**Influence of Age and Gender on Schizotypal Traits and Schizotypal Personality Disorder Risk: Multivariate Analysis in a Non-Clinical Undergraduate Sample.**

**Abstract**

Schizotypy refers to a multidimensional personality spectrum analogous to and predictive of vulnerability to psychotic disorders (ie, schizophrenia). Age and gender have been shown to be important moderators of schizotypal trait expression in the general population. The present study aims to investigate whether age and gender can predict schizotypal traits and Schizotypal Personality Disorder (SPD) risk in a non-clinical sample. Participants consisted of 116 undergraduate students between the ages of 18 and 62 years. Schizotypal traits were assessed with the 104-item Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE), and SPD risk was assessed with the 32-item Schizotypal Personality Questionnaire-Brief Revised (SPQ-BR). Two separate multiple regression analyses were performed to investigate the amount of variance, attributed to age and gender in schizotypal traits and in SPD risk. Results indicated that age and gender together predict 5.3% of the variance in schizotypal traits and 6.1% in SPD risk. Age was a significant predictor of schizotypal traits and SPD risk, while gender did not significantly contribute to the predictive models. The present results emphasise the importance of considering age as a developmental factor in schizotypal trait expression and SPD risk. Findings highlight the need for revising predictive models and improving early detection strategies, which could increase the accuracy of mental health treatments, and focus on age-related factors.

**Introduction**

There is increasing focus on the prodromal stages of schizophrenia and identifying individuals at high risk of psychosis (Barrantes-Vidal et al., 2013; Mason, 2015; Nelson et al., 2013; Ambarini et al., 2021; Dong et al., 2021). 'Schizotypy' is a broad term that includes patients diagnosed with schizotypal personality disorder (SPD) but also encompasses healthy people in the general population who display particular personality traits (Meehl, 1962; 1990; Lezenweger, 2018; Chapman et al., 1984; Kwapil & Barantes-Vidal, 2015; Mohr & Claridge, 2015). Robust evidence demonstrates that high levels of schizotypal traits can foreshadow the onset of psychotic disorders, including SPD and schizophrenia (Kwapil et al., 2018; Debbané et al., 2015). This relationship is conceptualised as a spectrum of symptoms (Kwapil & Barrantes-Vidal, 2015), with subtle early expressions of distress such as atypical thinking, social withdrawal or unusual perceptions that can further develop over time and become clinically significant symptoms (Debbané et al., 2015; Westerhof Keyes, 2009). In the past, schizotypy was viewed as a distinct disease with clear boundaries, unlike more contemporary interpretations, which view schizotypy and psychotic disorders as part of a multidimensional continuum that reflects valuable insights for broad and heterogeneous psychosis-related disorders (Kwapil et al., 2008). This is a departure from describing it as a liability for the development of psychosis or schizophrenia (Meehl, 1973; Lenzenweger et al., 1989; Claridge, 1997; Lenzenweger, 2021).   
 Schizotypy shares a range of contributing factors with schizophrenia – genetic predispositions, neurodevelopmental problems, the effect of environmental stressors, and is made up of a complex interaction of social and psychological processes (Raballo & Parnas, 2011; Barrantes-Vidal et al., 2015; Fonseca-Pedrero & Debbane, 2017; Ettinger et al., 2014). Schizotypy refers to a continuous spectrum of traits in the general population ranging from quiet eccentricities to profoundly psychosis-like manifestations, lacking functional impairment or need for clinical assistance (Kwapil et al., 2013; Toutountzidis et al., 2022; Huang et al., 2023; Webster et al., 2022). SPD, however, is an official diagnosis included in 'Cluster A' personality disorders of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) and represents the clinical definition of a more severe and impairing expression of traits associated with schizotypy (American Psychiatric Association, 2013; Kwapil et al., 2022; Kirchner et al., 2018). For a diagnosis of SPD, the traits must be more pervasive, cause significant functional impairment or distress, and arise across different settings and contexts (Rosell et al., 2014). Usually, the management of SPD requires clinical assistance, ranging from psychotherapy to pharmacotherapy, to alleviate the symptoms; however, there is currently no guidance on how to deal with high schizotypal traits which do not merit the diagnosis (Ridenour, 2016; Kirchner et al., 2018). Prevalence studies report that SPD affects between 1.37 per cent and 4.6 per cent of the general population (depending on the study), with higher rates in men than in women (4.2 per cent and 3.9 per cent, respectively; Pulay et al., 2009). The rate of general schizotypy is closer to 5.2 per cent, but this is not expressed in the same way across different populations (American Psychiatric Association, 2013; Pulay et al., 2009; Nuevo et al., 2012). First symptoms of psychosis, which include schizotypal traits, might begin in late adolescence or early adulthood, often before any formal clinical diagnosis (Fusar-Poli et al., 2014); likewise, evidence of schizotypy has been noted in prepubescent children, implying that these traits start to begin at some point early in life (Green et al. 2022). The discovery of characteristics like lack of social enjoyment and unusual perceptions in children as young as eight provides evidence that schizotypy could also be a developmental phenomenon, which may result in more serious mental disorders as these individuals get older (Kwapil, 1998). Furthermore, longitudinal studies have shown that during adolescence, schizotypal features might serve as a predictor for the subsequent occurrence of psychotic diseases (Fonseca Pedrero & Debbané, 2017). This also points to a developmental progression from schizotypy to psychosis, as Gooding et al. suggest (2005) and is consistent with the continuum of symptoms framework (Westerhof & Keyes, 2009). Neurobiological research also offers evidence that some schizotypal features could stem from neurodevelopmental deficits that begin early in life, which suggests that these characteristics have a more innate basis, as not all can be developed via the environment or personal experiences but instead have a genetic or biological basis (Ettinger et al., 2015).  
 The range of schizotypal traits or symptoms includes the exact three dimensions found in schizophrenia: positive, negative,clu and disorganised, each corresponding to different aspects of the disorder's characteristics (Fonseca-Pedrero et al., 2018; Kwapil et al., 2018; Vollema & Bosch, 1995). Those with positive schizotypal symptoms can see things, hear voices or otherwise perceive things that aren’t there; that is, they experience abnormal sensory experiences that have no external cause (Charabi et al., 2019). They might believe they have telekinesis, precognition or that the random events happening around them are somehow directed at them. They might believe that the world has a greater significance than what is apparent (Zahid & Best, 2023; Eckbald & Chapman, 1983). People with positive schizotypy believe in ghosts, telepathy, conspiracy theories, and other unexplained phenomena (Drinkwater et al., 2021). Negative schizotypy diminishes social pleasure and interest in activities, making it challenging to appreciate normally pleasant pastimes (Kwapil et al., 2020). An individual exhibiting negative schizotypy prefers solitude rather than socialising and experiences discomfort/disinterest instead of social anxiety while socialising (Kwapil et al., 2012). High negative schizotypal scores are associated with less emotion, less vocal pitch variation, less smiling, less eye contact, and less frequent speech (Shi et al., 2012). They also have avolition (inability to initiate or engage in goal-directed behaviours), difficulty forming and maintaining intimate relationships, and a general detachment from others (Marder & Galderisi, 2017). Disorganised schizotypal traits capture a degree of disorganised symptoms of schizophrenia, which refer mainly to thought processes, speech and behaviour (Caplan ⁨& Guthrie, 1992; Schultze-Lutter et al., 2019). Consequently, disorganised schizotypal traits are associated with disorganised ways of speaking and thinking, with difficulty paying attention, following a train of thought, or maintaining a conversation (Mohr & Claridge, 2015). People with disorganised traits also act unpredictably, out of context, have odd mannerisms, dress oddly, or perform rituals that only make sense to them (Rosenfarb & Juan, 2006; Mathijsen, 2016). They also show inappropriate emotions (e.g., laughing at bad news; Meehl, 1973).   
 In order to understand the true impact of schizotypy on people's lives, it also has to be noted that it is often associated with comorbid conditions (Stein et al., 2016; Lim et al., 2016; Blechert & Meyer, 2005; Cramer, 2016; Burch et al., 2008; Einsenbarth et al., 2008). Cluster A and B personality disorders, neuropsychiatric illnesses and substance-related disorders – which might all be important in determining the trajectory in individuals from t-risk mental states to psychosis (Torti et al., 2013; Raine et al., 1991; Pulay et al., 2009). It can also involve problems with cognitive dysfunction, depression, anxiety, paranoia and personality problems, such as borderline or avoidant, which can cause a complex clinical symptomatology (Lewandowski et al., 2006; Koreen et al., 1993; Bottlender et al., 2000; Kemp et al., 2018; Hernández et al., 2023). SPD is associated with social anxiety, sensitivity to rejection and criticism, and heightened reactivity to praise (Premkumar et al., 2020; Kemp et al., 2020). Research has identified essential links between SPD and cognitive impairments similar to individuals with schizophrenia, such as working memory, attention and executive functioning problems (Kwapil & Barrantes-Vidal, 2015; Islam et al., 2018). Gilles de la Tourette syndrome, characterised by motor and vocal tics, has also been documented in large numbers of individuals with SPD (Greenberg et al., 2018; Cavanna et al., 2007). People living with SPD are also highly likely to use substances that aggravate schizotypal symptom complexity (Lurigio, 2011; Fenton et al.,2012). They are also reported to have significantly higher levels of suicidality and more negative attitudes about seeking help than people with lower schizotypal traits (Teraishi et al., 2014; Fekih-Romdhane et al., 2021).   
 Prior studies on schizotypy have consistently shown a correlation between age and gender and the manifestation of SPD in both clinical and non-clinical samples (Miettunen & Jääskeläinen, 2008; Miettunen et al., 2011; Drake et al., 2016; Guo et al., 2011; Kwapil & Barrantes-Vidal,2015; Salem & Kring, 1998; Dinn et al., 2002). In their study, Bora and Arabaci (2009) examined the effects of age and gender on schizotypy in the general population. They discovered that males exhibited greater scores in negative and disorganised symptoms, whereas females exhibited higher scores in positive schizotypy subscales. In addition, it was shown that younger participants achieved notably higher scores in positive and disorganised schizotypy subscales. This indicates a decrease in schizotypal traits as individuals age. Similarly, Badcock and Dragovic (2006) found that males exhibited greater scores of negative schizotypy in a group of non-clinical adults. Again, females had higher scores on positive sub-scales. Furthermore, it was verified that older persons demonstrated diminished overall scores compared to younger ones. This finding also supports that schizotypal tendencies tend to decrease as individuals age. In addition, Mata et al. (2005) found that in a group of undergraduate students who were not diagnosed with any mental health conditions, there was a negative correlation between age and all schizotypal traits. Males scored higher on the negative and disorganised factors, while females scored higher on the positive factor, again highlighting the gender-specific manifestations of schizotypy. Moreover, the results of this study are consistent with the findings of Fossati et al. (2003), who discovered that younger, non-clinical individuals, including adolescents and university students, generally had higher total scores than older individuals. Gender disparities were also noted, with females exhibiting greater scores in notions of positive dimensions while males demonstrated higher scores in the negative ones (Fossati et al., 2003). Furthermore, Miettunen and Jääskeläinen (2010) provided additional evidence to support these findings by confirming that males typically have higher levels of negative schizotypy. However, they noted no significant differences in positive schizotypy were identified between genders. Again, younger participants scored higher across all dimensions.   
 These consistent findings from multiple studies indicate that schizotypal traits vary significantly among individuals based on age and gender. With increasing age, people have more life experiences and reach maturity in their cognitive functioning, which will allow them to have better social role integration and coping strategies and, as such, to reduce the chance or attenuate the intensity of schizotypal traits (Sarajehlou et al., 2023; Chen et al., 2019;). Neuroimaging findings also differ between young and older individuals with SPD, suggesting that they are the outcome of brain development and maturation processes. Older individuals with SPD have symptoms of brain maturation and reduction of the severity of some abnormalities of specific neural systems when their brains are compared with those of younger individuals with SPD (Meyhoffer et al., 2015; Dickey et al., 2002). This suggests a possible stabilisation or reversal of the previous brain abnormalities due to brain maturation in older people with SPD (Zouraraki et al., 2023; Hori et al., 2008). It is possible that, as people mature, their brain finds ways of adaptation through developing compensatory mechanisms that can reduce the severity of schizotypal traits. This is supported by some neural adaptations that become more pronounced as differences between older and younger people with SPD increase (Romare et al., 2023; Grundy, 2006). There is, however, limited research on processes making older people without clinical diagnosis less schizotypal and prone to SPD, as most of the studies are focused on clinical samples of people living with psychotic disorders and schizophrenia.  
 Regarding gender, it is also suggestive of shifts in gender norms that modify the manifestation of symptoms of psychopathology in people living with schizotypy (Barrantes-Vidal et al., 2015; Fonseca-Pedrero & Debbane, 2017). Typical personality research indicates that there can also be gender differences in the expression of personality traits (Costa et al., 2001). Some studies suggest that women, for example, show a tendency to score higher on neuroticism and agreeableness, while men express tendencies to score higher on assertiveness and openness to experience (Weisberg et al.,2011; Chapman et al.,2007).   
 Clinical samples also show gender and age differences in schizotypal traits, and findings in research are similar to the ones in non-clinical cohorts (Debbane et al., 2015; Grant et al., 2013; Riecher-Rössler et al., 2018). Specifically, males are more likely to exhibit schizotypal traits than females, especially concerning negative schizotypy, further indicating that this domain could be a gender-specific vulnerability (Horan et al., 2023). In terms of age, there is some evidence showing that even though schizotypal traits are higher in younger people, scores remain relatively stable in clinical populations over age, suggesting that schizotypal traits, once developed, are not likely to see significant changes in clinical assessments as people age, further indicating the chronicity of these traits across the lifespan in clinical samples (Johns & Van Os, 2001; Venables & Raine, 2015).

