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GRATITUDE MODERATES THE RELATIONSHIP OF NEUROTICISM, ADVERSE CHILDHOOD EXPERIENCES AND PROSOCIAL BEHAVIOUR AMONG UNDERGRADUATES

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ABSTRACT

Young adults' prosocial tendencies have been shown to be adversely impacted by their experiences of trauma during childhood as well as their neurotic tendencies. However, studies examining mechanisms that could mitigate these adverse effects are scarce in literature, especially among students in tertiary institutions. We therefore examined the role of gratitude in the relationship of neuroticism, adverse childhood experiences (ACEs) and prosocial behaviour among undergraduates. Using a cross-sectional design, we conveniently sampled 349 undergraduates (male=157, female=192, mean=28.26, SD=3.39) from a Nigerian University, who were assessed using validated measures of neuroticism, adverse childhood experiences, gratitude and prosocial behaviour. The Hayes Process Macros-based moderation analysis results showed that the negative impact of neuroticism on prosocial behaviour (PSB) was not significant. Moreover, ACE-sexual abuse category was negatively associated with PSB, while the physical/emotional abuse dimension of the ACE did not predict PSB. Gratitude was positively associated with PSB. The test of moderation effects indicated that the negative impact of neuroticism on PSB was more severe for undergraduates high in gratitude, compared to undergraduates with low and moderate levels of gratitude. Interventions should prioritize trauma-informed care to effectively address the complex needs of undergraduates with history of abuses, while also targeting neurotic tendencies.

Keywords: *adverse childhood experiences, moderation, neuroticism, physical/emotional abuse, prosocial behaviour, sexual abuse.*

INTRODUCTION

The university environment is designed to encourage students to participate in academic and social activities. One important aspect of education in this setting is prosocial behaviour, which involves activities that are planned or carried out to benefit others without expecting any form of repayment, including the ability to consider the well-being and rights of others, leading to feelings of concern and empathy, and motivating individuals to act in ways that benefit others without seeking personal gain (Akunne et al., 2023). This behaviour encompasses voluntary actions undertaken intending to assist individuals or groups without the anticipation of reward (Afolabi, 2014). Prosocial behaviour is aimed at benefiting others, and can manifest in various forms such as helping, sharing, donating, and comforting (Eisenberg et al., 2016). It is a phenomenon that is commonly encountered in every society and is believed to have developed over time as a means of reinforcing social ties, improving group relations and in the end enhancing the well-being and existence of people within society (Feygina & Henry, 2015; Nijs & Nicolaou, 2021; Pandit, 2021). Prosocial behaviours with other people typically require both cognitive as well as affective processes (Comes-Fayos et al., 2024). Most of these beneficences happen in the form of partnerships, where both direct and indirect exchange of benefits are essential for coordinating activities of either survival, reproduction, and sometimes warfare (Pandit et al. 2017). In contemporary complex societies, such behaviours are not limited to knowing the recipients but also include helping people through anonymity, donating money, goods, blood, or organs or even providing help to people who are affected by natural disasters or conflicts in distant regions (Henrich & Muthukrishna 2021).

Several factors have been implicated in prosocial behaviour, some of which include emotional intelligence, culture, and cognition (Martí-Vilar et al., 2019), peer attachments (Malonda et al., 2019; Milledge et al., 2019), social support, positive affect, and psychological flexibility (Haller et al., 2022), religion (Batara, 2018), amongst others. A number of studies have also examined the role personality (Kline, et al., 2019; Koffi, 2020; Tariq & Naqvi, 2020; Thielmann et al., 2020), gratitude (Bono et al., 2019; Gulliford et al., 2019; Oguni & Otake, 2020; Vorkapić et al., 2019; Yang et al., 2024) and adverse childhood experiences (Bevilacqua et al., 2021; Chen et al., 2023; Zetino et al., 2020) in prosocial behaviour. However, these studies were done in western cultural context, with very few of them considering Nigerian cultural context. Furthermore, no given study has considered neuroticism, gratitude and adverse childhood experiences together at a time. Thus, there is much to unravel about the association between these factors and prosocial behaviour among undergraduates in the Nigerian populace and in the effort to bridge this huge gap in knowledge, this study thus attempts to examine the relationship between neuroticism, adverse childhood experiences, and prosocial behaviour, while at the same time, examining gratitude as a moderator of this relationship.

