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Developing and Validating the Gender Role Attitude Scale

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Abstract

The research paper was to advance and confirm a psychometric measure on gender role attitude among adults in Bangladesh. The knowledge on the attitudes towards gender roles is essential when applying to enhance equity and societal growth, and a cross-culturally defined tool to facilitate the same was required. In the first round, 25 items were produced through a logical way of generating so as to make it content relevant. The 220 purposively chosen adult respondents (both male and female) took the preliminary version of the scale. The face validity was determined by judgment of experts and reaction of participants. Item analysis and exploratory factor analysis (EFA) were the steps involved in the analysis of data to extract the item reduction and factors. Based on EFA, 8 items were retained and loaded on two separate factors which were Mutual Understanding and Equity. Inter-factor calculations were statistically significant and thus conspired with the construct (convergent) validity of the scale. The scale had a good overall reliability (Cronbach $\alpha = .82$) and one could find that its factors were also relatively reliable with acceptable levels of internal consistency. The use of independent sample t-tests demonstrated important gender based differences in gender role attitudes between the male and female group, and this area of significant perceptual difference has been highlighted. It will be found out that the newly derived scale was in fact reliable as well as valid in measuring gender role attitudes in the Bangladeshi adults. Its high psychometric forms also help the scale become an asset when used in research and social policy interventions in relation to generating gender equity in the future.

Keywords: gender role, attitude, mutual understanding, equity

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Introduction

People often envision a scenario in which both males and females have equal opportunities and access to various institutions in society, including religion, economy, education, and culture. A common misunderstanding about gender is the belief that it pertains solely to women. Many individuals expect that women will handle childcare, cooking, and household chores, while men focus on financial matters and work outside the home. Nowadays, more women are working outside, earning money, giving financial support to family (WORLD ECONOMIC FORUM, 2024)

Gender roles for men and women can be classified as traditional or egalitarian (Mandy Boehnke, 2011). Traditionally, women have been assigned non-equal responsibilities such as managing household duties and staying out of the workforce. In contrast, men have typically been viewed as the heads of the household, responsible for providing for their families. However, egalitarian roles involve equal responsibility sharing in social, professional, familial, and educational spheres (Demirel, 2003; Basow, 1992; Dökmen, 2004; Kimberly & Mahaffy, 2002; Lindsey, 1990).

Traditional gender roles, such as "man should be the head of the household," "woman's main duty is to take care of home and the family," "breadwinning should be the man's responsibility," and "man should be successful in professional life," were addressed to high school and university students in studies intended to ascertain their opinions about gender roles. This research validated the acceptance of traditional gender norms among students. According to research done to find out what university students in Turkey believed about gender roles, female students had a more egalitarian perspective than male students (Baykal, 1988; Güvenç, 1996). The roles assigned to men and women in society have unequivocally led to negative discrimination against women, consistently placing them in subordinate positions and entrenching an inequality model that favors males. This injustice is glaringly apparent in critical areas such as decision-making, freedom of choice, access to health benefits, equal pay for the same profession, as well as education and career opportunities. Following the increase in mandatory education to eight years in 1997, there was a notable rise in the enrollment of girls at every level of education, extending the duration of their active learning. However, data from the academic year 2006-2007 reveals that the enrollment rate for girls in primary education is just 87.9 percent, compared to a higher 92.2 percent for boys. Alarmingly, the percentage of girls enrolled in higher education institutions remains disproportionately low at only 18.6 percent. This disparity demands urgent attention and action. The same ratio for boys is 21.5 percent (Education Statistics in Turkey, 2006). The elimination of social status equality between men and women is the result of all these elements that are part of the inequality model (Akïn Demirel, 2003; World Health Organization, 1998).

In developing nations, women's education levels are significantly lower than men's, despite education being one of the key indicators of social standing (Akİn Demirel, 2003). The 2006 Population and Development Indicators report clearly demonstrates that 19.6% of Turkish women are illiterate, in stark contrast to just 4.0% of men. This significant

discrepancy highlights an urgent need for addressing educational inequalities in the country. These results show that gender disparity exists in Turkey at all educational levels, with differences between men and women. Furthermore, despite Turkey's overall rise in literacy over the past 70 years, the gap between males and women's levels of literacy has remained stable (Demirel, 2007). Increasing women's education is the most significant way to increase their participation in politics, the workforce, and decision-making processes (The Condition of Woman in Turkey, 2004).