The present investigation builds upon the methodology employed by Mata et al. (2005) in their study of undergraduate students, and it further incorporates findings from Bora and Arabaci (2009), who explored the impact of age and gender on schizotypy in the general population. The current study is also based on a non-clinical research sample of undergraduate students; however, a multivariate approach (multiple linear regression) not used before in this kind of investigation is utilised to explore predictive capabilities of age and gender on schizotypal traits and SPD risk. Given the extensive comorbidities and profound personal consequences associated with schizotypal traits and SPD, ranging from subclinical manifestations to full-blown psychotic disorders, the importance of this research cannot be overstated. For this reason, it is critical to examine the relationship between schizotypy, age and gender in non-clinical samples to obtain a better understanding of the preliminary prodromal stages of psychotic disorders, as each person with any level of schizotypal anomalies is part of these demographics, irrespective of socio-economic status, ethnic origin, or level of education. This study also highlights the urgent need for more research on effective treatments and early detection, given the significant gaps in current studies addressing the general population's detection and management strategies for these traits. There is no standardised treatment protocol available for individuals in the general population who are high in schizotypal traits but do not meet the diagnostic criteria for SPD; recognising and correcting these exclusions is essential, considering the prevalent occurrence of schizotypal symptoms in the general population and the possibility of significant repercussions (Debbané et al., 2015; Polner et al., 2019; Lenzenweger, 2021; Claridge & Beech, 1995; Rimsky & Cain, 2020). Studies conducted by Green et al. (2022) and Lenzenweger (2021) have shown that in the general population, there is a significant number of individuals who exhibit schizotypal characteristics that are close to clinical thresholds but who do not meet the criteria for SPD or schizophrenia. This discovery emphasises the immediate requirement for research that expands our comprehension of schizotypy beyond clinical diagnosis and improves proactive therapeutic strategies to reduce its impacts.   
 The main aim of the present investigation is to explore the predictive power of age and gender variables on schizotypal traits and SPD risk in the general population. The current study employs the three-factorial Schizotypal Personality Questionnaire Brief Revised (SPQ-BR; which measures the risk of SPD and is based on DSM-5 criteria for the disorder), and the four-factorial Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE; which is a scale which measures personality changes to find schizotypal traits in the general population). By utilising these two complementary, multifactorial psychometric scales, the research is enhanced, as a wide range of symptoms and behaviours associated with schizotypal traits can be investigated in greater depth; it also becomes more reliable and valid as it permits the comparison of results derived from two instruments, thus incorporating a broader range of schizotypal traits. The study is expected to provide valuable insights about the studied sample regarding the demographic factors that contribute to the formation of schizotypal traits. The current study tests two hypotheses. The first hypothesis posits that age and gender will significantly negatively predict schizotypal traits in the participant sample. The second hypothesis suggests that age and gender will significantly negatively predict the risk of SPD in this cohort.