Neuroticism stands out as a prominent trait at the top of the personality hierarchy (Ormel et al., 2012). It is a well-established and extensively researched domain of personality traits, supported by significant evidence regarding its heritability, early-life origins, and stability throughout the lifespan (Widiger, 2017). In the Big-Five Model (BFM) of personality, neuroticism is marked by items related to anxiety, anger, depression, self-consciousness, impulsiveness, and susceptibility to stress (Guo et al., 2019; McCrae & Costa, 2010). People with high levels of neuroticism are prone to experiencing anxiety, depression, social anxiety, self-blame, and a tendency to withdraw from social interactions (Karimzade & Besharat, 2011). These individuals tend to react poorly to environmental stress, often perceiving ordinary situations as threatening and minor frustrations as overwhelmingly hopeless (Maj, 2020).

Previous studies have indicated a negative association between neuroticism and prosocial behaviour. Individuals with high levels of neuroticism consistently score lower on self-reported and behavioural assessments of prosocial behaviour (Habashi et al., 2016; Lönnqvist et al., 2011). Tariq and Naqvi (2020) found neuroticism be negatively associated with prosocial behaviour among Pakistan college students, indicating that adolescents who score high in neuroticism, marked by anxiety, sadness and loneliness, may lose interest in social activities. Moreover, Guo et al. (2018) while examining the reason for less prosociality among neurotic among Chinese undergraduates, found that neuroticism was a negative predictor of prosocial behaviour. The study however revealed that if prosocial behaviour does not require interpersonal interactions or if the social interaction is less anxiety-inducing, neuroticism's impact on prosocial behaviour may be absent. Furthermore, in a research of how the Big Five personality traits are linked to charitable actions, it was discovered that neuroticism was associated with lower levels of both time and money donations among UK homes (Brown & Taylor, 2015). Research has also suggested that neuroticism is negatively associated with a prosocial orientation in dictator games among UK undergraduates (Brocklebank et al. 2011) and cooperative transfers in games that assess prisoner's dilemma among German Undergraduates (Lönnqvist et al., 2011). Contrary to the above studies, Snippe et al. (2018) found a positive association between prosocial behaviour and neuroticism. The study revealed that individuals with higher levels of neuroticism reported experiencing greater positive affect following prosocial behaviours compared to those with lower levels of neuroticism. The above studies predominantly focused on Western and Asian undergraduate samples, ignoring the African, particularly Nigerian, context. This has left a cultural context gap in understanding the relationship between neuroticism and prosocial behaviour. We therefore aim to bridge this gap by investigating this dynamic within Nigerian population, offering insights into how cultural differences may influence this association.

Adverse childhood experiences (ACEs) is another variable which could perhaps be associated negatively with prosocial behaviour among undergraduates. According to ACEs definition, it includes events that are either stressful or potentially traumatic for children before age 18 (Gilgoff et al., 2020). In other words, ACEs refer to a number of most pressing and regularly existing sources of stress that children put up with in their early years of life (Ugwu et al., 2024). In a broader context, it is defined as cognitions, emotions, and behaviours that occur under stress, which do not conform to the ordinary conditions of the growing environment (McLaughlin, 2016). These adverse factors include child's abuse or neglect, domestic violence, parental mental illness and separation (Bevilacqua et al., 2021). The evidence based on ACE further show that there are associated long term health and mental health consequences (Hughes et al., 2017), and since this consequence is great and lasts long, the cost of ACE is very high to families and the community in general. For instance, projected assessments in 2013, approximated annual economic measures of the underlying illness burden of ACEs to range from \$581 billion in Europe to \$748 billion in North America (Bellis, Lowey et al., 2014). Growing research has begun to show that the adverse effects of ACEs may be seen at a younger developmental stage in children and adolescents (Scully et al., 2020).

