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The Influence of Mental Well Being, Cognitive Ability, Personality Traits, and Emotional Intelligence on Self-Esteem among Hearing-Impaired Students in Pakistan

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Abstract

Objectives: *Hearing-impaired students in Pakistan face significant educational and social challenges, often experiencing lower self-esteem due to communication barriers and societal stigma. This study examines the relationships between mental well-being (MWB), cognitive ability (CA), personality traits (PT), emotional intelligence (EI), and self-esteem (SE) among hearing-impaired students.*

Methods: *Data were collected from 300 students in 10 special education schools using validated survey instruments. Structural equation modelling (PLS-SEM) was employed to analyse the relationships among the study constructs.*

Results: *The findings indicate that MWB, CA, and PT significantly influence SE, highlighting their crucial role in fostering psychological well-being. However, EI's moderating effect was largely non-significant, except for PT, suggesting that personality resilience enhances self-esteem when coupled with emotional intelligence. Cognitive assessments revealed higher memory scores among male students, while guardians' hearing status did not significantly impact students' attention performance.*

Conclusions: *This study shows the importance of targeted interventions to enhance MWB, cognitive skills, and personality development among hearing-impaired students. EI training is beneficial yet its impact appears limited unless combined with broader psycho-social support. Findings contribute to policy recommendations for special education, advocating for inclusive programs and psychological support for hearing-impaired students in Pakistan.*

Keywords: Hearing-Impaired Students, Self-Esteem, Mental Well-Being, Cognitive Ability, Personality Traits, Emotional Intelligence

Introduction

In Pakistan, special education has historically been overlooked with limited focus on children with hearing impairments (Pathan et al., 2025). The first school for hearing-impaired students was established in Karachi in 1920, marking the initial step towards formal education for this community. Today, the Directorate General of Special Education oversees 56 institutions dedicated to educating and rehabilitating children with special needs. In Punjab, the Government has expanded special education services, increasing the number of institutions from 51 (serving 4,265 children) to 292 (supporting nearly 32,345 children) (Special Education Department, 2023). These efforts aim to integrate hearing-impaired individuals into society by fostering communication and social engagement.

Despite these initiatives, several challenges remain in implementing special education programs effectively. Parental concerns and societal stigma often prevent families from enrolling their children in specialized institutions, leading to increased isolation among hearing-impaired students (Jahangir et al., 2023). Research suggests that while these students express satisfaction with their education and family life, they frequently report dissatisfaction with social interactions and outdoor activities (Baroi, 2024; National Academies of Sciences, Engineering, and Medicine, 2016). These struggles are associated with lower scores in areas related to emotions, behavior, and peer relationships, emphasizing the importance of psychological stability and social well-being. Hearing

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impairments not only affect communication abilities but also influence social relationships and emotional development (Sturrock et al., 2022).

Understanding the role of EI in supporting mental well-being and personality development is crucial in addressing these challenges (Ida Merlin & Prabakar, 2023). Schools play a vital role in cognitive and emotional growth, preparing students to navigate personal and academic challenges. While recent studies have explored the relationship between EI and mental well-being, there is limited research on its moderating effect between mental well-being, cognitive ability, personality traits, and self-esteem (Chen & Cheng, 2023). Similarly, while self-esteem has been widely studied, its connection to emotional intelligence requires further investigation to develop comprehensive support strategies for hearing-impaired students (Al-Khateeb et al., 2020).

Recent advancements in cognitive assessment tools have allowed for a more accurate evaluation of cognitive abilities in hearing-impaired individuals. The Cambridge Neuropsychological Test Automated Battery (CANTAB) has been used to assess memory and attention in this population, providing insights into their cognitive strengths and challenges. However, further research is required to refine these assessments and explore their full implications for hearing-impaired students' academic and personal development.

Despite growing recognition of the mental, emotional, and social aspects of hearing impairment, there is still limited research examining how these factors interact in the context of SE and EI. Despite the extensive research conducted in general education that looked into performance of part-time students (Humayon et al., 2018a) , public school student behavior and lifestyle factors influencing achievement (Hayat et al., 2018), university employee and establishment well-being (Humayon et al., 2018b) the area of special education has not received as much attention and remains largely under-researched. Therefore, this study aims to analyze the relationships between MWB, CA, PT, EI and SE among hearing-impaired students in Pakistan, contributing to a better understanding of their educational and psychological needs.