**Method**

**Design.**

The within-subjects model utilised two simultaneous multiple linear regressions to analyse the impact of age and gender on schizotypal traits and risk of SPD in non-clinical samples. There were two independent variables (predictors), age and gender, and two dependent variables (criterions). The first dependent variable was the total score from the SPQ-BR (Cohen et al., 2010), measuring SPD risk in the general population. The second dependent variable was the total score from the O-LIFE (Mason & Claridge, 2006), measuring the level of schizotypal traits in the general population.

**Participants.**

A prospective power analysis conducted using G\*Power Software version 3.1.9.7 (Faul et al., 2007) suggested that to achieve a statistical power of 0.8, with a significance level set at p < 0.05, a sample size of 68 would be advisable (Appendix A).Participants were recruited via the SONA portal, resulting in a total sample size of 157 UK-based undergraduate students. Due to a high number of unanswered questions (exceeding 15% of the entire question pool) and patterns of random responding (Osborne & Blanchard, 2011), data from 41 participants had to be excluded, resulting in a final participant count of N=116, with an age range from 18 – 62 years (*M = 31.1, SD = 11.28),* 86 female, 30 male (see Table 1).

**Table 1.** *Participant gender distribution ("gender assigned at birth").*

|  |  |  |
| --- | --- | --- |
|  | N | Percent |
| Male | 30 | 25.9% |
| Female | 86 | 74.1% |
| Total | 116 | 100% |

The study predominantly comprised participants who identified as white. Additionally, the study included participants from diverse ethnic backgrounds, albeit in smaller proportions. Two participants chose not to disclose their ethnicity (see Table 2).

**Table 2**. *Participants ethnic backgrounds.*

|  |  |  |
| --- | --- | --- |
|  | Frequency | Percent |
| White | 96 | 82.8% |
| Black/African/Caribbean | 6 | 5.2% |
| Asian/Indian/Chinese/Other Asian background | 5 | 4.3% |
| Mixed background | 5 | 4.3% |
| Other | 2 | 1.7% |
| Prefer not to say | 2 | 1.7% |
| Total | 116 | 100.0% |

Participation in the study was voluntary, although participants were incentivised with 2 SONA credits. To take part, individuals had to be over 18 years old and not be diagnosed with any mental health disorders or have a first-degree relative with schizophrenia or SPD.

**Measures**

*Schizotypal traits*

**Oxford-Liverpool Inventory of Feelings and Experiences** (O-LIFE; Mason & Claridge, 2006).

O-LIFE, a 104-item self-report measure, evaluates traits across four dimensions, which correspond to positive, negative and disorganised characteristics of schizotypy, with the addition of the impulsive nonconformity dimension (introduced by Mason et al., 1995). O-LIFE was developed to measure each element of schizotypy in a detailed way, providing a good understanding of schizotypal characteristics; it was also designed to capture personality differences related to schizotypy rather than clinical manifestations such as schizotypal or schizoid personality disorder characteristics; this makes it an appropriate tool for studying schizotypy in the general population (Grant et al., 2013). O-LIFE questionnaire demonstrates strong validity and reliability across various studies (Yaghoubi & Mohammadzadeh, 2012; Mitchell et al., 2017). Its subscales correlate well with other established measures of schizotypy, confirming its construct validity (Schofield & Mohr, 2014). Additionally, confirmatory factor analysis supports the robustness of its factor structure, affirming its structural validity (Mason & Claridge, 2006). Reliability is evidenced by consistently high Cronbach's Alpha (α= .89; Cella et al.,2013), which indicates the questionnaire's internal consistency and composite reliability. O-LIFE is built of four sub-scales. The Unusual Experiences (UE) subscale of O-LIFE, composed of 39 items, evaluates positive schizotypy. This scale includes questions that probe perceptual aberrations, magical thinking, ideas of reference, odd beliefs, paranormal experiences, unusual thought content, and hallucinations. Examples include "Do you believe in telepathy?" or "Does your voice ever seem distant or far away?" The UE subscale is noted for its high reliability, achieving a Cronbach's alpha of .89, indicating strong internal consistency (Mason & Claridge, 2006). The Cognitive Disorganisation subscale comprises a 15-item measure focusing on the disorganised aspects of schizotypy. This scale assesses cognitive disruption and disorganisation, capturing difficulties in concentration, attention, and coherent thought and challenges in organising ideas and experiences. Some of the questions on the scale include "Is it hard for you to make decisions?" and "Do you worry too long after an embarrassing experience?" Indicative of its robust reliability, the Cognitive Disorganisation subscale records a Cronbach's alpha of .87, confirming its strong internal consistency and effectiveness in measuring these cognitive traits (Mason & Claridge, 2006).The Introvertive Anhedonia subscale includes 27 items focused on negative schizotypal traits. It evaluates tendencies towards anhedonia and social introversion, measuring an individual's diminished ability to enjoy social and physical activities, inclination to avoid social interactions, and reduced emotional expressiveness. This subscale features questions like "Do you feel that making new friends is not worth the energy it takes?" and "Are there very few things that you have ever really enjoyed doing?" Demonstrating strong internal consistency, the Introvertive Anhedonia subscale has a Cronbach's alpha of .82 (Mason & Claridge, 2006). The Impulsive Nonconformity subscale comprises 23 items measuring impulsive decision-making, attitudes of being opponents of socially valued behaviours or norms and behaving oddly or in ways that others do not recognise or accept. It taps into an individual's tendency to act on sudden urges and one's divergence from normatively expected patterns of social behaviour. Examples of items are: 'Do you often have an urge to hit someone?' and 'Do you often change between intense liking and disliking of the same person?' The Impulsive Nonconformity subscale demonstrated acceptable internal consistency (Cronbach's alpha = .77) (Mason & Claridge, 2006). Responses to all questions in the scale were dichotomous: "YES" answers scored +1 and "NO" answers 0, with the scoring reversed for negatively framed questions, allowing for a range of scores of 0-104 (with higher scores equalling higher schizotypal traits proneness). The full scale can be found in Appendix B.

*Schizotypal Personality Disorder Risk.*

**The Schizotypal Personality Questionnaire-Brief Revised** (SPQ-BR; Cohen et al., 2010)is a specialised 32-item self-assessment for the evaluation of schizotypal traits across nine critical dimensions outlined by the DSM-5 standards for the risk of SPD (American Psychiatric Association, 2013). This questionnaire was designed as a diagnostic tool to accurately identify characteristics of schizotypal traits for both clinical analysis and research applications. The SPQ-BR meticulously examines various aspects of schizotypal personality traits. Ideas of Reference and Suspiciousness focus on assessing paranoia and mistrust, with probing questions like "Do you sometimes feel that people are talking about you?" and "Do you often feel the need to be vigilant to prevent others from exploiting you?". No Close Friends and Constricted Affect measure social withdrawal and emotional restraint through queries such as "Do you find it difficult to get close to people?" and "I usually keep my feelings to myself." Eccentric Behaviour and Social Anxiety explore unconventional behaviours and social discomfort with statements like "Others perceive me as somewhat odd," and "I feel anxious when meeting new people." Magical Thinking, Odd Speech, and Unusual Perception assess atypical beliefs, speech irregularities, and sensory misperceptions with items such as "Do you believe in psychic forces or fortune telling?" "Do you often stray off-topic during conversations?" and "Have you ever seen a face change shape right before your eyes in a mirror?". Each domain demonstrates high internal consistency, with Cronbach's alphas between .80 and .90, establishing them as highly reliable. The overall Cronbach's alpha for the SPQ-BR is .90, affirming its effectiveness as a diagnostic tool (Cohen et al., 2010). Participants respond to items on a five-point ordinal scale ranging from 'strongly disagree' to 'strongly agree,' with a scoring system that assigns values from 1 to 5 without any reversed items. This results in a potential score range of 32 to 160, where higher scores indicate a higher risk of SPD. Details of the complete questionnaire are included in Appendix C.