Previous studies have implicated ACEs in prosocial behaviour. Frazier et al. (2013) reported that individuals who score high on lifetime traumas exhibited greater involvement in prosocial behaviour, and that lifetime trauma exposure contributed to additional variability in prosocial behaviour after controlling for other established factors associated with such behaviour. However, recent studies have consistently revealed negative associations between ACEs and prosocial behaviour. For instance, Carvalho et al. (2020) found that ACEs, including abuse and neglect, were negatively associated with altruistic behaviours, suggesting early maltreatment impedes the development of prosocial skills. Additionally, Gomis-Pomares and Villanueva (2020) reported that while the total number of ACEs (such as sexual abuse, physical abuse, emotional abuses, physical neglect, and household dysfunction) was not significantly related to overall altruism scores, emotional neglect showed a negative association with global altruism, which aligns with the findings of the Carvalho et al. (2020) study. As noted by Bowlby's (2005) attachment theory, individuals who have experienced childhood maltreatment are less likely to form secure attachment styles, which can affect their ability to relate to others and their social skills. Consistent with this theory, childhood maltreatment (including physical abuse, physical neglect, emotional abuse, emotional neglect, and sexual abuse) is widely recognized as a strong predictor of bullying and aggressive behaviours in adolescents (Auslander et al., 2016; Wang et al., 2017; Wang et al., 2019) and is linked to lower levels of prosocial behaviour in adolescents (Yu et al., 2020). Previous studies, including those above, primarily focused on altruistic behaviours rather than broader prosocial behaviours when examining the impact of ACEs, particularly emphasizing the negative associations with altruism. This leaves a gap in understanding how ACEs influence a wider spectrum of prosocial behaviours beyond altruism. Most of these studies have focused on children or adults, with relatively less emphasis on undergraduates. Given that undergraduates are a crucial group for educational interventions, more attention to this population is warranted.

Gratitude may moderate the relationship between neuroticism, adverse childhood experiences (ACEs) and prosocial behaviour. Moderating variables are known to influence the strength or direction of a relationship between two or more other variables in a study. They fundamentally impact the link between the independent/predictor and the dependent/outcome variables (Hayes, 2018). Gratitude has been defined as the acknowledgement and appreciation of the positive qualities of one's life and experiences (Puri et al., 2019). It is a mental state that occurs during social interactions when one person recognises obtaining a perceived valuable advantage from another (Mellis, 2020). This positive emotion is frequently felt when people receive something useful without actively seeking, deserving, or earning it, but instead consider

it as a gesture of goodwill from the donor (Emmons and McCullough, 2003; Emmons and Stern, 2013). According to Emmons and Stern (2013), the term "gratitude" is derived from the Latin words "gratia," meaning favour, and "gratus," meaning pleasant. Thus, gratitude is the interchange of kindness and generosity based on goodwill (Brickhouse, 2019; Chaplin et al., 2019). This emotional response regulates and strengthens relationships and is a universal expression observed throughout cultures (Mellis, 2020). Grateful people have stronger coping skills for everyday challenges, greater resilience, quicker healing from illness, and overall better physical health than those who are not grateful (Emmons & Stern, 2013; Gavian, 2011).

The moderating role of gratitude in the relationship of neuroticism, adverse childhood experiences (ACEs), and prosocial behaviour among undergraduates can be explained through Positive Psychology, particularly the Broaden-and-Build Theory by Fredrickson (2004), which suggests that positive emotions broaden an individual's thought-action repertoire, enabling them to build enduring personal resources such as psychological resilience and social connections. In the context of this study, gratitude (a positive emotion) can mitigate the negative effects of neuroticism and ACEs, fostering a more positive outlook and enhancing prosocial behaviour. For instance, neuroticism, often linked to negative emotional states and reduced prosocial behaviour (Guo et al., 2018; Habashi et al., 2016; Tariq & Naqvi, 2020), can be counteracted by gratitude, which encourages adaptive coping and positive social interactions. Similarly, gratitude can buffer the detrimental effects of ACEs by broadening perspectives and promoting behaviours that strengthen social bonds and psychological well-being. This theoretical framework is supported by evidence showing how positive emotions can transform negative experiences (Fredrickson, 2013; Israelashvili, 2021), making it a reliable explanation for the moderating role of gratitude in this study.

Researchers have reported gratitude to be associated with prosocial behaviour. For example, Yost-Dubrow and Dunham (2018) found that individuals with higher levels of gratitude tend to make larger donations in a charity donation task and exhibit greater transfers and returns in an incentivized trust game. This finding supports the idea that people with a naturally higher tendency for gratitude are generally more generous and trusting. A study by Puri et al. (2019) also revealed that gratitude is associated with prosocial behaviour among adolescents. Furthermore, results of a study by Kashimoto et al. (2022) indicated that gratitude is linked to prosocial behaviour through its influence on self-efficacy and social worth. Yang et al. (2024) examined how gratitude mediates the relationship between a recipient's perception of a helper's motivation (whether it is autonomous or controlled) and the recipient's intentions to engage in prosocial behaviour. Their findings showed that perceiving helpers as autonomously motivated led recipients to have heightened intentions to engage in prosocial behaviour, a relationship that was mediated by increased feelings of gratitude.

