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The associations between personality traits, education, occupation and the occurrence of eczema in adulthood

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Abstract

There were 5834 participants with complete data on parental social class at birth, childhood cognitive ability tests scores at 11 years, educational qualifications at 33 years, the Big Five-Factor personality traits, occupational levels and eczema (measured at age 50 years). Results showed that eczema in childhood, educational achievement and occupational levels were significantly associated with the occurrence of reported eczema in adulthood. Emotionally Stable people (non-neurotic) were less likely to have eczema, but those with high Agreeableness and Openness more likely to have eczema. Childhood cognitive ability was significantly and positively associated with eczema in adulthood.

Keywords

child intelligence, cross-sectional and longitudinal, eczema, educational achievement, occupational levels, personality traits

Introduction

By focusing on social and psychological factors in childhood and adulthood, this study looks at the correlates of eczema (atopic dermatitis). Previous investigations indicate that the aetiological factors of eczema are not attributable to a single factor (Arima et al., 2005). Furthermore, while there are associations between eczema and personality traits, it is unclear whether it plays an aetiological role in eczema, and what the psycho-biological mechanisms of the development of eczema would be (Buske-Kirschbaum et al., 2001). Eczema has, however, been noted to have a distinct psychological and personality profile from other dermatological and atopical conditions (Bahmer et al., 2007; Mizara et al., 2012; Scheich et al., 1993; Takahashi et al., 2012; 2013).

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There have been some attempts to associate the Big Five personality factors with eczema. Studies have consistently indicated that high levels of trait Neuroticism are found in eczema patients (Al-Ahmar and Kurban, 1976; Schut et al., 2014; White et al., 1990) as well as temperaments that indicate lower levels of emotional stability (Takahashi et al., 2013; White et al., 1990). Correlations with other Big Five related factors, however, have been less consistent; Extraversion has been thought to negatively associated with eczema (Schut et al., 2014), while other researchers indicate no correlation (Al-Ahmar and Kurban, 1976). In a clinical sample, Schut et al. (2015) investigated the associations between personality traits Agreeableness and self-consciousness and psoriasis (a frequent skin disease accompanied by itch). They found that in psoriasis patients public self-consciousness was significantly associated with more induced itch ($r = .56$; $p < .001$), and Agreeableness was significantly associated with less induced scratching ($r = -.44$; $p < .05$) (Schut et al., 2015).

Personality correlates have also been found to relate with Immunoglobulin E (IgE) levels in eczema. Higher levels of IgE is associated with an increase in allergic reactions and mast cell stimulation (Gould et al., 2003), of which eczema is one of the most common causes. Compared to eczema patients with normal levels of IgE, patients with higher levels (and thus a stronger allergic response) have been found to have increased levels of emotionality (Neuroticism) and worse stress coping mechanisms (Scheich et al., 1993), suggesting a psycho-biological mechanism that mediates the exhibited behaviours in eczema.

An extensive review by Friedman and Kern (2014) indicates that factors such as depression and anxiety, both strongly associated with trait Neuroticism, play a part in many illnesses, including eczema (Al-Ahmar and Kurban, 1976; Kim et al., 2006; Mizara et al., 2012; Schut et al., 2014; Slattery and Essex, 2011; Takahashi et al., 2013). Depression has been thought to only be a strong association of eczema when co-morbidity with anxiety is accounted for (Klokk et al., 2010), particularly with face eczema. Trait anxiety appears to play a differing role to depression in the exacerbation of eczema, while higher depression has been associated with increased severity of eczema (Arima et al., 2005), state and trait anxiety has been found to be associated with increased duration of the illness (Kim et al., 2006)

Neurotic people are more prone to stress. Furthermore, there appear to be sex differences on the association between depression and inflammatory markers; stress may drive inflammation and subsequent depressive symptoms shown in women, not in men (Hiles et al., 2015).

There is a large body of literature in the links between social class, education and mental and physical health and illness (Feinstein and Bynner, 2004; Marmot, 2007; Wilkinson and Pickett, 2006), and between intelligence, socioeconomic position and health and mortality (Batty et al., 2009). Although higher parental socioeconomic status (SES) is linked with better child health outcomes, Corlin et al. (2013) found children with a relatively lower household income were significantly more likely to have an asthmatic condition, in the case of eczema findings do not seem to systematically support the protective role of SES. In a number of studies, eczema is characterized as the disease of the affluent and privileged children and several studies have shown that its prevalence increases with the SES of the family (Corlin et al., 2013; Hammer-Helmich et al., 2014; Heinrich et al., 1998; Stewart et al., 2001; Weber and Haidinger, 2010; Williams et al., 1994). Other studies found no relationship between eczema and SES (e.g. Mercer et al., 2004). However, there are speculations for this positive association as it can be susceptible to several biases. It is possible that high SES parents have a better health education and hence a better perception and interpretation of atopic symptoms are more worried about their children's health and seek medical help earlier (Mercer et al., 2004; Weber and Haidinger, 2010).