Women's participation in politics and decision-making processes is significantly hindered by several key factors, including low educational attainment, minimal professional involvement, and inadequate access to health care. In 2007, data revealed that women's employment in Turkey was a mere 22.2 percent, in stark contrast to the 64.3 percent for men. Moreover, the Household Labour Investigation in Turkey (2007) clearly shows that women represent 47.3% of the workforce, while 19% of men are engaged in unpaid family labor within the agricultural sector. It is crucial to address these disparities to enhance women's roles in society.

In the 2002 National Election results, women accounted for only 4.4% of the Turkish Parliament, highlighting a significant lack of representation. In the 2007 National Elections, this percentage rose to 9.1% (Distribution of Parliamentary Members by Gender, 2007 and National Elections, 2007). Women are primarily affected negatively by all of the aforementioned social status disparities. Data from 2007 indicates that in Turkey, 22.2 percent of women are employed, compared to 64.3 percent of men. In addition, the Household Labor Investigation in Turkey (2007) reports that 19% of men and 47.3% of women are unpaid family laborers in the agricultural sector. The results of the 2002 National Election revealed that female representatives comprised only 4.4% of the members of the Turkish Parliament. This figure rose to 9.1% in the 2007 National Elections (Distribution of Parliamentary Members by Gender; 2007 National Elections, 2007). It is evident that the prevailing social status disparities significantly disadvantage women. According to 2007 data, a striking 64.3% of men are employed, while only 22.2% of women in Turkey hold jobs. This stark contrast underscores the urgent need for change. Furthermore, according to the 2007 Household Labor Investigation in Turkey, 47.3% of women and 19% of men work as unpaid family laborers in the agriculture industry. 4.4% of the members of the Turkish Parliament are female legislators, based on the results of the 2002. National Election. In the 2007 National Elections, the ratio rose to 9.1% (Distribution of Parliamentary Members by Gender, 2007; National Elections, 2007). Most of the previously identified disparities in social status have a negative effect on women. Preventing these disparities between men and women is crucial, for this reason.

Conventional gender roles entail assigning responsibilities based on a person's sex, reflecting the disparities in duties that men and women assume in society. This characteristic not only raises the possibility of violence against the partner in affective relationships, but it also supports the rationalization of abusive behavior. In a similar vein, hostile sexism, which is defined by mistrust and antagonistic feelings toward the partner,

validates the mistreatment of women by endorsing its practice and simultaneously holding them accountable for the conflict (Herrera et al., 2012, Lila et al., 2013, Lila et al., 2014).

This may have an impact on how the very circumstances that are encountered in affective interactions are labeled, providing an interpretation of their classification as abuse separate from the identification of particular behaviors as abusive (Cortés et al., 2014; López-Cepero et al., in press). Women's actions concerning their standing as partners in affective relationships, in turn, will impact other people's opinions or views. According to Herrera et al. (2012), men who have a classic sexist mindset tend to view women more adversely when they reject their partner's decisions. Likewise, we cannot ignore the fact that, in addition to sexist views regarding roles, there are transcendent attitudes that, when viewed from an egalitarian standpoint, also need to be evaluated as defenders of equality (Baber & Tucker, 2006, López-Cepero et al., 2013). The Ambivalent Sexism Inventory (ASI) (Glick & Fiske, 1996) and the Attitudes Toward Men Inventory (AMI; Glick & Fiske, 1999) are two other tools that measure gender inequality, which can be expressed in either a hostile or benevolent way.The Social Roles Questionnaire (SRQ-R; Baber & Tucker, 2006) is one tool that, in contrast, not only measures inequality but also evaluates equality between the sexes, defining an attitudinal typology based on role characteristics. It does this by evaluating both sexes equally as recipients and sexist and egalitarian attitudes. Since the literature has shown a probable link between these attitudes and a higher or lower tolerance of potential abuse scenarios, it is important to highlight the distinctions in each type of attitude (Rodríguez-Franco et al., 2012). The Social Roles Questionnaire (SRQ-R; Baber & Tucker, 2006) is one tool that, in contrast, not only measures inequality but also evaluates equality between the sexes, defining an attitudinal typology based on role characteristics. It does this by evaluating both sexes equally as recipients and sexist and egalitarian attitudes. Since the literature has shown a probable link between these attitudes and a higher or lower tolerance of potential abuse scenarios, it is important to highlight the distinctions in each type of attitude (Rodríguez-Franco et al., 2012). We should aim to develop a new scale for measuring attitudes towards gender roles, informed by the theoretical framework of gender equality. This initiative will provide valuable insights into how we can effectively transform sexist beliefs and promote positive change.