**Procedure**

The experiment was conducted via the Qualtrics platform. Individuals were first presented with an information sheet (Appendix D) and required to fill out an online consent form (Appendix E); both files were embedded into the study file. Participants were comprehensively informed about their rights, including the option to withdraw from the study. The study began by collecting demographic data (sex at birth, age and ethnic background). Subsequently, participants were administered two psychometric assessments: the O-LIFE and the SPQ-BR. After completing the questionnaires, a debriefing session ensued, aimed at explaining the study's rationale and providing participants with information on available support services (see Appendix F). Participants were thanked for their participation. The study's duration was approximately 30 minutes.

**Ethical Considerations**

Before the commencement of the study, a research proposal and an ethics form were submitted to and subsequently approved by the Ethics Committee of Staffordshire University's Psychology Department. The committee identified no potential risks associated with the research. The study's design ensured that participation was voluntary, with each participant providing informed consent. Emphasising the study's integrity, measures were in place to guarantee anonymity and confidentiality; no identifying information was collected from participants. Data acquired during the study will be securely stored on the password-protected online drive for ten years. Individuals were made aware of their right to withdraw from the study until February 29, 2024, to mitigate any possible distress or harm resulting from participation. Additionally, individuals were provided with information on support services to safeguard participant well-being. This ensured that participants had access to essential support resources should the study's content cause adverse psychological effects.

**Results**

Data analysis was performed using IBS SPSS statistics 28 on the Windows 11 operating system.

*Descriptive statistics.*

Descriptive statistics of age, gender, schizotypal traits score, and SPD risk score were calculated (data can be found in Table 3).

**Table 3.** *Means and standard deviation of age, gender, schizotypal traits and SPD risk.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | *Mean* | *Std. deviation* | N |
| Age | 31.11 | 11.28 | 116 |
| Gender | .74 | .44 | 116 |
| Schizotypal traits a | 51.47 | 17.16 | 116 |
| Schizotypal personality disorder risk b | 101.09 | 22.23 | 116 |

a Score of Oxford-Liverpool Inventory of Feelings and Experiences (Mason & Claridge, 2006).b Score of Schizotypal Personality Questionnaire Brief Revised (Cohen et al., 2010).

*Parametric assumptions checks.*

Preliminary analyses were conducted to ensure no violation of linearity, multicollinearity, independence of residuals, distribution of residuals, or homoscedasticity, and no influential cases biased the data. A Pearson correlation coefficient was calculated to examine the relationship between the predictors to ensure no multicollinearity. The coefficients suggested that the multicollinearity assumption was not violated (Appendix G). Additionally, tolerance and variance inflation factors values did not indicate a violation of this assumption (Appendix H). Durbin-Watson statistics were calculated to assess the assumption that the values of the residuals are independent, which suggested that none of the assumptions were violated (Appendix H). Scatterplots were created to assess the homoscedasticity and did not indicate a violation of this assumption (Appendix I). P-P plots were created to assess the assumption that the values of the residuals are normally distributed. The plots did not indicate a violation of this assumption (Appendix J). There were no outliers. Additionally, Cook's Distance values were calculated to confirm the absence of influential cases that could potentially bias the model, indicating that no such cases were present (Appendix H).

*Age as a predictor of schizotypal traits – multiple regression analysis.*

A simultaneous multiple regression analysis was conducted to explore the predictive relationship between age and gender on schizotypal traits based on the Oxford-Liverpool Inventory for Feelings and Experiences scale (Mason & Claridge, 2006) The analysis indicated that the overall model was statistically significant, F(2,115)= 3.18; p=.045, explaining 5.3% of the variance in schizotypal traits scores (R² = .053, adjusted R² =.037). Upon examining the individual predictors within the model, it was found that the age coefficient was statistically significant (p= .013), but gender was not, it did not contribute to the predictive model. Please see Table 4 to find detailed coefficients data.

**Table 4.** *Regression coefficients, standard errors, t- and p-values for schizotypal traits criterion.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *B* | *SE* | *β* | *t-value* | *95% CI* | *p-value* |
| Constant | 62.69 | 5.47 | - | 11.49 | [52.12, 73.81] | <.001 |
| Age | -.352 | .14 | -.232 | -.62 | [-.62, -.07] | .013 |
| Gender | -.723 | 3.58 | -.019 | -7.81 | [-7.8, 6.3] | .840 |

R2=.053, R2press=0.1

Model validation of this analysis was performed using PRESS statistic (R2press= 0.1), suggesting that the model adequately performs in predicting schizotypal traits based on age and gender in this participant sample. The fit of model with the data, evaluated using Cohen's classification for *R* values, indicates a small-to-moderate effect size. For each one standard deviation increase in gender, the schizotypal traits score decreases by approximately 0.32 units. For each one standard deviation increase in age, the schizotypal traits score decreases by approximately 3.97 units. The final predictive model is *Schizotypal Traits Score=62.69+ (−0.352×Age)+(−0.723×Gender)+ϵ.*

Research findings show that age significantly and negatively influences schizotypal traits within the specific participant sample, indicating that an increase in age is associated with decreased schizotypal traits. Although females in this sample exhibited lower schizotypal traits, the gender variable did not reach statistical significance. This suggests that gender does not play a significant role in predicting schizotypal traits within this group.

*Age as a predictor of schizotypal personality disorder risk- multiple regression analysis.*

A simultaneous multiple regression analysis was conducted to explore the predictive relationship between age and gender on the risk of schizotypal personality disorder based on the Schizotypal personality questionnaire- brief revised (Cohen et al., 2010). The analysis indicated that the overall model was statistically significant, F(2,115)= 3.65; p=.029, explaining 5.3% of the variance in schizotypal traits scores (R² = .061, adjusted R² =.044). Upon examining the individual predictors within the model, it was found that the age coefficient was statistically significant (p= .010), but gender was not; it did not contribute to the predictive model. Please see Table 5 to find detailed coefficients data.

**Table 5.** *Regression coefficients, coefficients standard errors, t- and p-values for schizotypal personality disorder risk criterion.*

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | *B* | *SE* | *β* | *t-value* | *95% CI* | *p-value* |
| Constant | 118.57 | 5.47 | - | 16.77 | [104.57, 132.58] | <.001 |
| Age | -.47 | .18 | -.24 | -2.63 | [-.83, -.11] | .010 |
| Gender | -3.66 | 4.62 | -.07 | -.792 | [-12.81, 5.5] | .430 |

R2=.061, R2press=0.1

Model validation of this analysis was performed using PRESS statistic (R2press= 0.1), suggesting that the model adequately performs in predicting schizotypal traits based on age and gender in this participant sample. The model fit with the data, evaluated using Cohen's classification for *R* values, indicates a small-to-moderate effect size. For each one standard deviation increase in age, the risk of SPD decreases by approximately 5.30 units. For each one standard deviation increase in gender, the risk of SPD decreases by approximately 1.61 units. The final predictive model is *Risk of Schizotypal Personality Disorder=118.57+(−0.47×Age)+(−3.66×Gender)+ ϵ.*

The findings indicate that age negatively correlates with the risk of SPD in this sample, indicating that risk decreases as age increases. Conversely, gender does not exhibit a significant impact on predicting this disorder. However, it was noted that women had, on average lower scores than men.