While existing studies have extensively explored the relationships between personality traits or neuroticism and prosocial behaviour, as well as gratitude and prosocial behaviour, few studies have focused on these factors within the Nigerian context. Moreover, there is a notable scarcity of literature investigating the influence of adverse childhood experiences on prosociality. Also, to the best of our knowledge, this is the first study to investigate gratitude as a moderator in relationship of these factors in whole. Specifically, this study seeks to explore whether gratitude buffer the link of neuroticism, adverse childhood experiences, and prosocial behaviour among the Nigerian population, with a particular focus on undergraduates. It is thus hypothesized that: (a) neuroticism will negatively and significantly predict prosocial behaviour among undergraduates, (b) Physical/emotional abuse will negatively and significantly predict prosocial behaviour among undergraduates, (c) sexual abuse will negatively and significantly predict prosocial behaviour among undergraduates, (d) gratitude will positively and significantly predict prosocial behaviour among undergraduates, (e) gratitude will significantly moderate the relationship between neuroticism and prosocial behaviour among undergraduates, (f) gratitude will significantly

moderate the relationship between physical/emotional abuse and prosocial behaviour among undergraduates, (g) gratitude will significantly moderate the relationship between sexual abuse and prosocial behaviour among undergraduates.

METHODS

Participants and Procedure

The study comprised 349 undergraduate students (157 male, 192 female) from the University of Nigeria, Nsukka, located in Enugu State, Nigeria. Participants were selected using convenient sampling method. The age range of participants was 16 to 35 years (mean = 28.26, SD = 3.39). The majority of participants identified as Igbo (86.8%) and Christian (96.6%), with smaller proportions identifying as Yoruba (8.9%), Hausa (1.7%), or belonging to other ethnic groups, and with religious affiliations including Muslim (2.0%), Traditional (0.9%), or other (0.6%).

Five research assistants were trained by the researcher/s to assist in the recruiting the participants. Participants were approached in their lecture halls by the researchers and the trained assistants, and were invited to participate in the study. Those who consented to participate in the study were given questionnaires to complete. The researchers explained the study's purpose, the researcher's identity, and the tasks involved. Participants were assured of confidentiality and informed of their right to withdraw at any point without consequences. They were encouraged to answer honestly, and no complaints were received about the questionnaire length. The researcher reviewed the completed questionnaires to ensure all items were answered.

Instruments

The Prosocialness Scale for Adults

The Prosocialness Scale for Adults, developed by Caprara et al. (2005), consists of 16 items measuring prosocial behaviour using a five-point Likert scale ranging from 1 = occasionally true to 5 = always true. It assesses behaviours related to sharing, helping, taking care of, and feeling empathy towards others. The scale has good internal consistency (Cronbach's α = .91), as reported by the original developers. In the present study, we found a Cronbach's α of .89. The scale's validity was confirmed through convergent validity with the Prosocial Behaviour Scale by Afolabi (2013) (r = .30, p < .001).

The Neuroticism sub-scale of the Big Five Inventory (BFI)

The Neuroticism sub-scale used in this study was adapted from the Big Five Inventory (BFI) by John et al. (1991). The BFI is a 44-item measure that assesses personality based on the Big Five Factors: openness, conscientiousness, extraversion, agreeableness, and neuroticism (Goldberg, 1993). The neuroticism sub-scale consists of eight, 5-point items (1 = disagree strongly, 5 = agree strongly), with items 2, 5 and 7 being reverse scored. The internal consistency reported by the developers for this sub-scale was .73 (Cronbach's alpha). The validity coefficients with the NEO-FFI (Costa & McCrae, 1992) and the TDA (Goldberg, 1992) were corrected for attenuation and averaged .91 for Extraversion, Agreeableness, and Conscientiousness, .88 for Neuroticism, and .83 for Openness (John & Srivastava, 1999). We obtained an internal consistency Cronbach's alpha of .70 in the present study. Scores on this measure were significantly correlated with scores on the Neuroticism sub-scale of the Mini International Personality Item Pool (Mini-IPIP) developed by Donnellan et al. (2006) (r = .36, p < .001), demonstrating its validity.