Rationale of the Study

The knowledge of gender role attitudes is an essential requirement in the establishing of gender equity though overcoming traditional stereotypes that suppress the concept of the potential of human beings due to their sex. A rigid way of gender rules still exists in most societies like in Bangladesh, which affect the education, working conditions, household duties and societal expectations. Such functions tend to favor males as well as support the inferiority of women, thus hampering the achievement of equality and integrative development.

In as much as efforts on a global and national level have been made towards strengthening gender equity, there is still perceived inequality in various levels which

can be cited in education, political participation, labour force participation, and decision making power. Such inequalities are not only perpetuated by structural impediments; they are further sustained by strongly entrenched beliefs and attitudes on respective roles of men and women. Thus, the perception of the population to gender roles is considered to be an important aspect of perception and treatment of gender-based discrimination.

Globally, there are a number of tools used in the measurement of gender role attitudes though in most cases, the tools do not capture the cultural context, values and lived reality of people in a non-western society like in Bangladesh. This symbolizes the dire necessity of a culturally considerate, dependable, and valid psychometric tool that will cerate the subtle sense of Bangali views in gender roles.

The aim of the present study was to address this gap, the Gender Role Attitude Scale (GRAS) was developed and confirmed. The scale seeks to give the researchers, educators and policymakers a standardized information in gauging the gender role attitudes. Through this, it is also possible to identify the gaps in perception between males and females of any given gender, and the information can be used as an input to making the educational curriculum, social intervention, and advocacy to create gender equity in Bangladesh.

Attitude towards gender role is an important issue nowadays. How male and female perceive their own role and the role of their opposite gender determines whether gender can balance work and house hand-in-hand. To measure such attitude, no psychometric measure has yet been found in accordance with our culture (Bangladesh). Hence, developing a scale regarding the topic is seemed to be a requisite.

Objectives of the Study

Objectives of the present study are as follows:

1. Developing a scale to measure gender role attitudes
2. Exploring the latent construct of the newly developed scale, and
3. Estimating reliability and providing validity evidence of the newly developed scale.

Method

The development of the Gender Role Attitude Scale was accomplished through a series of decisive steps:

Step 1: Identifying and Operationalizing the Construct(s)

The first step in developing any kind of instrument is to identify or operationalize the construct. In this study, our concern was to measure gender role attitudes. The concept of ‘gender role’ highlights the expectations, obligations, and activities that society places on women and men. Understanding these roles is crucial, as they influence not only individual identities but also our collective progress toward equality and inclusivity. A reflection of gender roles to women and men on their communal life denotes significant differences in family life, professional life, social life, education life, and career choice (Demirel, 2003; Basow, 1992; Dökmen, 2004; Lindsey, 1990).

There is considerable diversity in the literature regarding the definition or categorization of gender roles. In contemporary gender studies, researchers frequently explore a range of defined roles that individuals may occupy within various contexts. These roles include: (1) egalitarian gender roles, which emphasize equality and shared responsibilities; (2) female gender roles, often highlighting societal expectations specific to women; (3) marriage gender roles, which examine the dynamics and responsibilities within marital relationships; (4) traditional gender roles, characterized by historical norms and expectations; (5) parental gender roles, focusing on the distribution of responsibilities between parents; and (6) occupational gender roles, which assess how gender influences professional opportunities and workplace behavior. Each of these categories provides a framework for understanding the complexities of gender interactions across different social settings.

This report after factor analysis could retain two domains—equity and mutual understanding as representative factors for gender role attitude. The operational definition of gender role attitude for this study is unequivocally centered on the roles of genders (male and female) regarding equity and mutual understanding in all aspects of life.