**Discussion**

The current study aimed to explore the predictive capabilities of age and gender concerning schizotypal traits and risk of SPD in a non-clinical sample of undergraduate students, using scores from the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE) and the Schizotypal Personality Questionnaire - Brief Revised (SPQ-BR; Mason & Claridge, 2006; Cohen et al., 2010). Consistent with the hypotheses, results from both multiple regressions were significant. The analysis of age and gender on schizotypal traits indicated that combined, they accounted for the modest yet statistically significant variance of 5.3% in schizotypal traits; the analysis of the predictive capability of age and gender on SPD risk resulted in a 6.1% variance. Age significantly contributed to the predictive model in both models, supporting the theories that schizotypal traits may decrease with maturity. Gender, however, was found not to be a significant contributor in either of the models for this cohort. Current research aligns with that of Badcock and Dragovic (2006) and Bora and Arabaci (2009), who observed a decrease in schizotypal traits among older adults but contrasts with the findings of Raine et al. (1991) and Fossati et al. (2003) on gender, with no significant gender differences detected in our study's non-clinical sample of undergraduate students, suggesting a context-dependent manifestation of these traits. The findings indicate that in this sample, age negatively correlates with schizotypal traits and risk of SPD, which means that schizotypal traits overall decrease as people get older. Maturational processes help to clarify this by pointing to developmental and psychosocial changes that improve executive function and social cognition, or to neurological maturation, which likely reduces one’s risk of psychotic-like experiences and suicidality (Fonseca-Pedrero & Debbané, 2017). With increasing age, people have more life experiences and reach maturity in their cognitive functioning, which will allow them to have better social role integration and coping strategies and, as such, to reduce the chance or attenuate the intensity of schizotypal traits (Sarajehlou et al., 2023; Chen et al., 2019;). In contrast, the analysis did not reveal significant gender differences in predicting schizotypal traits or SPD risk. This result contrasts with classical views about gender differences in psychopathology that include SPD (Drake et al., 2016; Mata et al., 2009). The absence of significant gender differences in predicting schizotypal traits and SPD risk in this study might be influenced by several factors, including cultural, contextual, and sample size considerations. A university's cultural and academic environment, typically promoting gender-neutral perspectives, may dilute traditional gender differences in broader societal contexts. Furthermore, the predominance of female participants in this study limits the generalizability of the findings to other genders and may reduce the statistical power to detect gender-specific differences. Additionally, the measurement tools employed, such as the SPQ-BR and O-LIFE, are validated for general psychopathological assessment but might lack the sensitivity to detect nuanced gender variations in schizotypal traits. These instruments are calibrated for broader populations and may not effectively capture the subtle gender-specific manifestations of schizotypal traits. Future research should consider employing methods that focus explicitly on gender differences, possibly using adapted versions of these tools or additional measures that have demonstrated sensitivity to gender complexity in psychological traits. (Fonseca-Pedrero & Debbané, 2017).   
 The strengths of current research are multifaceted and provide a solid foundation for its reliability and validity (Mason, 2015). First, it has high ecological validity. Its great advantage is the careful analytical methodology, including the multivariate analysis technique. This technique enables the distinct and comprehensible analysis of the impacts of demographic factors in a highly precise manner. It was also designed using well-researched, established psychometric tools, covering both schizotypy factor models in the literature. O-LIFE and SPQ-BR have been previously widely used and recognised as scales that can assess schizotypal dimensions in detail (Debbané et al., 2015; Mason & Claridge, 2006; Cohen et al., 2010). O-LIFE's broader applicability in general populations and SPQ-BR's clinical specificity capture a more comprehensive picture of schizotypy, exploring the continuum of schizotypal traits from various manifestations.

The study's additional strength is its focus specifically on a mixed-age, non-clinical sample, which is a group of people that is often ignored in research on schizotypy, as there is a tendency to investigate younger groups, clinical populations or individuals who have a high likelihood of developing psychosis. Nevertheless, the importance of studying non-clinical samples with limited exclusion criteria is growingly acknowledged as essential for comprehending the complete range of schizotypal traits in the general population without the complicating influences of clinical treatment or severe mental health problems. The current study also sheds light on the manifestation of schizotypal traits and their risk of SPD among individuals in an educational environment by focusing on this particular group.   
 The present study has also faced some challenges and limitations, which must be addressed in the future. First, there were some methodological constraints. The current research was designed as a one-off, cross-sectional study, which means that despite the wealth of data that has been collected, there is no way to assess whether the findings of predictability of schizotypal traits and SPD risk would remain consistent over time or how these relationships would evolve as participants age or experience changes in their environment or mental health status. Cross-sectional designs capture a snapshot of data simultaneously, limiting the ability to conclude causality or the directionality of the relationships observed (Maier et al., 2023). It is imperative to strengthen the research model by employing longitudinal studies rather than cross-sectional ones in order to allow for a more nuanced understanding of the dynamics of schizotypy and its potential progression into more severe psychosis-spectrum disorders, thereby enriching our comprehension and facilitating early intervention strategies (Nelson et al., 2013; Tacket et al., 2019). Also, due to time constraints, the multifactorial nature of schizotypy could not be assessed. It would have given a more fine-grained picture of the spectrum of schizotypal traits and its presentation across various groups. Likewise, the assessment of schizotypal traits across set age cohorts could have offered valuable insights into the developmental trajectory of schizotypy. The current study also did not use stratification or randomisation of the participants, making it less generalisable to the broader population. The university students were surveyed using a convenience sample and may not have represented undergraduate populations from other contexts or people of different ages. This could affect the generalisability of the findings, as those who volunteered to participate in the study may differ from the student population in terms of personality characteristics or their motivation to participate. The participants' commitment level was also a problem, as many people did not reach the required 85% of the answered questions threshold and had to be removed – as high as 21% of the initial participant pool. There might be a reason for the length of the experiment – as each participant had to answer 104 O-LIFE questions and 32 SPQ-BR (which could have been repetitive and uncomfortable) with a prior demographics questionnaire and would have to sacrifice about 25 to 30 minutes in order to participate (only earning two Sona credits, which might not have been a good enough incentive). This limitation could be mitigated using shorter psychometric tools, which will be employed in future research among participants who will not be getting any incentives for participation (such as O-LIFE shorter version; Dembinska-Krajewska et al., 2014). There could also be a better incentive for participation in a non-university-based sample or the implementation of more SONA credits granted to students. Another solution could be on-campus testing, with forced breaks between each set of questions asked, which could mean a trade-off regarding the quantity over quality of participants willing to participate (Dineen-Griffinet al., 2019). Engaging further with the participant pool, due to people being invited to participate through a university website, in a western country and on a Psychology course – 82.8% of people who took part in the ethnic background were 'White', and 74.1% were female. The small size of ethnic background groups has significantly restricted the potential for statistical analysis between ethnicities, rendering the data insufficient for obtaining meaningful results in the multivariate analysis (Cohen, 2013). Furthermore, research that categorises gender strictly as male and female without acknowledgement of non-binary or transgender experiences can be considered tone-deaf to the complexities of gender identity today (Suen et al., 2020). Such categorisation may overlook significant aspects of schizotypy related to gender diversity, thereby limiting the applicability and sensitivity of research findings. Acknowledging and incorporating a broader spectrum of gender identities in research design enriches the data and aligns with contemporary understandings of gender, enhancing the inclusivity and relevance of psychological research.   
 Another limitation was the reliance on self-reported scales data measuring schizotypy (O-LIFE and SPQ-BR) and not incorporating other aspects into said research (such as mental health problems, people's socio-economic status, and current stress level). Not including a psychometric measure, which could evaluate a person's depression and anxiety or other problems which are associated with positive, negative, and disorganised dimensions of schizotypy, was a missed opportunity, as despite participants claiming not having any diagnosis of mental health nature and no first-degree family members with SPD or schizophrenia, there is always a possibility that they do live with a form of a disorder they are not aware of (Battaglia et al., 1995). Additionally, as there are many reasons why schizotypy develops and thrives (genetics, psychosocial factors, current environment), adding more questionnaires, which can screen for problems that could trigger the manifestation of schizotypy in general population participants, would be a significant enhancement and opportunity for richer, in-depth analysis (Grant et al., 2013). Incorporating differences across cultures could significantly enhance the data, as people from different countries have different opinions on what is odd; for example, there is research confirming high schizotypy scores across Tunisian people, as they believe the supernatural is part of their culture and heritage; therefore they will naturally score higher on positive schizotypy (Fekih-Romdhane et al., 2023, Rbeiz et al., 2022). The inclusion of sexual or ethnic minority screening could also enhance the picture of schizotypy. Some studies have examined the prevalence of psychosis and how it manifests among sexual minority populations and noted an increased prevalence of mental health problems in those samples in general population (Post & Veling, 2019). However, it is essential to note that for all proposed additions, an entire battery of tests would have to be used, making it even more of a multidimensional study requiring a lot of time and effort from participants (Webster, 2019).

While the exclusion of people with mental health diagnoses was required in this study due to the limitation of the researcher (undergraduate students cannot incorporate clinical samples), the exclusion of people who have no mental health diagnosis of their own but who have first-degree relatives with a diagnosis of schizophrenia or SPD could have caused a potential loss of critical variance by omitting specific schizotypy dimensions (causing a type 2 error; Mason, 2015). It is proposed that in future studies, these people should not be excluded from the sample; however, there should be a comprehensive exploration and a robust analysis of whether and how such characteristics might affect the results of this particular study.