Literature Review

Mental wellbeing and self-esteem

Mental well-being maneuvers a fundamental role in manufacturing self-esteem among hearing-impaired students. Research by Ummi Habibah Abd Rani and Najib Ahmad Marzuki (2017) explored that psychological well-being constructively cogitate with self-esteem in hearing-impaired students, especially constructs similarly autonomy and environmental control. Nevertheless, difficulties in communication mostly hinder their psychological well-being, that negatively influence their self-esteem. Self-esteem is a fundamental aspect of psychological well-being which significantly influences an individual's thoughts, emotions, and behaviours. Positive self-esteem is widely recognized as a key indicator of overall psycho-social functioning and mental health, as it fosters resilience, emotional stability, and a sense of self-worth (Soucase et al., 2023; Mehmood et al., 2017). Conversely, low self-esteem is often associated with mental health challenges such as anxiety, depression, and feelings of inadequacy. Research has shown that specific populations, such as hearing-impaired students, are particularly vulnerable to lower self-esteem due to factors like communication barriers, technological limitations, and difficulties with social integration (Awan et al., 2024; Nawaz et al., 2021). These challenges can exacerbate feelings of isolation, reduce self-worth, and contribute to cognitive and emotional difficulties which further feature the intricate relationship between self-esteem and mental well-being (Pooja et al., 2024). Understanding this relationship is crucial for developing targeted interventions that promote both self-esteem and mental health across diverse populations.

H1: In hearing-impaired students, MWB has a positive and significant relationship with SE, such that higher levels of MWB are associated with greater SE.

Cognitive ability and self-esteem

Cognitive ability plays a significant role in shaping self-esteem, particularly among hearing-impaired students. Research suggests that higher cognitive abilities, such as problem-solving, memory, and learning, enable individuals to navigate challenges more effectively, fostering a sense of competence and self-worth (Qaxxorovich, 2024). For hearing-impaired students, cognitive skills are especially critical in overcoming communication barriers and adapting to educational and social environments. Studies have shown that students with stronger cognitive abilities are better equipped to process and respond to complex social cues, which can enhance their confidence and self-esteem (Qi et al., 2024).

Furthermore, cognitive abilities contribute to academic success, which is often linked to positive self-perception and emotional well-being. This relationship underscores the importance of cognitive development programs in supporting the psychological well-being of hearing-impaired students. Therefore, it is hypothesised as below:

H2: CA has a positive and significant relationship with SE in hearing-impaired students, such that higher CA is associated with greater SE.

Personality traits and self-esteem

Personality traits, particularly resilience and adaptability, are critical determinants of self-esteem in hearing-impaired students and plays a crucial role in developing slef-esteem among hearing-impaired people. Resilience, defined as the ability to recover from adversity, has been shown to mitigate the negative effects of hearing impairment on self-esteem by enabling students to cope with challenges such as communication barriers and social exclusion (Johnson et al., 2018).

Similarly, adaptability, or the capacity to adjust to new or difficult situations, helps hearing-impaired students navigate their environments more effectively, fostering a sense of control and self-worth. Research indicates that students with higher levels of these traits are more likely to maintain positive self-esteem, even in the face of significant challenges (Qi et al., 2024). Interventions aimed at fostering resilience and adaptability, such as social skills training and mindfulness programs, have been shown to enhance self-esteem and overall psychological well-being in this population. This highlights the potential of targeted interventions to strengthen these traits and improve outcomes for hearing-impaired students. Therefore, it is hypothesised as below:

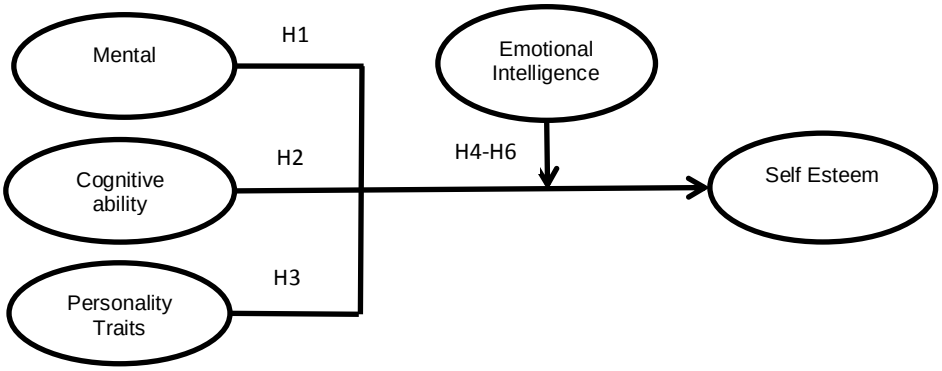
H3: PT have a positive and significant relationship with SE in hearing-impaired students, such that higher levels of PT are associated with greater SE.