Step 2: Generation of Items Pool

After identifying the construct, a series of items were developed across the constructs on which numerical information can be collected. Items were generated with the help of literature review. We initially selected 25 items from the literatures.

Step 3: Designing and Scoring Response Options

In this study, we employed a four-point Likert-type scale as the response format. The scale clearly defines the following options: 1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree. This robust approach ensures precise measurement of participants' opinions.

Step 4: Collecting Data

We conveniently collected data from a total of 220 males and females by using this scale. They were all different professionals and students with no age limit. Data has been collected via online. Participants were asked to report any words or concepts they found difficult to understand. Participants were promised that their answers would remain under wraps, ensuring complete confidentiality and peace of mind.

Results

Item Analysis

We computed corrected item-to-total correlations of 25 items to see if individual item went with the total GRAS score (Table-1). The corrected item total correlation values of 25 items ranged from r = -.236 (item no 7) to r =.684 (item no 2).

Table 1

Corrected Item-to-Total Correlations of 25 Items

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item1	75.95	78.280	.656	.802
Item2	76.03	76.570	.684	.799
Item3	77.90	96.982	-.600	.850
Item4	76.37	78.984	.467	.809
Item5	75.63	83.888	.388	.814
Item6	77.46	96.277	-.422	.856
Item7	77.92	91.126	-.236	.838
Item8	75.85	78.886	.609	.804
Item9	76.25	76.250	.626	.801
Item10	75.80	81.409	.468	.810
Item11	76.63	77.376	.454	.809
Item12	75.77	80.012	.614	.806
Item13	76.13	80.376	.365	.814
Item14	75.64	83.638	.480	.813
Item15	76.31	79.860	.326	.817
Item16	76.53	77.008	.553	.804
Item17	76.13	78.015	.606	.803
Item18	75.78	81.203	.522	.809
Item19	76.65	79.624	.405	.812
Item20	75.84	82.969	.369	.814
Item21	75.90	80.346	.500	.809
Item22	76.18	77.254	.606	.802
Item23	76.39	82.795	.275	.818
Item24	75.84	80.993	.473	.810
Item25	75.70	80.916	.612	.807

Items that value of corrected item-total correlation was $r<.30$ were excluded. According to Field (2013), item-total correlation values higher than .30 considered adequate. After removing specific items, we recalculated the corrected item-total correlations and identified items with

correlation values below 0.30, which we promptly excluded. Ultimately, we retained 8 items with correlation values exceeding 0.30, as detailed in Table 2.

Table 2
Corrected Revised Item-to-Total Correlations for 8 Items

Items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Item1	25.49	10.379	.617	.790
Item2	25.58	9.971	.597	.795
Item5	25.17	12.125	.456	.813
Item12	25.32	10.994	.585	.796
Item14	25.19	12.116	.543	.806
Item18	25.33	11.226	.541	.802
Item21	25.45	10.696	.547	.801
Item24	25.39	10.969	.516	.806

Factor Analysis

To begin with, our analysis revealed a KMO value of .896, which surpasses the recommended threshold of 0.50. This suggests that our sample is well-suited for factor analysis. Furthermore, the results of Bartlett's Test indicated that the correlation matrix is not an identity matrix, with a significance level below 0.000. This finding reinforces the validity of our data and confirms that we meet the necessary criteria to proceed with factor analysis.

Table 3
Factor Matrix for 8 items

Items	Factor	
	1	2
Item1		.742
Item2		.882
Item5	.559	
Item12		.613
Item14	.552	
Item18	.516	
Item21	.699	
Item24	.687	

Note. Values less than .30 were excluded.

We analyzed the data using Principle Component Analysis extraction method and all the factor loading <.30 was suppressed. The factor analysis clearly indicated a two-factor solution for the eight items. Factor 1 includes items 5, 14, 18, 21, and 24, and is designated as 'Mutual Understanding.' Factor 2 comprises items 1, 2, and 12, and is labeled as 'Equity.'