The current study supports the predictive relationships age and gender have with schizotypy and SPD in the participant's sample. The findings enrich our understanding of schizotypy in this cohort and show the relevance of interventions in early psychosis (Nenadić et al., 2021). Future research directions should prioritise longitudinal designs across many demographic groups to explore the developmental pathways of schizotypal traits and evaluate their potential evolution into a more pronounced psychopathological state. Furthermore, longitudinal approaches could also measure the stability of schizotypal traits along the timeline and capture the dynamic course of age and gender predictability on schizotypy over time. It is imperative to acknowledge that any future study involving similar measures and aims should employ a cohort of much larger size and more diverse. Moreover, more scales or tests that could also screen for neurobiological, genetic, and environmental factors should be added to measure the whole dimension of how age and gender can predict schizotypal traits and SPD risk. Understanding potential interactions would contribute to a deeper comprehension of the complex interaction between vulnerabilities and schizotypy presentation. Extensive research indicates a decrease in schizotypy among older adults in non-clinical samples (Miettunen & Jääskeläinen, 2008; Miettunen et al., 2011; Drake et al., 2016; Guo et al., 2011; Kwapil & Barrantes-Vidal,2015; Salem & Kring, 1998; Dinn et al., 2002); however, the underlying processes behind these changes are poorly understood, highlighting a significant gap in the literature. Similarly, there is a lack of research on the treatment of individuals who exhibit high schizotypal traits but do not meet the diagnostic criteria for SPD or schizophrenia. This results in inadequate support for high-functioning individuals with schizotypy, whose symptoms are severe but not severe enough to require psychiatric intervention. Future studies should aim to develop preventative measures and treatment protocols for this group, which are currently nonexistent. Additionally, it is crucial to investigate whether schizotypy in such individuals improves with age, as observed in the general population, or if it progresses into a clinical illness.   
 The findings of this study, indicating that age negatively predicts schizotypal traits and SPD risk, suggest potential implications for early intervention and prevention strategies, particularly within similar cohorts. While these results are derived from a single participant pool of undergraduate students and thus are not immediately generalisable to the broader public, they underscore the importance of early psychological assessment and intervention in similar settings. These findings could inform broader psychological practice and health policy if replicated and extended across diverse populations. For instance, within educational settings, such policies could advocate for integrating mental health screenings, mainly focusing on late adolescence and early adulthood, which are pivotal for developing schizotypal traits. Schools and universities might implement routine psychological evaluations to identify students at risk, allowing for timely intervention strategies that could prevent the progression of these traits into more severe disorders. Moreover, if these findings were confirmed through broader, longitudinal studies, they could lead to public health initiatives aimed at increasing mental health literacy and reducing the stigma associated with psychiatric conditions. These initiatives could promote awareness of the signs of schizotypal personality traits and the benefits of early psychological intervention, potentially shaping policies that support mental health from a young age across various community settings.  
 To fill the scientific voids regarding the prediction of schizotypal manifestations and the influence of age and gender on the likelihood of developing SPD, it is imperative to understand that it is a multifaceted problem and exploration of just age and gender variables might not yield yield in higher understanding of the processes that create schizotypal traits in people. A holistic strategy combining new research directions with established knowledge is needed to examine it well, acknowledging individual differences and variability across all the samples. The ultimate goal of this integration is to promote human welfare through the formulation of innovative intervention strategies that take age and gender into account.

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**Appendix A**

**Prospective power analysis using G\*Power 3.1.9.7 software.**

A screenshot of a computer

Description automatically generated

**Appendix B**

**Questions from O-LIFE scale (Mason & Claridge, 2006).**

**Unusual Experiences**

1. Do you believe in telepathy?
2. Do you ever feel sure that something is about to happen, even though there does not seem to be any reason for you thinking that?
3. Do you ever suddenly feel distracted by distant sounds that you are not normally aware of?
4. Do you often have days when indoor lights seem so bright that they bother your eyes?
5. Does your sense of smell sometimes become unusually strong?
6. Have you felt as though your head or limbs were somehow not your own?
7. Have you sometimes sensed an evil presence around you, even though you could not see it?
8. Have you wondered whether the spirits of the dead can influence the living?
9. On occasions, have you seen a person’s face in front ofyou when no one was in fact there?
10. When in the dark do you often see shapes and forms even though there’s nothing there?
11. When you look in the mirror does your face sometimes seem quite different from usual?
12. Are your thoughts sometimes so strong that you can almost hear them?
13. Can some people make you aware of them just by thinking about you?
14. Do ideas and insights sometimes come to you so fast that you cannot express them all?
15. Do the people in your daydreams seem so true to life that you sometimes think they are real?
16. Do you sometimes feel that your accidents are caused by mysterious forces?
17. Do you think you could learn to read other’s minds if you wanted to?
18. Does it often happen that nearly every thought immediately and automatically suggests an enormous number of ideas?
19. Does a passing thought ever seem so real it frightens you?
20. Does your voice ever seem distant or faraway?
21. Have you ever felt that you have special, almost magical powers?
22. Is your hearing sometimes so sensitive that ordinary sounds become uncomfortable?
23. Do you ever have a sense of vague danger or sudden dread for reasons that you do not understand?
24. Do you feel so good at controlling others that it sometimes scares you?
25. Have you ever thought you heard people talking only to discover that it was in fact some nondescript noise?
26. Have you felt that you might cause something to happen just by thinking too much about it?
27. Have you occasionally felt as though your body did not exist?
28. Have you sometimes had the feeling of gaining or losing energy when certain people look at you or touch you?
29. Are the sounds you hear in your daydreams really clear and distinct?
30. Do your thoughts sometimes seem as real as actual events in your life?

**Cognitive Disorganisation**

1. Are you easily distracted when you read or talk to someone?
2. Do you ever feel that your speech is difficult to understand because the words are all mixed up and don’t make sense?
3. Do you often experience an overwhelming sense of emptiness?
4. Do you often feel lonely?
5. Is it hard for you to make decisions?
6. Are you a person whose mood goes up and down easily?
7. Are you easily hurt when people find fault with you or the work you do?
8. Are you sometimes so nervous that you are blocked?
9. Do you dread going into a room by yourself where other people have already gathered and are talking?
10. Do you easily lose your courage when criticised or failing in something?
11. Do you find it difficult to keep interested in the same thing for a long time?
12. Do you frequently have difficulty in starting to do things?
13. Do you often feel that there is no purpose to life?
14. Do you often have difficulties in controlling your thoughts?
15. Do you often worry about things you should not have done or said?
16. Do you worry about awful things that might happen?
17. No matter how hard you try to concentrate do unrelated thoughts creep into your mind?
18. When in a crowded room, do you often have difficulty in following a conversation?
19. Are you easily confused if too much happens at the same time?
20. Are you easily distracted from work by daydreams?
21. Do you often feel fed up?
22. Do you worry too long after an embarrassing experience?
23. Would you call yourself a nervous person?
24. Do you often hesitate when you are going to say something in a group of people whom you more or less know?

**Introvertive Anhedonia**

1. Can you usually let yourself go and enjoy yourself at a lively party? negative
2. Do people who try to get to know you better usually give up after a while?
3. Do you feel that making new friends isn’t worth the energy it takes?
4. Do you find the bright lights of a city exciting to look at? negative
5. Do you like going out a lot? negative
6. Do you prefer watching television to going out with other people?
7. Do you usually have very little desire to buy new kinds of food?
8. Is it fun to sing with other people? negative
9. Are people usually better off if they stay aloof from emotional involvements with people?
10. Are there very few things that you have ever really enjoyed doing?
11. Are you much too independent to really get involved with other people?
12. Are you rather lively? negative
13. Can just being with friends make you feel really good? negative
14. Do you have many friends? negative
15. Do you like mixing with people? negative
16. Do you think having close friends is not as important as some people say?
17. Does it often feel good to massage your muscles when they are tired or sore? negative
18. Has dancing or the idea of it always seemed dull to you?
19. Have you often felt uncomfortable when your friends touch you?
20. Is trying new foods something you have always enjoyed? negative
21. On seeing a soft thick carpet have you sometimes had the impulse to take off your shoes and walk barefoot on it? negative
22. When things are bothering you do you like to talk to other people about it? negative
23. Do you feel very close to your friends? negative
24. Do you love having your back massaged? negative
25. Have you had very little fun from physical activities like walking, swimming, or sports?
26. Do you enjoy many different kinds of play and recreation? negative
27. Is it true that your relationships with other people never get very intense?