Emotional Intelligence as moderator

Emotional Intelligence (EI), defined as the ability to perceive, control, and evaluate emotions, plays a significant role in shaping self-esteem and mental well-being. Research has shown that EI can act as a protective factor, enhancing the positive effects of mental well-being, cognitive ability, and personality traits on self-esteem, particularly among hearing-impaired students (Marzuki et al., 2018; Pervez et al., 2024). For instance, students with higher EI are better equipped to manage stress, navigate social interactions, and adapt to challenges, which can amplify the benefits of cognitive abilities and resilient personality traits on their self-esteem. Studies have also demonstrated that EI training programs significantly improve mental health outcomes, including reductions in anxiety, depression, and social dysfunction, while simultaneously boosting self-esteem (Ashori et al., 2021). These findings suggest that EI may moderate the relationship between mental well-being, cognitive ability, personality traits, and self-esteem by enhancing emotional regulation and interpersonal skills. This highlights the potential of EI-focused interventions to support the psychological well-being of hearing-impaired students. Therefore, it is hypothesised as below:

H4-H6: EI moderates the relationships between MWB, CA, PT and SE, such that higher levels of EI strengthen the positive effects of these factors on SE.

Figure 1: *Conceptual Model*



Research Methodology

This study was conducted in 10 special education schools across Pakistan and focused on hearing-impaired students aged 15 and above. The selected schools included both government and private institutions, ensuring diverse representation of students from different regions and socioeconomic

backgrounds. These schools were chosen to reflect the various educational settings available for hearing-impaired students in Pakistan. A simple random sampling technique was used to select 300 students from these 10 schools, ensuring nearly balanced participation of male (50.33%) and female (49.67%) students from different academic levels. To maintain the study's focus, only students with diagnosed hearing impairments were included, while those with additional cognitive or developmental disabilities were excluded.

Additionally, students were categorised based on their guardians' hearing status. The hearing status of guardians was included as a variable to explore its potential influence on students' cognitive and emotional development. Previous research suggests that guardians' hearing status may affect communication patterns, emotional support, and learning environments at home, which could, in turn, impact students' self-esteem and cognitive performance (Wong et al., 2018). By categorising students based on whether their guardians have normal hearing or are hearing-impaired, this study aimed to examine whether these differences in household dynamics play a role in shaping students' psychological and cognitive outcomes. However, statistical analysis found no significant impact of this factor on students' cognitive performance in attention tasks.

By selecting 10 special education schools, this study provides a targeted analysis of self-esteem, cognitive abilities, and emotional well-being of hearing-impaired students in Pakistan's special education system. In line with earlier studies (Hayat et al., 2019; Hudaibiya & Raza, 2024), pilot testing was carried out with ten students from different schools to test the validity of constructs (e.g., Nazeer, Naveed, Sair & Khan, 2025). Structured questionnaires were used to collect data on a scale of Strongly Disagree (1) to Strongly Agree (5) (e.g., Zhu, Khan, Nazeer, Li, Fu, Badulescu & Badulescu, 2022; Khan & Nazeer, 2021). Survey questions were adapted from validated scales, including Mental Well-Being's 5-items from Stewart-Brown et al. (2009), Emotional Intelligence's 5-items from Davies et al. (2010), Cognitive Ability's 4-items from Condon and Revelle (2014), Personality Traits' 6-items from Sibley et al. (2011), and Self-Esteem's 5-items from Monteiro et al. (2022).

Data Analysis

Table 1 shows that male students constitute 151 out of 300 (50.33%) and made up little more than half of the sample. Similarly, female students made up 149 out of 300 (49.67%) which indicated nearly balanced gender representation. On the other hand, 137 students (45.67%) have guardians who have normal hearing and 163 students (54.33%) have guardians who are hearing-impaired. This research found that this distribution is important because previous study (Wong et al., 2018) suggests that the hearing status of guardians can influence a child's self-esteem, communication development, and emotional intelligence.