Reliability

The reliability of Gender Role Attitude Scale (GRAS) was determined by computing Cronbach's alpha. The Cronbach's alpha was .82 which indicates an excellent internal consistency reliability for this scale with specific sample. The values of Cronbach's alpha for the factors of GRAS- Mutual Understanding, Equity were .75, .80 respectively. The reliability analysis of the factors is presented in Table 4

Table 4
Exploring the Impact of Factors on Reliability Analysis

Factors	No of items	*M*	*SD*	Coefficient Alpha
Mutual Understanding	5	18.41	2.299	.75
Equity	3	10.57	1.991	.80

Validity

Face validity was ensured by the response of the sample. The construct validity was assessed by estimating inner-factor correlation and factor-total GRAS correlation. The result presented in Table 5 showed that the scale has significant construct validity. Factorial validity refers to the description of the inner structure of GRAS that is the number of dimensions that underlie the GRAS and the definitions of dimensions which is determined by the factor analysis. Factor 1 (mutual understanding) concerns the understanding and shared activities between male and female. Factor 2 (equity) concerns the equal rights of the both groups.

To investigate gender differences in Gender Role Attitude, independent sample *t* test was performed. Table 6 reveals intriguing insights into the substantial differences in attitudes toward gender roles based on gender. These findings highlight how perspectives can vary significantly between groups, sparking important conversations about societal expectations and individual beliefs.

Table 5
Correlation between the GRAS Factors

	1	2
1.Mutual Understanding	-	.529**
2. Equity	.529**	-

Note. ***p* <.001

Table 6

Descriptive Statistics and Gender Differences in GRAS

Gender	*N*	*M*	*SD*	*t*
Female	108	83.64	7.232	7.282
Male	112	75.39	9.454	

Note. $p < .001$, $N = 220$.

Discussion

This study aimed to develop a robust and reliable scale for measuring attitudes towards gender roles. The development of this scale was conducted by several steps. At first, we identified the qualities that can define the term Gender Role Attitude.

Then, we went through the literature review for collecting items under the identified categories. We selected 25 items at the beginning. After that, we checked face validity through pretest and we measured construct validity through factor analysis where we collected 16 responses via online. Following the pretest and factor analysis, we successfully retained eight items for the scale. To enhance clarity and comprehension, the scale was subsequently administered to 220 participants, allowing us to confirm that they understood each item effectively.

The data obtained from the participants was first analyzed through item analysis and each item discriminative ability was determined. Item analysis was done by computing corrected item-to-total correlation. The analysis from Table 1 revealed that the values of items 3, 4, 6, 7, 8, 9, 10, 11, 13, 15, 16, 17, 19, 20, 22, 23, 25 were below .30. Therefore, these 17 items were excluded and item-to-total correlation of remaining 8 items were presented in result Table 2. In Table 3, they were then factor analyzed to determine dimensionality and construct validity. According to the rules of thumb, the minimum sample size should be 50 observations and measure of sampling adequacy must exceed .50 for overall test and Bartlett's test of sphericity ($p < .05$) is statistically significant for factor analysis (Hair, Black, Babin, & Anderson, 2014). According to Kline (1994), for a successful factor analysis at least 100 participants should have to provide and the minimum ratio of participants and variables should be 2:1 and the minimum ratio of participants and extracted factors should be 20:1. On the basis of all of this, we could use this sample size ($n = 220$) to proceed factor analysis. Table 3 represented factor analysis from which two factors were identified under which the 8 items were loaded. The factor loadings of 8 items ranged from .34 to .75. As a rule of thumb, only variables with loadings of .32 and above are interpreted (Tabachnick & Fidell, 2007) and the factor loadings of ±.3 to ±.4 are minimally acceptable, values greater than ±.5 are necessary for practical significance (Hair et al, 2014). So, all the variables under two factors were interpretable and only few variables were minimally acceptable. Furthermore, we determined the reliability. It is evident from result of Table 4 that the overall reliability of the scale was found to be high (.82). The values of Cronbach's alpha

for all factors ranged from .75 to .80. This study suggested that the internal consistency of all the factors were acceptable. The rules of thumb for evaluating alpha coefficient can be described as follows: "$\alpha \geq .9$ = Excellent, $.9 > \alpha \geq .8$ = Good, $.8 > \alpha \geq .7$ = Acceptable, $.7 > \alpha \geq .6$ = Questionable, $.6 > \alpha \geq .5$ = Poor, $.5 > \alpha$ = Unacceptable" (George & Mallery, 2003; cited in Gliem & Gliem, 2003). After that the construct validity was determined by computing interactor correlations and correlation with total score of GRAS. The result from Table 5 showed that the construct validity of this scale was significant. Factorial validity was determined from factor analysis. The responses from participants provided a valuable opportunity to assess the reliability and validity of the GRAS, allowing us to strengthen its effectiveness as a measurement tool.