**Impulsive Nonconformity**

1. Do people who drive carefully annoy you?
2. Do you often feel like doing the opposite of what other people suggest, even though you know they are right?
3. Do you often feel the impulse to spend money which you know you can’t afford?
4. Do you often have an urge to hit someone?
5. Do you sometimes talk about things you know nothing about?
6. Are you usually in an average sort of mood, not too high and not too low? negative
7. Do you at times have an urge to do something harmful or shocking?
8. Do you ever have the urge to break or smash things?
9. Do you often change between intense liking and disliking of the same person?
10. Do you stop to think things over before doing anything? negative
11. Do you think people spend too much time safeguarding their future with savings and insurance?
12. Have you ever blamed someone for doing something you know was really your fault?
13. Have you ever cheated at a game?
14. Have you ever felt the urge to injure yourself?
15. When in a group of people do you usually prefer to let someone else be the centre of attention? negative
16. When you catch a train do you often arrive at the last minute?
17. Would being in debt worry you? negative
18. Would you take drugs which may have strange or dangerous effects?
19. Do you consider yourself to be pretty much an average kind of person? negative
20. Have you ever taken advantage of someone?
21. Would you like other people to be afraid of you?
22. Do you often overindulge in alcohol or food?
23. Would it make you nervous to play the clown in front of other people? Negative

**Appendix C**

**Schizotypal Personality Questionnaire – Brief Revised, 32 Questions**

**Ideas of Reference**

1. Do you sometimes feel that people are talking about you?
2. Do you sometimes feel that other people are watching you?
3. When shopping do you get the feeling that other people are taking notice of you?

**Suspiciousness**

1. I often feel that others have it in for me.
2. Do you sometimes get concerned that friends or co-workers are not really loyal or trustworthy?
3. Do you often have to keep an eye out to stop people from taking advantage of you?

**No Close Friends**

1. Do you feel that you cannot get “close” to people.
2. I find it hard to be emotionally close to other people.
3. Do you feel that there is no one you are really close to outside of your immediate family, or people you can confide in or talk to about personal problems?

**Constricted Affect**

1. I tend to keep my feelings to myself.
2. I rarely laugh and smile.
3. I am not good at expressing my true feelings by the way I talk and look.

**Eccentric Behaviour**

1. Other people see me as slightly eccentric (odd).
2. I am an odd, unusual person.
3. I have some eccentric (odd) habits.
4. People sometimes comment on my unusual mannerismsand habits.

**Social Anxiety**

1. Do you often feel nervous when you are in a group of unfamiliar people?
2. I get anxious when meeting people for the first time.
3. I feel very uncomfortable in social situations involving unfamiliar people.
4. I sometimes avoid going to places where there will be many people because I will get anxious.

**Magical Thinking**

1. Do you believe in telepathy (mind-reading)?
2. Do you believe in clairvoyance (psychic forces, fortune telling)?
3. Have you had experiences with astrology, seeing the future, UFO’s, ESP, or a sixth sense?
4. Have you ever felt that you are communicating with another person telepathically (by mind-reading)?

**Odd Speech**

1. I sometimes jump quickly from one topic to another when speaking.
2. Do you tend to wander off the topic when having a conversation?
3. I often ramble on too much when speaking.
4. I sometimes forget what I am trying to say.

**Unusual Perception**

1. I often hear a voice speaking my thoughts aloud.
2. When you look at a person or yourself in a mirror, have you ever seen the face change right before your eyes?
3. Are your thoughts sometimes so strong that you can almost hear them?
4. Do everyday things seem unusually large or small?

**Appendix D**

**Information sheet.**

|  |  |
| --- | --- |
| **INFORMATION SHEET**  **Unusual experiences and introvertive anhedonia as predictors of schizotypal traits in the general population.** | Logo  Description automatically generated |
| **Marta Osuchowska**  **o023706l@student.staffs.ac.uk** | **Dr Justine Drakeford**  **j.drakeford@staffs.ac.uk** |

**INVITATION PARAGRAPH**

I would like to invite you to participate in this research project, which forms part of my undergraduate psychology degree at Staffordshire University. The research will be conducted by Marta Osuchowska. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what your participation will involve. Please take time to read the following information carefully.

**What is the purpose of the study?**

This study aims to assess how certain aspects of personality, namely unusual experiences/beliefs and introversion, can serve as predictors of scores on schizotypal questionnaires. By delving into the relationship between these specific personality traits and the prevalence of schizotypy in the general population, this research endeavours to contribute valuable insights to a field that has been relatively underexplored.

**Who has given approval for this study?**

Approval for this study has been granted by the Staffordshire University Psychology Department Psychology Ethics Committee.

**TAKING PART**

**Why have I been invited to take part?**

I am recruiting participants over 18 years of age to take part in this study.

I am interested in a non-clinical sample which means that you cannot take part in the study if you have a *formal diagnosis of mental health problem* or if you have a *first-degree relative* (mum, dad, sibling) with a diagnosis of schizotypal personality disorder or schizophrenia.

**What will happen if I take part?**

This study will involve filing out two questionnaires (which will take you about 30 minutes).

The first one will have questions with a YES or NO answers, such as:

* On occasions, have you seen a person’s face in front of you when no one was in fact there?
* When in the dark do you often see shapes and forms even though there’s nothing there?
* When you look in the mirror does your face sometimes seem quite different from usual?

The second one is a self-report scale (choice of one out of five answers from ‘highly disagree’ to ‘highly agree’) with statements such as:

* I tend to keep my feelings to myself.
* I rarely laugh and smile.
* I am not good at expressing my true feelings by the way I talk and look.

After you finish both the questionnaire and scale, you will be debriefed and the study will conclude.

**Do I have to take part?**

Participation is completely voluntary. You should only take part if you want to and choosing not to take part will not disadvantage you in any way. Once you have read this information sheet, please feel free to ask any questions that will help you decide about taking part. If you decide to take part, we will ask you to sign a consent form.

**Incentives**

If you are an undergraduate psychology student at Staffordshire University, you will receive 2 SONA credits for taking part in the study. If you are not a student at Staffordshire University, there will be no incentives for taking part in the study (except for the satisfaction of helping an aspiring psychologist).

**What are the possible risks of taking part?**

There are no risks to taking part in the study.

**What if I am upset by anything during the course of the study?**

If this happens you might like to take a break or, if you prefer, you can withdraw from the study at any point. If you decide to withdraw, you will be shown a copy of the debriefing sheet, which contains information about sources of support you can access if there is anything you wish to talk about in confidence.

**What are the possible benefits of taking part?**

Aside from any incentives discussed above, there are no direct benefits to you as a participant. However, the research may help us to better understand how magical thinking can predict whether person is more prone to schizotypal traits and schizotypal personality disorder.

**What if I change my mind about taking part?**

You are free to withdraw at any point of the study, without having to give a reason. Withdrawing from the study will not affect you in any way.

You can also withdraw your data from the study after you have finished participating, up until **29/02/2024,** after which withdrawal of your data will no longer be possible as the data will already have been processed. To withdraw from the study, please contact Marta Osuchowska ([o023706l@student.staffs.ac.uk](mailto:o023706l@student.staffs.ac.uk)) and provide your unique ID.

If you choose to withdraw from the study, we will not retain any information you have provided us.

**What if I don't want to answer any particular questions?**

You are free to skip any questions you would prefer not to answer, without penalty.

**DATA HANDLING AND CONFIDENTIALITY**

**Will the information I give you be kept confidential?**

The information obtained will be treated with the strictest confidence throughout the study and the data will be stored safely in a secure location to which only the researcher and their supervisor has access. Your data will be processed in accordance with data protection law and will comply with the General Data Protection Regulation 2018 (GDPR).