Table 1: *Summary of Demographic Variables*

Category	**Frequency**	**Percentage**
Male	151	50.33%
Female	149	49.67%
Normal Hearing Guardians	137	45.67%
Hearing-Impaired Guardians	163	54.33%

N = 300

Table 2 provides details on measures of central tendency indicating that there was a general agreement on all study constructs. Additionally, MWB, CA and PT had positive and significant correlations with SE, laying the foundation for path estimation using structural equation modelling (Hair et al., 2019).

Table 2: *Descriptive and Correlational Analysis*

Variable	**M**	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
1. Gender	1.50	0.50	1								
2. Hearing	1.46	0.50	.173**	1							
3. MWB	3.13	1.12	-.074	-.023	1						
4. CA	3.04	0.99	-.015	.122*	.206**	1					
5. PT	3.42	1.03	.028	.087	.288**	.216**	1				
6. EI	3.22	1.12	-.024	.031	.030	-.047	-.037	1			
7. SE	3.05	1.16	-.065	.091	.267**	.384**	.310**	.038	1		
8. Memory	3.18	1.31	-.114*	-.062	.804**	.173**	.237**	-.018	.199**	1	
9. Attention	3.06	1.37	-.053	-.016	-.022	-.045	.071	.113	-.047	-.008	1

*N = 300, M = mean, SD = standard deviation, ** = p < .01, * = p < .05*

***Measurement Model Assessment*:** Since data failed to follow a normal distribution therefore SamrtPLS software was used to implement PLS-SEM. As per Kock (2015) VIF values were consulted which found to be < 3.3, indicating that common method bias and multicollinearity was not a concern for this study, see Table 4 for details.

A model is also deemed fit if its factor loadings (FL) are above 0.5, as shown in Figure 2 that all factor loadings were above 0.5. Similarly, for reliability / internal consistency of the measures the values of Cronbach alpha (α) for all measures were > 0.7, which established the base of reliability (Hair et al., 2019). Composite reliability (CR) was assessed to rule out the potential underestimation of CA, and all measures reported CR values > 0.7 (Garson, 2012). The convergent validity of the measures was evaluated by the scores of average variance extracted (AVE) > 0.5, and it was also found to be more than minimum. Similarly, the ratios of hetero-trait and mono-trait (HTMT) correlations were < 0.85, which confirmed the discriminant validity of the measures, see Table 3 for the details. Some of these scales like psychological well-being scale have been tested in well-known studies (e.g. Hayat & Afshari, 2021; Hayat & Afshari, 2022).

Table 3: *Reliability and Validity of the Measurement Model*

Variable	**α**	**CR**	**AVE**	**HTMT**				
				CA	EI	MWB	PT	SE
CA	0.891	0.925	0.754	-				
EI	0.913	0.930	0.726	0.062	-			
MWB	0.929	0.946	0.780	0.226	0.070	-		
PT	0.912	0.932	0.695	0.238	0.066	0.313	-	
SE	0.915	0.936	0.746	0.425	0.058	0.289	0.339	-

***Path Model Assessment*:** As shown in Table 4 and Figure 2 that MWB had a positive and significant impact on SE (B = .124, t = 2.391, p = .017), thus MWB caused substantial variation in SE, H1 was therefore supported. Similarly, CA also had a positive and significant impact on SE (B = .333, t = 6.507, p < .001), thus CA also caused substantial variation in SE, supporting the H2. Likewise, PT also had a positive and significant impact on SE (B = .195, t = 3.223, p = .001), hence PT also caused substantial variation in SE, providing an obvious support to H3. However, the interaction between MWB and EI was unable to induce a substantial variation in SE as their impact was not statistically significant on SE (B = .005, t = .100, p = .921), so H4 was not supported. Similarly, the interaction between CA and EI was also unable to induce a substantial variation in SE as their impact was also not significant (B = -.087, t = 1.597, p = .111), hence H5 was also not supported. Nonetheless, the interaction between PT and EI induced a substantial variation in SE as their impact on SE was significant (B = .144, t = 2.367, p = .018), meaning that H6 was supported. Additionally, MWB, CA, PT and their interactions with EI jointly explained 24.9% variance in SE (R^2 = 0.249), which was small effect size (Cohen, 1992).