In Table 6, we analyzed the differences in Gender Role Attitudes between male and female participants. An independent samples t-test was conducted to assess these gender differences, revealing statistically significant variations in attitudes: female participants exhibited a mean score of 83.64, whereas male participants demonstrated a mean score of 75.39. These findings support the assertion that gender influences attitudes towards gender roles.

Furthermore, the results presented in Tables 2 and 3 confirm that the Gender Role Attitude Scale (GRAS) comprises 8 items. Each item is scored on a 4-point scale ranging from 4 (indicating "strongly agree") to 1 (indicating "strongly disagree"). The overall score for each participant is calculated by summing the scores of all items, resulting in a minimum possible score of 8 and a maximum score of 32, with a midpoint of 20.

This scoring system indicates that higher scores are associated with a more positive Gender Role Attitude, while lower scores reflect a more negative stance. Overall, the GRAS has proven to be a reliable and valid tool for measuring Gender Role Attitudes, highlighting its significance in understanding the underlying dynamics of gender perceptions in various contexts.

The findings in Table 3 highlight two important factors that can enhance our understanding of student performance. The total score for each factor is derived from the cumulative scores of all related items. For the factor of Mutual Understanding, which includes five items, students can achieve a maximum score of 20, with a minimum score of 5 and a midpoint of 12.5. Similarly, the factor of Equity consists of three items, allowing for a score range from 3 to 12, with a midpoint set at 7.5. Evaluating scores in relation to these midpoints can provide valuable insights into how effectively participants demonstrate these qualities. This approach can guide improvements and foster development in these areas. The scale can be used to provide necessary feedback regarding the Gender Role Attitude Scale that will be useful in knowing attitudes towards gender roles. The present study is not beyond its limitation. Because the factor pattern that emerged from a large sample size factor analysis will be more stable than that emerging from a smaller sample and the larger samples increase the generalizability of the conclusions reached by means of factor analysis (DeVellis, 2017). The study utilized a sample drawn from students, and although the sample size was 220, there is an opportunity to expand this in future research to

enhance the robustness of the findings. Therefore, it may be an obstacle for generalization and it is not the representative of the population concerned. In spite of its limitation this study is very helpful for measuring the Gender Role Attitude.

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Appendix

Factor wise final items of Gender Role Attitude Scale (GRAS)

Items	দৃঢ়ভাবে ভিন্নমত (১)	ভিন্নমত (২)	একমত (৩)	দৃঢ়ভাবে একমত (৪)
Factor : Equity				
১. পরিবারের যেকোন সিদ্ধান্ত গ্রহণের ক্ষেত্রে নারী ও পুরুষের সমান সুযোগ থাকা উচিত।				
২. কর্মক্ষেত্রে গুরুত্বপূর্ণ পদগুলোতে পুরুষের পাশাপাশি নারীদেরও অংশগ্রহণের সুযোগ দেয়া উচিত।				
৩. ছেলে ও মেয়ের লেখাপড়া ও চাকুরিক্ষেত্রে সমান অধিকার পাওয়া উচিত।				
Factor : Mutual Understanding				
৪. সন্তানের ভালোমন্দ বিচারে মা-বাবা উভয়ের মতামতের সমান গুরুত্ব থাকা উচিত।				
৫. দাম্পত্য জীবনে স্ত্রীর মতামতের প্রতি স্বামীর শ্রদ্ধাবোধ থাকা উচিত।				
৬. পরিবারকে খুশি রাখতে একজন নারীর মুখ বুঝে সবকিছু সহ্য করা উচিত।				
৭. সব বিষয়ে প্রভুত্ব করা পুরুষের বৈশিষ্ট্য হওয়া উচিত।				
৮. মেয়েদের বিয়ের ক্ষেত্রে ইচ্ছের বিরুদ্ধে হলেও, পরিবারের সিদ্ধান্ত মেনে নিতে হবে।				

*Last 3 items (6, 7, 8) are negative which were reversed coded during statistical analysis.