This study

This study looks at social (social class of self and parents, education) and psychological (personality, education) correlates of self-reported occurrence of eczema in adulthood. This study has four strengths compared with many previous studies in the area. First, it used a large, nationally representative prospective birth cohort. Second, it looks at two main aspects of individual difference (personality and intelligence) and their associations with the health outcome. Third, we were able to look at role of gender, class, education and personality, as well as childhood eczema in understanding eczema in adulthood. Fourth, we used an up-to-date and comprehensive measure of personality which was an advance on the relatively few other studies which examined the relationship between personality and eczema.

Based on the previous findings, it is hypothesized that higher socioeconomic position with better education and emotionally more stable individuals (low in Neuroticism) would report less eczema in adulthood.

Method

Sample

The National Child Development Study 1958 is a large-scale longitudinal study of the 17,415 individuals who were born in Great Britain in a week in March 1958 (Ferri et al., 2003. The following analysis is based on data collected when the study participants were at birth, at ages 7, 11, 33 and at 50 years. At birth, available information included parental social class (response=97%) and gestational age and birth weight (response=86%). At age 7 years, mothers were interviewed and provided information on cohort whether members ever suffered from eczema identified by medical doctors (response=91%). At age 11 years, children completed cognitive ability tests (response=87%). At age 33 years, cohort members provided information on educational qualifications and current occupational levels. At age 50 years, 8532 participants completed a questionnaire on personality traits (response=69%), and 9760 participants provided information on their current occupation and whether they were suffering from eczema (response=79%). The analytic sample comprises 5834 cohort members (51% females) with complete data. Analysis of response bias in the cohort data showed that the achieved adult samples did not differ from their target sample across a number of critical variables (social class, parental education and gender), despite a slight under-representation of the most disadvantaged groups (Plewis et al., 2004).

Measures

Childhood measures. Parental social class at birth was measured by the Registrar General's measure of social class (RGSC). RGSC is defined according to occupational status and the associated education, prestige or lifestyle (Marsh, 1986) and is assessed by the current or last held job. Where the father was absent, the social class (RGSC) of the mother was used. RGSC was coded on a 6-point scale from unskilled to professional occupations (Leete and Fox, 1977). At birth, mothers were interviewed and provided information on gestational age and birth weight. Mothers also provided information on whether participants ever had eczema by the 7 years diagnosed by physicians. Childhood cognitive ability tests (Douglas, 1964) were accessed when cohort members were at age 11 years consisting of 40 verbal and 40 non-verbal items and were administered at school.

Adulthood measures. At age 33 years, participants were asked about their highest academic or vocational qualifications. Responses are coded to the 6-point scale of National Vocational Qualification (NVQ) levels which ranges from 'none' to 'university degree/higher'/equivalent NVQ 5 or 6. Data on current or last occupation held by cohort members at age 50 years were coded according to the Registrar General's classification of occupations (RGSC), described above, using a 6-point classification mentioned above. Personality traits were assessed by the 50 questions from the International Personality Item Pool (IPIP) (Goldberg,

1999). Responses point (5-scale, from 'Strongly Agree' to 'Strongly Disagree') are summed to provide scores on the 'Big Five' personality traits: Extraversion, Emotionality/Neuroticism, Conscientiousness, Agreeableness and Intellect/Openness. At age 50 years, participants provided information on whether they were currently suffering from the occurrence of eczema or other skin problems with Yes/No response.

Statistical analyses

To investigate the social and psychological correlates of the occurrence of eczema in adulthood, we first examined the characteristics of the study population using analysis of variance (ANOVA). Second, correlation matrix of all the variables used in the study was examined. Third, we carried out the logistic regression analyses (in total and by sex) using STATA version 12 using eczema in adulthood as dependent variable and social and psychological factors in childhood and adulthood as independent variables controlling for gestational age and birth weight as these have been shown to be related to many adult health issues.