The Adverse Childhood Experiences Abuse Short form (ACE-ASF)

The ACE-ASF is an 8-item retrospective self-report measure of physical, emotional and sexual abuse categories of abuse domain of ACE. The physical abuse sub-scale comprises 2 items and

assesses abuse features such as “hitting, spanking, kicking, slapping, hitting with an object, and emotional abuse subscale comprises 2 items assessing abuse features as shouted at or threatened. The sexual abuse subscale has 4 items that measure unwanted sexual fondling; having to touch someone sexually against one’s will. Respondents rate the frequency of each experience of abuse on a scale from “Refuse to answer” to “Many times” with response options scores ranging from 1-5. The scores ranged from 4 to 20 for the sub-scales with higher score indicating higher self-reported abuse. Exploratory factor analysis (EFA) by the developers established a two-factor structure: physical/emotional abuse and sexual abuse and confirmatory factor analysis (CFA) confirmed the model fitted the data well and demonstrated good internal consistency for sexual abuse ($\alpha = 0.83$) and poor for physical/emotional abuse ($\alpha = 0.57$). For the current study, the alpha coefficients were .77 for the scores from physical/emotional abuse and .91 for sexual abuse. A concurrent validity test with the Felitti et al (1998) Adverse Childhood Experiences Questionnaire yielded a correlation of .46, $p < 0.01$, meaning that the measure is valid for use in Nigeria.

The Gratitude Questionnaire–6 (GQ-6)

The GQ-6, developed by McCullough et al. (2002), is a six-item scale that measures the span, frequency, intensity, and density of gratitude, focusing primarily on its emotional component. Participants rate items on a seven-point Likert scale (1 = strongly disagree to 7 = strongly agree), with items 3 and 6 reverse scored. The scale demonstrates strong internal consistency ($\alpha = 0.82$). Exploratory factor analysis on two samples (Sample 1, $n = 205$; Sample 2, $n = 204$) showed a single factor solution, explaining 67.63% to 69.08% of the total variance. Confirmatory factor analysis on Sample 2 confirmed this one-factor structure. We validated the GQ-6 in Nigerian context and found a reliability of $\alpha = 0.72$. Concurrent validity was established with the Gratitude Resentment and Appreciation Test- Revised Short (Thomas & Watkins, 2003) ($r = .61$, $p < .01$).

Design/ Statistics

This study employed a survey research approach with a cross-sectional design. Pearson's correlation analysis was employed to explore the relationships among variables, while the Hayes PROCESS Macros method was utilized to examine the study's hypotheses. Moderation analysis allows for a more thorough examination of complex interactions within the data, yielding insights that are vital for determining the underlying mechanisms and external variables that influence outcomes (Hayes, 2018).

RESULTS

Relevant correlations are shown in Table 1. Gender was positively and significantly correlated with prosocial behaviour ($r = .17$, $p = .002$), suggesting that male undergraduates were more likely to be prosocial than their female counterparts. Increased instances of sexual abuse were significantly correlated with decreased levels of gratitude ($r = -.21$, $p = .000$) among these undergraduates. Furthermore, those who experienced physical or emotional abuse were more likely to be neurotic ($r = .25$, $p = .000$). Gratitude was positively associated with prosocial behaviour and the association was significant ($r = .54$, $p = .000$), suggesting that undergraduates who acknowledge and appreciate the positive aspects of their life were more likely to engage in prosocial behaviour.

Table 1: Correlations of demographic variables, gratitude, ACEs (physical/emotional and sexual abuses), neuroticism and pro-social behaviour among undergraduates

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Gender	.55	.50	-							
2. Age	22.26	3.29	-.12*	-						

3. Religion	.05	.32	.05	.04	-				
4. Pro-social behaviour	57.03	11.70	.17**	-.02	.01	-			
5. Neuroticism	25.51	4.67	.04	.03	-.03	.12*	-		
6. Physical/emotional abuse	11.41	4.00	-.09	.04	-.07	-.02	.25***	-	
7. Sexual abuse	9.99	3.78	-.02	.13*	-.01	-.23**	.17**	.44**	-
8. Gratitude	26.99	7.81	.04	.01	-.02	.54***	.24***	.08	-.21***

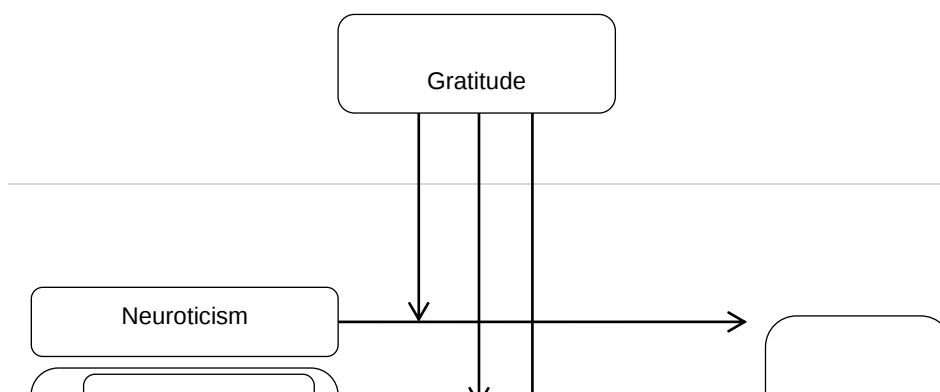
Note: ***<.001; **<.01; *p<.05 (Gender: Male = 0, Female = 1); Bolded values indicate significance.