Table 4: *Path Estimates*

Path	**Estimate**	**T**	**P**	**VIF**	**R^2**	**Status**
MWB → SE	0.124	2.391	0.017	1.132	0.249	H1: Supported
CA → SE	0.333	6.507	0.000	1.101		H2: Supported
PT → SE	0.195	3.233	0.001	1.143		H3: Supported
MWB x EI → SE	0.005	0.100	0.921	1.087		H4: Not Supported
CA x EI → SE	-0.087	1.597	0.111	1.103		H5: Not Supported
PT x EI → SE	0.144	2.367	0.018	1.117		H6: Supported

These findings suggest that while mental well-being, cognitive ability, and personality play a significant role in self-esteem, their influence is limited when EI in added as moderator, as EI does not significantly change these relationships except for PT (Table 4).

Figure 2: *Statistical Model*

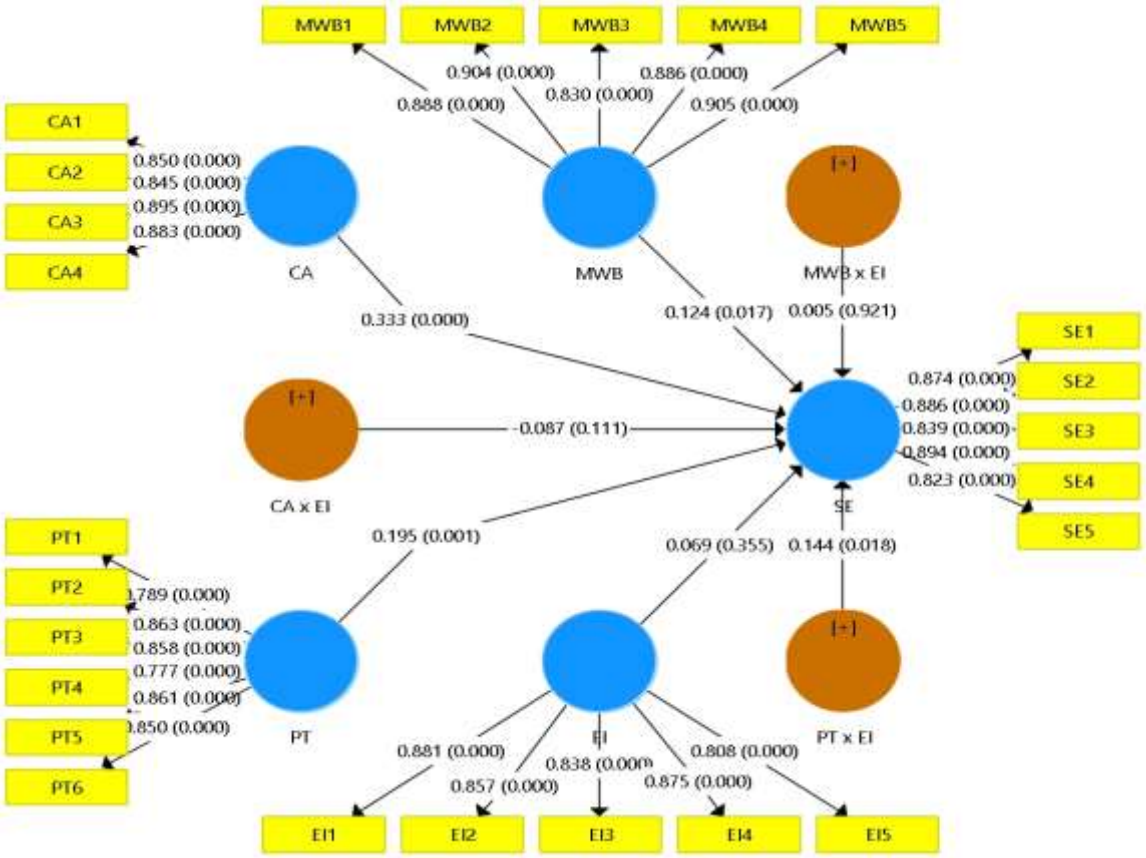


Figure 3 demonstrates the simple slopes (Cohen et al., 2013) which exhibits that the positive impact of PT on SE was stronger among the participants who assumed more EI (green slope) as compared with lesser EI (red slope). Thus, these slope tests provided details on conditional effect of PT on SE while interacting with EI, thus H6 received robust support.