Results

Descriptive analysis

Table 1 shows the characteristics of the study population according to the occurrence of eczema at 50 years. There were significant sex differences in the prevalence of eczema. It appears that the rate of the reported eczema was greater for women than for men (8.3% for women and 6.8% for men). ANOVA showed that the differences were statistically significant ($t(df = 5832) = 5.10$, $p < .05$).

Correlation matrices of all variables in the study are shown in Appendix 1. It shows self-reported eczema in adulthood was significantly and positively associated with childhood intelligence, traits Agreeableness and Openness, and negatively associated with Emotional Stability. The self-reported eczema in adulthood was significantly associated with eczema in childhood diagnosed by physicians.

Regression analysis

Table 2 shows results of logistic regression model using self-reported eczema in adulthood as dependent variable. As predicted, the model shows that traits Emotional Stability (i.e. low Neuroticism) was associated with less reported eczema in adulthood. The model also shows that traits Agreeableness and Openness were associated with more eczema in adulthood. Furthermore, those with more education (compared with no education) and higher levels of occupation (compared with unskilled workers) were less likely to report eczema in adulthood.

There were sex differences in the associations between eczema and other indicators. For men, childhood intelligence, education, occupation, traits Extraversion, Agreeableness and Openness were all significantly associated with eczema in adulthood, whereas for women, apart from childhood eczema, which was a strong indicator of adult eczema, for both men and women, trait Emotional Stability was the only variable which was significantly associated with eczema in adulthood.

Discussion

This study sets out to explore the associations between personality factors as well as social factors and the occurrence of self-reported eczema in adulthood. Trait Emotional Stability, higher social class and better education were associated with the low occurrence of eczema in adulthood as predicted.

Further analyses showed there were sex effects on the associations between social and psychological factors and the outcome variable. For females, trait Neuroticism was a significant predictor, a trait often implicated in both mental and physical illness. Stress-proneness (or low stress tolerance/resilience), especially for women, may increase the risk of eczema by increasing systemic inflammation, which in turn may lead to enhanced promotion of eczema-related inflammation (Kuebler et al., 2015). For males, trait Agreeableness was the strongest predictor. This may indicate males who are too tender-hearted and unassertive who

Table 1. Social and demographic characteristics of the study population and prevalence of eczema at age 50 years.

	n	%	Prevalence of eczema (%)
Gender			
Male	2879	49.3	6.8
Female	2955	50.7	8.3
Parental social class at birth			
Unskilled (V)	427	5.7	5.9
Partly skilled (IV)	678	10.7	6.9
Skilled manual (III)	2835	47.5	7.4
Skilled non-manual (III)	651	13.0	8.8
Managerial/tech (II)	925	18.6	8.9
Professional (I)	318	4.5	6.3
Educational qualifications at age 33 years			
No qualifications	414	7.3	7.7
CSE 2-5/equivalent NVQ 1	656	7.7	5.2
O Level/equivalent NVQ 2	2016	40.0	8.7
A level/equivalent NVQ 3	904	14.3	7.0
Higher qualification/equivalent NVQ 4	961	14.3	6.6
University degree/equivalent NVQ 5, 6	883	16.4	8.2
Own current social class at age 50 years			
Unskilled (V)	120	3.9	14.2
Partly skilled (IV)	623	10.5	7.4
Skilled manual (III)	1027	15.2	6.5
Skilled non-manual (III)	1213	22.3	8.1
Managerial/tech (II)	2481	38.9	6.9
Professional (I)	370	9.3	11.1

NVQ: National Vocational Qualification.

may be manipulated by less Agreeable, tough-minded others leading in turn to stress and its consequences as described above.

Previous research has indicated that Agreeable people are less likely to have eczema (Schut et al., 2014). This study, however, indicates the opposite; higher levels of Agreeableness are found in eczema patients although further analysis by sex shows this association is only for men, not for women. Studies indicate that eczema patients have high vulnerability to stress in situations of social conflict (Buske-Kirschbaum et al., 2008), have maladaptive schemas that fear social isolation (Mizara et al., 2012) and struggle to cope with hostility and anger (White et al., 1990). Furthermore, eczema patients are found to have higher harm avoidance scores, indicating a strong shyness and anticipatory anxiety element (Kim et al., 2006). This study suggests similar findings; eczema patients are high on Agreeableness, which can be postulated to result in a willingness to employ certain behavioural patterns in order to calm social conflict, avoid social anxiety and hostility, and satisfy their needs to be near others. Further investigations need to be conducted, however, to confirm these postulations.