Table 2 shows the moderation analysis results, after adjusting for age and gender. The results show that Gratitude (GR) positively and significantly predicted prosocial behaviour ($B = .77$, $p = .000$), indicating that undergraduates who express higher levels of gratitude were more likely to engage in prosocial behaviour (PSB), while the association between neuroticism and prosocial behaviour was negative but not significant ($B = -.06$, $p = .604$), suggesting that neuroticism has only a weak and non-meaningful impact on prosocial behaviour among undergraduates. The interaction of GR and neuroticism was significant ($B = -.04$, $p = .008$), suggesting that gratitude moderated the link between neuroticism and PSB. Figure 1 illustrates this interaction, showing that gratitude, rather than mitigating against the adverse impact of neuroticism on prosocial behaviour, strengthened the negative association for undergraduates with high gratitude ($B = -.35$, $p = .033$, $CI = -.67, -.03$).

Table 2: Hayes PROCESS macro results for neuroticism, and ACEs (physical/emotional abuse and sexual abuse) predicting prosocial behaviour with gratitude as a moderator

Variables	B	SE B	T	p-level	95%CI	R ²	F
Neuroticism (NE)	-.06	.12	-.52	.604	[-.29, .17]	.32	32.98 (5, 343)***
Gratitude (GR)	.77	.07	11.04***	.000	[.63, .91]		
N X GR	-.04	.01	-2.66**	.008	[-.06, -.01]		
Gender	3.42	1.05	3.26**	.001	[1.36, 5.49]		
Age	-.004	.16	-.03	.980	[-.32, .31]		
Physical/emotional abuse (PE)	-.13	.14	-.96	.340	[-.40, .14]	.31	31.17 (5, 343)***
Gratitude (GR)	.80	.07	11.68***	.000	[.67, .94]		
PE X GR	.001	.02	.08	.935	[-.03, .04]		
Gender	3.34	1.06	3.14**	.002	[1.24, 5.43]		
Age	-.02	.16	-.13	.893	[-.34, .29]		
Sexual abuse (SA)	-.37	.14	-2.65**	.009	[-.65, -.10]	.33	33.12 (5, 343)***
Gratitude (GR)	.76	.07	11.19***	.000	[.63, .90]		
SA X GR	-.01	.02	-.72	.473	[-.05, .02]		
Gender	3.48	1.05	3.31**	.001	[1.41, 5.55]		
Age	.03	.16	.20	.839	[-.28, .35]		

Note: CI = Confidence Interval; ***<.001, **<.01, *<.05; NE = Neuroticism, GR = Gratitude, PE = Physical/emotional abuse, SA = Sexual abuse; Bolded values indicate significance



The results further showed that physical/emotional abuse (PEA) did not predict prosocial behaviour ($B = -.13$, $p = .340$), indicating that the negative impact of PEA on prosocial behaviour among these undergraduates was a weak and non-meaningful one. Also, the interaction between gratitude and PEA was not significant ($B = .001$, $p = .935$), suggesting that gratitude did not moderate the relationship between PEA and PSB. Furthermore, sexual abuse (SA) negatively and significantly predicted prosocial behaviour ($B = -.37$, $p = .009$), an indication that undergraduates who have experienced sexual abuse were less likely to engage in prosocial behaviour. The interaction between gratitude and SA was also not significant ($B = -.01$, $p = .473$), suggesting that gratitude did not moderate the relationship between SA and PSB.

DISCUSSION

The major aim of this study was to investigate whether gratitude moderates the relationship of neuroticism, adverse childhood experiences and prosocial behaviour among undergraduates. We could not confirm our first hypothesis that neuroticism would negatively and significantly predict prosocial behaviour among undergraduates, given that the negative impact of neuroticism on prosocial behaviour was not significant. This is in slight disagreement with previous researches (e.g., Brown & Taylor, 2015; Guo et al., 2018; Habashi et al., 2016; Tariq & Naqvi, 2020) which found that higher neuroticism was associated with lesser prosocial behaviour. Our finding suggests that higher neuroticism levels may not always have significant impact on the tendency to engaging in prosocial behaviours, especially among undergraduates. But then, we cannot completely rule out that neuroticism has no adverse impact on undergraduates' likelihood to engage in prosocial behaviour, as this non-significant association does not eliminate the likelihood of a detrimental influence (Edelsbrunner & Thurn, 2023; Kafi & Ansari-Lari, 2022). It could be that the potential effect is either negligible or hidden by data variability. More research with a larger sample size or various approaches is therefore required to investigate this link more extensively.