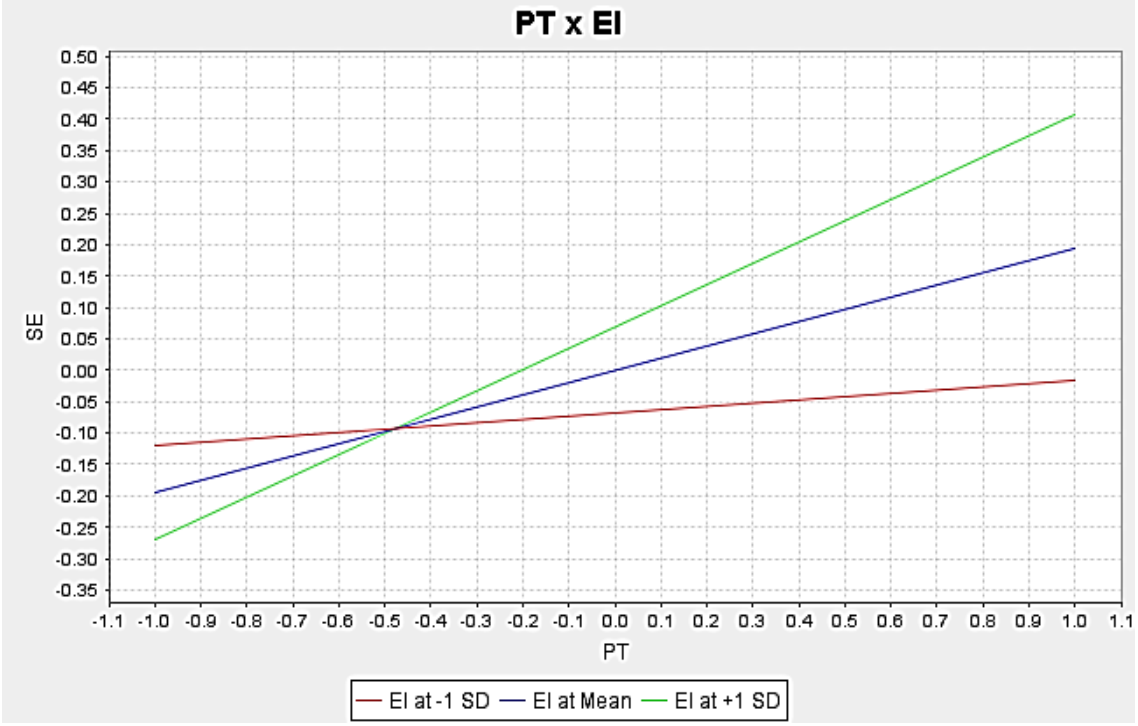


Figure 3: *Simple Slopes – PT x EI → SE*

The CANTAB memory and attention analysis compared cognitive performance based on gender and guardians' hearing status, for which a t-test was carried out (Field, 2024). Memory scores

were slightly higher for males (M = 3.32, SD = 1.27) than females (M = 3.03, SD = 1.34), the difference was small but statistically significant (t = 1.972, p = .049), see Table 5. Hence gender do significantly differ to influence the memory. While, attention scores were slightly weaker among students with normal-hearing guardians (M = 3.04, SD = 1.44) compared to those with hearing-impaired guardians (M = 3.08, SD = 1.32), but the difference was very minute and also not significant (t = .271, p = .787). Thus, guardians' hearing status do not significantly influence attention performance.

Table 5: ***CANTAB Memory and Attention Analysis***

Outcome	Group	Mean (SD)	Difference	T	P
Memory	Male	3.32 (1.27)	0.30	1.972	0.049
	Female	3.03 (1.34)			
Attention	Normal Hearing	3.04 (1.44)	0.04	0.271	0.787
	Impaired Hearing	3.08 (1.32)			

Discussion

The findings of this study provide significant insights into the relationships between mental well-being (MWB), cognitive ability (CA), personality traits (PT), emotional intelligence (EI), and self-esteem (SE) among hearing-impaired students in Pakistan. The results indicate that MWB, CA, and PT positively influence SE, highlighting their critical role in the psychological well-being of hearing-impaired students. However, the moderating effect of EI on these relationships was largely non-significant, except for its interaction with PT, which had a significant impact on SE.

The positive association between MWB and SE aligns with previous research emphasising the crucial role of mental well-being in self-perception and confidence among students with disabilities (Hintermair, 2008; Theunissen et al., 2014). Hearing-impaired students with better MWB tend to experience higher self-esteem, reinforcing the notion that psychological support and interventions aimed at enhancing MWB can be beneficial for this population (Leigh et al., 2009).