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Marital Satisfaction and Depression among Married Adults in Dhaka City: Exploring the Role of Socio-demographic Factors

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Abstract

Marital satisfaction and depression are intertwined factors significantly affecting the mental well-being of married individuals. The present study was designed to investigate the association between marital satisfaction and depression among married individuals in Dhaka city, with a focus on the role of sociodemographic factors. Data were collected from 390 married adults (208 males, 182 females; age range 21–55 years, $M = 34.25$, $SD = 5.08$) in Dhaka city. The Bangla versions of the ENRICH Marital Satisfaction Scale and the Beck Depression Inventory-II were used to collect data. The results revealed a significant negative correlation between marital satisfaction and depression ($r = –.530$, $p < .01$), indicating that higher marital satisfaction was associated with lower levels of depression. Results of the t-test revealed that females reported significantly higher levels of depression than males, although there was no statistically significant difference in marital satisfaction by gender. Participants from joint families reported greater marital satisfaction than those from nuclear families. ANOVA results indicated significant differences in depression across occupational groups and marital satisfaction across socioeconomic groups. Multiple regression analysis identified marital satisfaction, gender, and family type as significant predictors of depression, with marital satisfaction emerging as the strongest predictor. The overall model explained approximately 32% of the variance in depression scores, $R^2 = .318$, $F(5, 382) = 35.56$, $p < .001$. These findings emphasize the importance of marital satisfaction in the psychological well-being of married individuals in urban Bangladesh.

Keywords: marital satisfaction, depression, sociodemographic factors, married individuals

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Introduction

Marital satisfaction is widely recognized as a key determinant of psychological well-being and life satisfaction (Fincham et al., 1997). A person can feel accepted, desired, adequate, and complete when he/she have a good married life, and this feeling is not possible in any other form of human relationships (Coleman & Miller 1975). Marital satisfaction (MS) can be defined as an individual's subjective experience of specific components within his/her marital relationship (Schoen et al., 2002). An individual's assessment of their marriage, contentment, and as a couple their ability to work together is their marital satisfaction (Schoen et al., 2002). Marital satisfaction plays a pivotal role in the psychological well-being of individuals, shaping not only the quality of intimate relationships but also influencing broader mental health outcomes such as depression. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), depression can be defined by a person's persistent feelings of sadness, hopelessness, discouragement, lack of motivation, and a general loss of interest or pleasure in day-to-day life (American Psychiatric Association, 2013). One of the main causes of the worldwide burden of disease and disability is mental health problems (Whiteford et al., 2013). Globally, mental illness affects about 1 billion individuals. About 18.7% of adults and 12.6% of children in low- and middle-income countries (LMICs) like Bangladesh suffer from mental health conditions, especially stress, anxiety, and depression (Koly et al., 2022).

Marital satisfaction and depression are intertwined factors significantly affecting the mental health of married individuals, and this relationship is also observed among married individuals in Dhaka city (Islam et al., 2016). Several studies found that marital dissatisfaction can be a significant risk factor for depression (Rehman & Hossain, 2024; Miller et al., 2013; Wang et al., 2013). Whereas, a study conducted in Korean couples reveals that depression can negatively affect marital satisfaction, creating a reciprocal association (Choi & Jung, 2021). The association between marital satisfaction and depression has been explored through various theoretical models, including the Marital Discord Model of Depression (MDMD) (Maroufizadeh et al., 2018; Wang et al., 2013). This model suggests that marital discord is a significant predictor of depression.

Several studies indicated that socio-demographic factors play a significant role in determining marital satisfaction and depression (Bahrami et al., 2021; Akhtar-Danesh & Landeen, 2007; Sigurðardóttir et al., 2023). A study conducted in Dhaka explored depression among married women and found that Employment and academic status, marital satisfaction, and psychological well-being jointly accounted for 56.2% variability in depression (Islam et al., 2016). Similarly, lower socioeconomic status is often associated with increased stress and decreased marital satisfaction, contributing to higher rates of depression (Du et al., 2021). Financial stress can affect relationships, leading to conflict and dissatisfaction (Bather et al., 2024). Age can influence marital satisfaction, with different age groups facing unique challenges and expectations within marriage (Mridha, 2020). Studies suggest that causal paths differ between men and women, with depression leading to decreased marital satisfaction in men, whereas marital dissatisfaction leads to

depression in women (Fincham et al., 1997). Educational attainment may shape marital expectations, resources, and stress exposure, and was therefore considered an important variable alongside other sociodemographic variables.Bottom of Form

