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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 5,834 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: Eczema; Child Intelligence; Personality Traits; Educational Achievement; Occupational Levels; Cross-sectional and Longitudinal

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 etiological factors of eczema are not attributable to a single factor (Arima et al., 2005). Further whilst there are associations between eczema and personality traits, it is unclear whether it plays an etiological 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 atopic conditions (Takahashi et al., 2013; Takahashi et al., 2012; Mizara et al., 2012; Bahmer et al., 2007; Scheich et al., 1993).

There have been some attempts to associate the Big Five personality factors to eczema. Studies have consistently indicated that high levels of trait Neuroticism are found in eczema patients (Al-Ahmar & 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), whilst other researchers indicate no correlation (Al-Ahmar & Kurban, 1976). In a clinical sample Schut and colleagues (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 ($r=.56$; $p<0.001$), and Agreeableness was significantly associated with less induced scratching ($r=-.44$; $p<0.05$) (Schut, Muhl, Reinisch, Claßen, Jäger, Gieler & Kupfer, 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 (Scheik et al., 1993), suggesting a psycho-biological mechanism that mediates the exhibited behaviours in eczema.

An extensive review by Friedman and Kern (2014) indicate that factors such as depression and anxiety, both strongly associated with trait Neuroticism, play a part in many illnesses, including eczema (Al-Ahmar & Kurban, 1976; Kim et al., 2006; Mirzara et al., 2012; Schut et al., 2014; Slattery & Fox, 2011; Takahashima 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; whilst 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 and recently Kuebler and colleagues showed that stress induces increases in NF- κ B that relate to subsequent mRNA expression of pro-inflammatory (Kuebler, Zuccarella-Hackl, Arpagaus, Wolf, Farahmand, von Känel, & Wirtz, 2015). Further, there appear to have sex effects on the association between depression and inflammatory markers; stress may drive inflammation and subsequent depressive symptoms shown in women, not in men (Hiles, Baker, de Malmanche, McEvoy, Boyle, & Attia, 2015).

There is a large body of literature in the links between social class, education and mental and physical health and illness (Feinstein & Bynner, 2004; Marmot, 2007; Wilkinson, & Marmot, 2003; Wilkinson, & Pickett, 2006), and between intelligence, socioeconomic position and health and mortality (Batty, Gale, Tynelius, Deary, & Rasmussen, 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, Linneberg, Thomsen, & Glümer, 2014; Heinrich et al., 1998; Stewart et al., 2001; Williams, Strachan, & Hay, 1994; Weber & Haidinger, 2010). 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 & Haidinger, 2010).

This Study

The current study looks at social (social class of self and parents, education) and psychological (personality, education) correlates of self-reported occurrence of eczema in adulthood. The present 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 aspect 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, Bynner, & Wadsworth, 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, 8,532 participants completed a questionnaire on personality traits (response = 69%), and 9,760 participants provided information on their current occupation and whether they were suffering from eczema (response = 79%). The analytic sample comprises 5,834 cohort members (51 per cent 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, Calderwood, Hawkes, & Nathan, 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 six-point scale from unskilled to professional occupations (Leete, 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, participants were asked about their highest academic or vocational qualifications. Responses are coded to the six-point scale of National Vocational Qualifications levels (NVQ) 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 (5-point, 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 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 ANOVA. Second, correlation matrix of all the variables used in the study were 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 ($t (df = 5832) = 5.10, p < .05$).

Inset Table 1 about here

Correlation matrices of all variable 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. Further, 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 associate with eczema in adulthood.

Discussion

The current study set 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 was 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 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). The present study, however, indicates the opposite; higher levels of Agreeableness are found in eczema patients, though 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 current 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.

The present 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. Whilst 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 pursuits (football and other sports) thus may reduce stress related eczema more effectively. Stress vulnerability to uncertainty (Buske-Kirschbaum et al., 2008) and higher levels of hypochondriasis (Al-Ahmar & Kurban, 1976) could relate to the observed high Openness to experience scores; a need to know all of the variables in a situation, and a 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 intelligence children grew up to have better adult mental and physical health outcomes (Batty et al., 2009; Feinstein & Bynner, 2004). This might be related to responsibility induced stress, which may worsen the skin problems such as dermatitis or urticarial (Dave, Xiang, Rehm, & Marshall, 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 are larger in men than in women.

Finally, the regression but not the correlational results showed a link between socio-economic status and eczema, though 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 seven. However this study did show the role of personality factors in adulthood. Further, 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 individualised advice to eczema patients if they have some insight into their personality.

Limitations

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

	n	%	Prevalence of eczema %
<i>Gender</i>			
Male	2879	49.3	6.8
Female	2955	50.7	8.3
<i>Parental social class at birth</i>			
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
<i>Educational qualifications at age 33</i>			
No qualifications	414	7.3	7.7
CSE 2-5/equivalent NVQ1	656	7.7	5.2
O Level/equivalent NVQ2	2016	40.0	8.7
A level/equivalent NVQ 3	904	14.3	7.0
Higher qualification/equivalent NVQ4	961	14.3	6.6
University Degree/equivalent NVQ 5, 6	883	16.4	8.2
<i>Own current social class at age 50</i>			
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

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

<i>Measures</i>	All		Males		Females	
	Odds ratio (95% CI)	<i>p</i>-value	Odds ratio (95% CI)	<i>p</i>-value	Odds ratio (95% CI)	<i>p</i>-value
Parental social class at birth (<i>unskilled as reference group</i>)						
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	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	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 (<i>no qualification as reference group</i>)						
CSE 2-5/equivalent NVQ1	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 NVQ2	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 NVQ4	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 (<i>unskilled as reference group</i>)						
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

Note: * $p < .05$; ** $p < .01$; *** $p < .001$. Adjusted for gestational age and birth weight.

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

<i>Variables</i>	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender	.51 (.50)	–											
2. Eczema at age 50	.08 (.26)	.027	–										
3. Eczema at age 7	.03 (.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***	–

Note: * $p < .05$; ** $p < .01$; *** $p < .001$. 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.