This study also shows the significant associations between trait Openness and eczema in adulthood and between trait Extroversion and the outcome variable for men but not for women. While Extraversion has been found to be associated with joy, fun and leisure activities (Furnham, 2008) which may reduce stress, compared with women, men are more active in those outdoor pursues (football and other sports) thus may reduce stress-related eczema

Table 2. Odds ratios (95% CI) for eczema at age 50 years, according to eczema in childhood, childhood intelligence, educational qualifications, occupational levels and personality traits.

Measures	All		Males		Females	
	Odds ratio (95% CI)	*p*-value	Odds ratio (95% CI)	*p*-value	Odds ratio (95% CI)	*p*-value
Parental social class at birth (*unskilled as reference group*)						
Partly skilled	1.06 (0.71, 1.94)	0.848	1.11 (0.50, 2.47)	0.796	0.99 (0.49, 2.00)	0.972
Skilled manual	1.20 (0.77, 1.88)	0.414	1.19 (0.60, 2.37)	0.618	1.21 (0.67, 2.16)	0.531
Skilled non-manual	1.46 (0.87, 2.40)	0.155	1.33 (0.60, 2.91)	0.483	1.54 (0.79, 3.01)	0.205
Managerial/tech	1.39 (0.85, 2.27)	0.193	1.42 (0.67, 3.01)	0.363	1.33 (0.69, 2.56)	0.400
Professional	0.99 (0.53, 1.88)	0.984	0.94 (0.36, 2.49)	0.904	1.03 (0.44, 2.43)	0.937
Eczema at age 7 years	5.38 (3.58, 8.08)***	0.000	6.93 (3.80, 12.63)***	0.001	4.78 (2.71, 8.43)***	0.001
Childhood intelligence at age 11 years	1.14 (1.04, 1.29)*	0.030	1.23 (1.03, 1.47)*	0.024	1.09 (0.92, 1.29)	0.328
Educational qualifications (*no qualification as reference group*)						
CSE 2-5/equivalent NVQ 1	0.56 (0.33, 0.95)*	0.032	0.36 (0.13, 0.95)*	0.038	0.68 (0.36, 1.30)	0.244
O Level/equivalent NVQ 2	0.92 (0.60, 1.40)	0.692	1.17 (0.60, 2.29)	0.643	0.80 (0.46, 1.41)	0.443
A level/equivalent NVQ 3	0.69 (0.43, 1.13)	0.144	0.85 (0.41, 1.75)	0.660	0.59 (0.29, 1.20)	0.149
Higher qualification/ equivalent NVQ 4	0.59 (0.36, 0.98)*	0.042	0.57 (0.26, 1.26)	0.165	0.66 (0.34, 1.27)	0.210
University degree/ equivalent NVQ 5, 6	0.63 (0.37, 1.08)	0.093	0.52 (0.23, 1.17)	0.112	0.78 (0.38, 1.58)	0.484
Own social class (*unskilled as reference group*)						
Partly skilled	0.41 (0.22, 0.77)**	0.005	0.27 (0.10, 0.69)**	0.007	0.61 (0.26, 1.44)	0.262
Skilled manual	0.39 (0.22, 0.71)**	0.002	0.23 (0.10, 0.53)***	0.001	0.82 (0.33, 2.03)	0.668
Skilled non-manual	0.38 (0.21, 0.68)***	0.001	0.28 (0.12, 0.70)**	0.006	0.56 (0.25, 1.28)	0.172
Managerial/tech	0.34 (0.19, 0.60)***	0.001	0.23 (0.10, 0.53)***	0.001	0.48 (0.21, 1.10)	0.084
Professional	0.63 (0.32, 1.23)	0.178	0.43 (0.17, 1.09)	0.075	0.95 (0.35, 2.55)	0.914
Extraversion	0.93 (0.83, 1.04)	0.198	0.82 (0.69, 0.97)*	0.020	1.03 (0.88, 1.21)	0.671
Emotional stability	0.88 (0.79, 0.98)*	0.015	0.93 (0.80, 1.09)	0.386	0.83 (0.72, 0.95)**	0.008
Agreeableness	1.20 (1.05, 1.36)**	0.008	1.40 (1.16, 1.70)***	0.001	1.01 (0.84, 1.22)	0.884
Conscientiousness	0.94 (0.84, 1.04)	0.237	0.95 (0.81, 1.12)	0.536	0.93 (0.81, 1.03)	0.353
Openness	1.15 (1.02, 1.30)*	0.023	1.21 (0.92, 1.15)*	0.039	1.11 (0.94, 1.31)	0.239

