination can be evaluated in two ways. First, being in a new university class may be associated with higher levels of social stress among the irregular students; this can be due to probable feelings of social failure in educational process. Thus, the cognitive schema of social failure may lead to stress in a new social environment. Second,

the average social stress score of the regular students was slightly lower than that of the irregular students. Social success that comes after a highly competitive examination process may reduce stress in the new social environment for regular students.

The findings of this study should be assessed with some important limitations. Because our research has a cross-sectional design, it is not possible to determine the cause-effect relationship; however, this study provides some implicit inferences. Although the sample size is relatively adequate, we could not include all of the first term university students. Information about the gender and age of all of the first term students, as well as their demographic information, do not exist due to institutional reasons. In addition, psychotic experiences, adaptation-related stress, and perceived discrimination may be very different in a non-voluntary group.

On the other hand, data for our study was obtained with a self-report scale (the CAPE and social environment questionnaires) for which the Turkish reliability and validity studies have not been performed. Psychotic experiences are encountered more frequently with the self-report scale than with clinical screening (Linscott and Van Os 2013). This may be because the volunteers might have overrated or underrated information regarding the research variables, particularly the previous psychiatric complaints, the familial predisposition information, the adaptation-related stress, and the perceived discrimination (Coughlin 1990). In the current study, we attempted to keep the data quality high and without bias. In this respect, the names of the volunteers were not recorded, data was collected in a sealed envelope, and incomplete forms were not included. On the other hand, data regarding the irregular students, including the reason for their lost term, was not collected. According to our results, the irregular students carry a higher risk of social stress, and in hindsight, we should have collected this important information.

Despite the limitations, to our knowledge, our current research is the first to examine psychotic experiences, social adaptation-related stress, and perception of exclusion in university students in Turkey. Confirming the results by repeating this study, and by using more formative methods and structured interviews in forthcoming studies, might provide more relevant information on this topic. On the other hand, different cases (e.g., military, immigration, business environment, compliance with post-disaster periods) that are adapting to a new social environment should also be studied.

CONCLUSION

During adaptation to a new social environment, experienced or perceived difficulties and perception of discrimination can lead to social stress. This social stress can lead to the emergence of positive psychotic experiences. The relationship between

social stress and psychotic experiences is stronger in communities with higher social stress (e.g., those with academic failure or a high perception of discrimination). In addition, predisposition increases stress levels during the adaptation process and perceived discrimination; it may also facilitate the occurrence of positive psychotic experiences as well. New research can provide a more detailed understanding regarding the relationship between adaptation to a new social environment and psychotic experiences. With better understanding, new programs may be developed (e.g. integration programs, psychosocial support, campaigns against discrimination), which can help individuals under these special circumstances.

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