Similarly, CA demonstrated a strong and significant positive effect on SE, indicating that students with higher cognitive abilities tend to have better self-esteem. This aligns with study suggesting that cognitive skills, such as problem-solving and memory, contribute to an individual's confidence and ability to navigate social and academic challenges (Theunissen et al., 2014). The use of the Cambridge Neuropsychological Test Automated Battery (CANTAB) further revealed that male students had significantly higher memory scores than female students. These findings support previous research highlighting cognitive differences among hearing-impaired individuals, particularly in memory retention and processing (Most et al., 2007).

Personality traits (PT) also had a significant impact on SE, indicating that students with resilient and adaptable personality traits experience higher self-esteem. This is consistent with prior studies suggesting that personality traits such as resilience, adaptability, and emotional stability are key factors in fostering self-esteem among individuals with disabilities (Qi et al., 2024). Given that hearing impairments often lead to communication barriers, fostering personality traits such as resilience can significantly improve students' ability to cope with social and academic difficulties (Hintermair, 2008).

Although the role of EI as a moderator was not statistically significant for MWB and CA, it did significantly interact with PT to influence SE. This suggests that students with high EI and strong personality traits experience a greater boost in SE. The findings align with research emphasising the importance of EI in improving MWB (Qi et al., 2024). However, the lack of significant moderation in the other relationships suggests that while EI is an important construct, its influence on the direct relationships between MWB, CA, and SE may be less pronounced than previously thought (Leigh et al., 2009). These results indicate that personality traits play a more dominant role in shaping SE, while EI enhances this effect rather than acting as a universal moderator.

Furthermore, the comparison of cognitive abilities based on guardians' hearing status revealed no significant differences in attention scores. Interestingly, the hearing status of guardians did not significantly influence students' attention performance, as measured by the CANTAB assessment. This finding suggests that other factors, such as the quality of communication, emotional support, or educational resources, may play a more critical role in shaping cognitive outcomes than guardians' hearing status alone. For instance, hearing-impaired guardians may use sign language or other adaptive communication methods that foster effective interaction, potentially mitigating any disadvantages associated with their hearing status. While this study did not find a significant impact

of guardians' hearing status on attention performance, it is important to consider the broader role of guardians in fostering self-esteem and emotional well-being. Guardians, regardless of their hearing status, serve as primary sources of emotional support and encouragement for hearing-impaired students. Their ability to provide a nurturing and inclusive environment may be more influential than their hearing status alone. Future research should explore these dynamics further, including how guardians' communication strategies and emotional involvement contribute to students' cognitive and emotional development. Overall, the findings of this study provide valuable insights into the complex interplay between MWB, CA, PT, EI, and SE among hearing-impaired students. While MWB, CA, and PT were found to significantly influence SE, EI's moderating effect was limited, suggesting that other psychosocial and environmental factors may play a more substantial role in determining self-esteem. Future research should explore additional moderating variables, such as family support, peer relationships, and educational interventions, to gain a more comprehensive understanding of factors contributing to the well-being of hearing-impaired students in special education settings.

In conclusion, this study emphasises the need for targeted interventions to enhance MWB, cognitive skills, and personality development among hearing-impaired students. Incorporating personality-based resilience training and cognitive skill-building programs into special education curricula could be effective strategies for improving self-esteem. Additionally, while EI training remains beneficial, its impact may be more effective when combined with broader psychosocial interventions. Policymakers and educators should consider these findings when designing support programs to ensure the holistic development of hearing-impaired students in Pakistan.

Limitations and Future Research

This study has several limitations. First, it was conducted in only 10 special education schools which limits its generalizability. Future research should expand the sample to include mainstream inclusive schools. Second, reliance on self-reported measures may introduce bias therefore future studies should incorporate qualitative insights from students, parents, and teachers. The study also focused on quantitative relationships which overlooks factors like peer interactions, family support, and social attitudes. Future research should adopt mixed-methods approaches to explore these influences. Additionally, the CANTAB cognitive assessment measured only memory and attention and missed other cognitive skills like problem-solving and executive functioning. Although EI was tested as a moderator, its effect was largely insignificant, except with personality traits. Future studies should explore other moderators, such as resilience, self-efficacy, and adaptive learning strategies. Lastly, the study used a cross-sectional design, limiting causal conclusions. Longitudinal research is needed to assess the long-term impact of cognitive and emotional factors on self-esteem and well-being.

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