Our study results further revealed that only the sexual abuse category of ACEs was negatively and significantly associated with prosocial behaviour (PSB), whereas the physical/emotional abuse category of ACE (ACE-PEA) did not predict PSB, leading to a complete confirmation of our third hypothesis that sexual abuse would negatively and significantly predict prosocial behaviour among undergraduates, while our second hypothesis that physical/emotional abuse would negatively and significantly predict prosocial behaviour among undergraduates was not confirmed. Our finding on sexual abuse impact on PSB was in alignment with Carvalho et al. (2020) which highlights the long-term detrimental effects of sexual abuse on altruistic behaviours and prosocial skills. Our findings on the non-significant impact of ACE-PEA on PSB was also in agreement with Gomis-Pomares and Villanueva (2020) which found that the total number of ACEs

(such as sexual abuse, physical abuse, emotional abuses, physical neglect, and household dysfunction) was not significantly associated with altruistic behaviours.

Our findings suggest that sexual abuse seems to have greater adverse impact on prosocial behaviour compared to physical and emotional abuse, especially among undergraduates. Individuals who have gone through sexual abuse may develop unwarranted mistrust, social withdrawal, and anxiety (Malti, 2020), which can be detrimental to the development of prosocial behaviour. Furthermore, the lack of significance in the ACE-PEA-PSB relationship suggests that the effects of various types of abuse on prosocial tendencies may be more complex or mediated by other factors. It is possible that undergraduates who have experienced physical/emotional abuse develop resilience or coping mechanisms that lessen the detrimental effects on prosocial behaviour, or that other supporting experiences in their lives outweigh the harmful effects of such abuse.

The differential impact of these two categories of ACEs on prosocial behaviour calls for a greater consideration of the specific types of adverse experiences one might have undergone when exploring their psychological and behavioural consequences. It follows that there is a need to design interventions aimed at encouraging prosocial behaviour in such individuals that takes into account the type of ACEs suffered. For example, there are trauma-informed therapies (Fondren et al., 2020) that can more effectively encourage civic engagement in sexually abused individuals – such individuals may benefit more from such therapies that address the consequences of sexual abuse (Black et al., 2012). Furthermore, fostering supportive environments that enhance trust and healthy social interactions may also help reduce some of the negative impact of sexual abuse on prosocial behaviour (Banyard et al., 2021; Yang et al., 2022).

The present study's results further revealed that gratitude was positively associated with PSB, suggesting that higher levels of gratitude are linked to increased prosocial behaviour among undergraduates. Thus, our hypothesis that gratitude would positively and significantly predict prosocial behaviour among undergraduates was confirmed. This finding aligns with previous research (e.g., Yost-Dubrow & Dunham, 2018; Puri et al., 2019) which demonstrated that individuals with higher levels of gratitude tend to engage in more prosocial activities. The positive relationship between gratitude and prosocial behaviour highlights the potential of gratitude as a valuable psychological resource. Cultivating gratitude may not only enhance prosocial behaviour but also improve the overall social interactions and well-being of young adults.

Moreover, gratitude was found to significantly moderate the relationship between neuroticism and prosocial behaviour (PSB), but it did not moderate the association of sexual abuse (ACE-SA), physical/emotional abuse (ACE-PEA) and prosocial behaviour. Therefore, our hypothesis that gratitude would significantly moderate the relationship between neuroticism and prosocial behaviour among undergraduates was confirmed, while our last two hypotheses that gratitude would significantly moderate the relationship between physical/emotional abuse and prosocial behaviour among undergraduates, and that gratitude would significantly moderate the relationship between sexual abuse and prosocial behaviour among undergraduates, were not confirmed. Specifically, our findings revealed that for undergraduates with low and moderate levels of gratitude, neuroticism was not significantly associated with PSB.