**Data Protection Statement**

The data controller for this project will be Staffordshire University. The University will process your personal data for the purpose of the research outlined above. The legal basis for processing your personal data for research purposes under data protection law is a 'task in the public interest'. You can provide your consent for the use of your personal data in this study by completing the consent form that will be provided to you.

**Who will have access to my data?**

Only the researcher and the researcher's supervisor will have access to the raw data. You have the right to access information held about you. Your right of access can be exercised in accordance with the General Data Protection Regulation. You also have other rights including rights of correction, erasure, objection, and data portability. Questions, comments, and requests about your personal data can also be sent to the Staffordshire University Data Protection Officer. If you wish to lodge a complaint with the Information Commissioner's Office, please visit [www.ico.org.uk](http://www.ico.org.uk/)

**Who will see the finished report?**

All data in the finished report will be presented in the form of group statistics. The final report will be seen by the researcher's supervisor and a second marker from the Psychology department, and possibly by an external examiner. In addition, the completed report may also be made available to future Staffordshire University students for teaching/reference purposes.

**What will happen to my responses to the study?**

All data will be kept in secure storage (to which only the researcher has access) for ten years, according to departmental policy, and it will be destroyed after that.

**What will happen to the results of the study?**

The results of the study will be disseminated in the final written report and in a student conference presentation. There is a possibility that results might be disseminated more widely, for example at a research conference or in an article published in a research journal. If the research is written up for academic journal publication your anonymised data may be stored permanently in an online research data repository.

**FURTHER QUESTIONS**

**Is there anyone I can talk to about the study before I take part?**

You can contact me directly on the details provided at the top of this form. If you wish to talk to someone else about my study before taking part, please feel free to contact my project supervisor (contact details also available at the top of this form).

**What if I have further questions, or if something goes wrong?**

If this study has harmed you in any way, or if you wish to make a complaint about the conduct of the study, you can contact the study supervisor or the Chair of the Staffordshire University Ethics Committee for further advice and information:

Prof. Nachiappan Chockalingam

Research, Innovation and Impact Services

Staffordshire University

Cadman Building

College Road

Stoke-on-Trent

ST4 2DE

n.chockalingam@staffs.ac.uk

**I know a friend who may be interested; can they participate in your study?**

Yes, as long as your friend meets the criteria mentioned above. Your friend should use the same link you accessed it on or contact me directly ([o023706l@student.staffs.ac.uk](mailto:o023706l@student.staffs.ac.uk)) .

**If you have any further questions, please do not hesitate to contact me.**

**Thank you for your time.**

**Thank you for reading this information sheet and for considering taking part in this research.**

**Appendix E**

**Study Consent Form.**

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**CONSENT FORM**

|  |  |  |
| --- | --- | --- |
| **Marta Osuchowska**  **o023706l@student.staffs.ac.uk** | **Dr Justine Drakeford**  **j.drakeford@staffs.ac.uk** | |
| I am over 18 years of age and I voluntarily agree to participate in a research project conducted as part of a psychology undergraduate degree by Marta Osuchowska, an Undergraduate Psychology student at Staffordshire University. | | **Yes/No** |
| I understand that I am being asked to participate in a study lasting approx. 30 minutes and I will be asked to answer questions in an online questionnaire. | | **Yes/No** |
| I understand that, if I wish, I may withdraw from participating at any time and my data will be destroyed. I have been informed that withdrawal after 29/02/2023 will not be possible. | | **Yes/No** |
| I understand that I will be fully protected in accordance with the Data Protection Act of 2018, and in compliance with the British Psychological Society ethical guidelines, and that any personal details will be kept confidential. | | **Yes/No** |
| I understand that in the case that a report is published based on this study, the fully anonymised data may be made available for the use of other researchers for an indefinite period of time. Otherwise, they will be kept until ten years after the article has been published, and then destroyed. | | **Yes/No** |
| I understand that any personal details will be anonymised in any report based on this study and if the research is written up for academic journal publication my anonymised data may be stored permanently in an online research data repository. | | **Yes/No** |

If you have any further questions about this study, please contact the researcher or the Project Supervisor (details above).

**[Options: Please adapt accordingly depending on what information you need. You may not need this section so delete if necessary]**

**[Unique Identifier].**

Because we are not collecting your name or other identifying information, we need a way to identify your data if you wish to withdraw it after participation.

Please enter a five-digit code, made of any numbers and/or letters of your choosing, and make a note of it. If you wish to withdraw your data in future, you must provide this code.

|  |
| --- |
|  |

**Appendix F**

**Participant debrief.**

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**Participant Debrief**

**Unusual experiences and introvertive anhedonia as predictors of schizotypal traits in general population.**

**Marta Osuchowska**

**o023706l@student.staffs.ac.uk**

**Dr Justine Drakeford**

**j.drakeford@staffs.ac.uk**

Thank you for taking part in this study.

The purpose of this study was to research whether unusual experiences and introvertive anhedonia can be a predictor of schizotypal traits in the general population.

The research questions for this study were designed to check your level of unusual experiences (such as magical thinking, being superstitious etc) with introvertive anhedonia (being an introvert and not needing the company of other people) and evaluate how prominent schizotypal traits are in your personality. Once we obtain this data, we can measure how one affects the other and whether there is any relationship between those two factors.

For more detailed explanations, or if you wish to know the results of the study, please contact the researcher using the contact details above.

Your details will be kept confidential at all times, and complete anonymity will be maintained. Raw data will be kept on password-protected computer, which will only be accessible to me and my supervisor. Raw data will be destroyed after ten years. In the case that a report is published based on this study, the fully anonymised data may be made available for the use of other researchers for an indefinite period of time . Otherwise, they will be kept by Staffordshire University until ten years after the article has been published, and then destroyed.

If you wish to withdraw your data you need to contact the researcher using the code you provided earlier, before 29.02.2023. No other information is required, and you will not be asked to provide a reason.

If you have been affected by any of the issues raised in this study, and would like to talk to someone in confidence about it, you may wish to contact the following organisation(s):

* Staffordshire University Student Wellbeing Services
* Samaritans - Call 116 123 or email [jo@samaritans.org](mailto:jo@samaritans.org)
* Hearing Voices Network – https://www.hearing-voices.org/

Thank you again for your participation.

**Appendix G**

**Pearson correlation coefficient table.**

*Pearson correlation coefficient.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 |
| 1. Schizotypal personality risk | - | - | -.236 | -.055 |
| 1. Schizotypal traits | - | - | -.230 | -.002 |
| 1. Age | -.236 | -.230 | - | -.071 |
| 1. Gender | -.055 | -.002 | -.071 | - |

*Note.* To ensure that multicollinearity is not violated, the cutoff point for the Pearson Correlation coefficient should fall within the range of -0.7 to 0.7.

**Appendix H**

**Durbin-Watson statistics, Cook’s distance, Tolerance and Variance inflation factors results table.**

*Durbin-Watson statistic,Cook’s distance, Tolerance and Variance inflation factors results.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Criterion | Durbin-Watson statistic | Cook’s Distance | Tolerance | Variance Inflation Factors |
| Schizotypal traits a | 1.82 | .07 | - | - |
| Schizotypal Personality disorder b | 1.92 | .12 | - | - |
| Age | - | - | .995 | 1.005 |
| Gender | - | - | .995 | 1.005 |

*Note.* To ensure that the residuals are independent, the Durbin-Watson statistic must fall within the range of 1-3. To ensure that no influential cases are biasing the model, Cook’s Distance should be below 1. To ensure that the assumptions for multicollinearity are not violated, the VIF scores should be less than 10, and the Tolerance values should be greater than 0.1.a Score of Oxford-Liverpool Inventory of Feelings and Experiences (Mason & Claridge, 2006).b Score of Schizotypal Personality Questionnaire Brief Revised (Cohen et al., 2010).

**Appendix I**

**Scatterplots for the assumptions check of homoscedasticity.**

**A graph with blue dots

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**A graph with blue dots

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**Appendix J**

**P-P plots and histograms for assessment of the assumption that the values of the residuals are normally distributed.**

**A graph of a normal growth

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**A graph of a graph

Description automatically generated**

**A graph of a normal graph

Description automatically generated with medium confidence**

**A graph of a normalized histogram

Description automatically generated**