CI: confidence interval; CSE: Certificate of Secondary Education, NVQ: National Vocational Qualification.
Adjusted for gestational age and birth weight.
*$p < .05$; **$p < .01$;***$p < .001$.

more effectively. Stress vulnerability to uncertainness (Buske-Kirschbaum et al., 2008) and higher levels of hypochondriasis (Al-Ahmar and Kurban, 1976) could relate to the observed high Openness to experience scores; a need to know all of the variables in a situation, and knowledge of all the potential damaging variables noted in hypochondriacs that leads to worry. This high need for control may explain the occurrence of stress-related conditions. Furthermore, trait Openness is correlated with intelligence, and thus could further explain the role of childhood intelligence in eczema. Children who are considered to be more intellectual may exhibit a greater need for approval of their performance, increasing their vulnerability to stress. Nonetheless, the present finding presents possibilities in further research on the effect of trait Openness on eczema and atopic conditions where a sparse number of literature has focused on.

The study also shows that brighter people are more likely to suffer from eczema, which is not in line with the previous findings, that tended to show that intelligent children grew up to have better adult mental and physical health outcomes (Batty et al., 2009; Feinstein and Bynner, 2004). This might be related to

responsibility induced stress, which may worsen the skin problems such as dermatitis or urticarial (Dave et al., 2011). Intelligent individuals are more likely to have more professional occupation with greater responsibilities; they may suffer more stress-related eczema or other skin problems. This might be more salient in men than in women, as the proportion of managerial status is larger in men than in women.

Finally, the regression but not the correlational results showed a link between SES and eczema although true for males and not females. This may be due to a working environments which exacerbates a whole range of skin diseases.

These results have shown that eczema appears to have a powerful biological component: the best predictor of eczema at 50 years was having the problem diagnosed at 7 years. However, this study did show the role of personality factors in adulthood. Furthermore, work needs to try to understand the effect of personality on eczema and vice versa and to spell out the mechanisms explaining the relationship. In this sense, medical practitioners may be able to give more targeted and individualized advice to eczema patients if they have some insight into their personality.

Limitations

This study is based on available variables in the dataset rather than being based on the study designed for the purpose, thus variables included in the study do not have a wide scope in investigating correlates of the outcome variable. Second, personality traits were measured only once in adulthood, thus the associations between personality traits and the outcome condition are cross-sectional. Third, there may be significant heterogeneity in what is called 'eczema' as the term used in the question is rather vague.

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Appendix 1. Pearson product-moment correlations of variables in the study.

	Variables	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12
1.	Gender	0.51 (0.50)	–											
2.	Eczema at age 50 years	0.08 (0.26)	.027	–										
3.	Eczema at age 7 years	0.03 (0.16)	.008	**.126*****	–									
4.	Parental social class at birth	3.33 (1.24)	−.019	**.020**	.024	–								
5.	Childhood intelligence	104.0 (12.85)	.074***	**.046*****	.028	.265***	–							
6.	Educational qualifications	2.68 (1.45)	−.084***	**.003**	.014	.329***	.487***	–						
7.	Own occupational levels	4.10 (1.21)	−.014	**.001**	.026	.329***	.460***	.460***	–					
8.	Extraversion	29.43 (6.60)	.079***	**.000**	.016	.025	.025	.076***	.125***	–				
9.	Emotional stability	28.90 (7.06)	−.136***	**−.040****	−.009	.024	.090***	.086***	.076***	.212***	–			
10.	Agreeableness	36.84 (5.27)	.407***	**.046*****	.002	.115***	.118***	.078***	.105***	.359***	.053***	–		
11.	Conscientiousness	34.01 (5.29)	.106***	**−.007**	.015	.040**	.043**	.063***	.087***	.143***	.182***	.274***	–	
12.	Openness	32.54 (5.16)	−.014	**.042****	.008	.141***	.274***	.322***	.245***	.397***	.094***	.335***	.224***	–

Variables were scored such that a higher score indicated being female, the presence of eczema in childhood or adulthood, a more professional occupation for parents or cohort members, higher scores on childhood intelligence, highest educational qualification, higher scores on traits Extraversion, Emotional Stability, Agreeableness, Conscientiousness, and Openness. Associations between eczema in adulthood and other variables are in bold.
$p < .01$;*$p < .001$.