However, when gratitude was high, the negative relationship between neuroticism and prosocial behaviour became stronger. Although our finding, in line with previous research (e.g., Yost-Dubrow & Dunham, 2018; Puri et al., 2019), demonstrates that individuals with higher levels of gratitude tend to engage in more prosocial activities, we further found that with the interaction of neuroticism, undergraduates with low levels of gratitude became more likely to engage more in PSB. Undergraduates who are low in gratitude tend to exhibit more neurotic tendencies, as they are easily agitated and demonstrate anger every now and then (Lin, 2017; Roberts, 2015; Szcześniak et al., 2020). These individuals might act prosocially to find emotional balance or to

ease the guilt associated with their neurotic outbursts as a result of these emotional swings. Conversely, grateful undergraduates are more capable of controlling their neurotic tendencies due to improved emotional control and self-awareness, which may lessen their need for prosocial behaviour as a coping strategy (Nash, 2013; Szcześniak et al., 2020).

Our finding suggests that gratitude has a contextual nature regarding its role in the link between neuroticism and PSB, given that in our study, high levels of gratitude amplified rather than mitigating the negative association between neuroticism and PSB. One possible reason could be that gratitude may increase self-awareness which could make undergraduates who are neurotic to become more fixed on their internal negative feelings so that it hinders their willingness to engage in prosocial acts. A high level of gratitude may cause neurotic undergraduates to reflect more deeply on their emotional challenges which would amplify the negative effects of their neurotic tendencies on their behaviour.

However, gratitude's lack of moderation in the relationship between adverse childhood experiences (ACE), specifically sexual and physical/emotional abuse, and prosocial behaviour suggests that the impact of such traumatic experiences on social behaviour may be more deeply ingrained and less susceptible to the buffering effects of gratitude alone. This highlights the complexities of dealing with the psychological consequences of ACEs and emphasises the need for more targeted therapeutic interventions that go beyond fostering gratitude, potentially involving trauma-informed care and other resilience-building strategies to assist affected individuals in developing healthy social behaviours.

We recommend that educators, mental health experts, and policymakers should prioritize trauma-informed care to address the complex needs of undergraduates with histories of abuse, while also targeting neurotic tendencies. Given that gratitude did not mitigate the negative impact of neuroticism on prosocial behaviour, but rather amplified it at higher levels, interventions should be tailored to focus on emotional regulation and trauma healing rather than relying solely on gratitude-building strategies to foster positive social behaviours.

One notable strength of our study, is its thorough evaluation of both direct and moderating effects in the link between neuroticism, adverse childhood experiences (ACEs), and prosocial behaviour among undergraduates. By looking at not just the direct impact of neuroticism and ACEs on prosocial behaviour, but also the moderating role of gratitude, the study provides a more nuanced view of the complicated interaction between these variables. This method provides a deeper understanding of how gratitude may potentially amplify, rather than buffer against the negative impacts of neuroticism on prosocial behaviour, while simultaneously emphasising the limitations of gratitude's moderating role in the setting of ACEs. Such findings provide useful implications for targeted interventions and highlight the necessity of incorporating emotional regulation and trauma healing in promoting prosocial behaviour.

While the strengths of the study are admirable, it is not without limitations. One of such limitations is the use of self-reported measures which may introduce bias due to social desirability or inaccurate self-assessment. Moreover, the cross-sectional nature of the research design compromises any ability to establish causation since such a design captures only one phase of a lifecycle rather than successive phases. Moreover, the findings may not be generalizable to all undergraduates, since the sample was obtained from only one university located in Eastern Nigeria. These limitations should therefore be addressed by future research endeavours through longitudinal. Further studies may be needed to test these findings on different populations in order to improve the representativeness of the findings. It would also be interesting to investigate other mechanisms that could buffer against the negative impacts of neuroticism on prosocial behaviour and how it is sustained across time frames, which could be accomplished utilizing both quantitative and qualitative methodologies.

Conclusion

While our study makes significant contributions to the understanding of how gratitude can moderate the effects of neuroticism and adverse childhood experiences (ACEs) on prosocial behaviour, addressing its limitations and expanding the scope in future research will further enrich this important area of study. Such advancements will not only bolster the robustness of the findings but also offer practical implications for developing interventions aimed at fostering prosocial behaviour in various populations.

Author Contributions

All authors were involved in the study's conception. Conceptualization, study design, material preparation, and analyses were carried out by Joy Ify Ugwu and Elisha John Igwe. The initial draft of the manuscript, and data collection, were done by Cecilia O. Apex-Apeh. All authors provided feedback on earlier versions, read and approved the final manuscript.

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Ethics declarations**Ethics Approval**

All study procedures received approval and oversight from the Institutional Review Board (IRB) at the University of Nigeria.

Declaration of Interest Statement

Authors declare no conflict of interest.

Data availability statement

Data for this study are with the authors and can be made available upon request.

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