Numerous studies indicated that people who have higher levels of marital satisfaction usually have lower levels of depression, which contributes to better mental health. Despite growing interest in the connection between marital satisfaction and mental health, limited studies have been conducted in South Asian context, particularly in urban settings like Dhaka, Bangladesh. This study was designed to fill this gap by exploring the relationship between marital satisfaction and depression and assessing how sociodemographic factors contribute to these outcomes among married individuals in Dhaka city. In addition, this study contributes to the literature by extending the Marital Discord Model of Depression (MDMD) to a South Asian urban context, thereby advancing theoretical understanding of how sociodemographic factors interact with marital satisfaction to predict depression. Because the design is cross-sectional, findings are reported as associations rather than causal effects; longitudinal or experimental research is required to establish temporal precedence.

Objectives of the Study

1. To examine the relationship between marital satisfaction and depression among married individuals in Dhaka city.
2. To explore the effect of sociodemographic factors on marital satisfaction and depression.
3. To examine whether marital satisfaction and depression differ across key sociodemographic variables such as gender, family type, occupation, and socioeconomic status.

Method

Participants

The total sample size of this study was *N*=390 married individuals, among them 208 were males and 182 were females, aged between 21 to 55 years (M = 34.25, SD = 5.08). The participants were selected using a purposive sampling technique, and a cross-sectional design was followed for this study. The inclusion criteria were: being married for at least two years, ages ranging from 20 to 60 years, and being able to read and write. A minimum duration of two years of marriage was set as an inclusion criterion to ensure that participants had sufficient time to experience marital dynamics and adjustment processes. The exclusion criteria were physical illness, and incomplete responses. The demographic features of the study participants are provided in table 1.

Table 1
Demographic features of the participants (N = 390)

Variable	Category	*N*	Percent (%)
Gender	Male	208	53.3
	Female	182	46.7
Educational Qualification	Secondary (up to Class 10)	3	0.8
	Higher Secondary	18	4.6
	Honors	120	30.8
	Masters and above	249	63.8
Occupation	Government Job	49	12.6
	Private Job	192	59.2
	Business	54	13.8
	Housewife	64	16.4
	Others	31	7.9
Socioeconomic Status	Lower Class	3	0.8
	Lower Middle Class	46	11.8
	Middle Class	274	70.3
	Upper Middle Class	64	16.4
	Upper Class	3	0.8
Type of Family	Nuclear	227	58.2
	Joint	163	41.8

Measures

Personal Information Form

A Personal Information Form (PIF) was used to gather the socio-demographic data of the participants. Which included information about the participant's age, gender, family type, social class, occupation, educational qualification etc. A question about conflict with spouse (5-point Likert type) was included to measure the frequency of conflict in this section. Although "conflict with spouse" was included in the Personal Information Form as a single-item measure, it was excluded from the multivariable regression analyses. This decision was made a priori because single-item measures can be psychometrically less stable and may inflate measurement error; therefore we preferred to preserve the regressions' measurement reliability.

The Enrich Marital Satisfaction Scale

The Enrich Marital Satisfaction scale was developed by Fowers and Olson (1993). This scale assesses a person's overall satisfaction in the marital relationship. This self-report instrument consists of 15 items evaluated on a 5-point Likert scale, where 1 indicated total disagreement to the statement, and 5 indicated total agreement. This scale has two subscales: 10 items measure Marital Satisfaction, and 5 items measure Idealistic Distortion. Elevated scores signify more marital satisfaction.

The original scale was translated into Bangla following a standard translation-back translation procedure to ensure linguistic and conceptual equivalence. The Bangla version was created using a forward-backward translation procedure, including six translators with expertise in psychological research, and piloted among a small sample of the target population. The Bangla version of this scale has a good test-retest reliability score of .878. Internal consistency of the Bangla version was satisfactory, with Cronbach's alpha values of .913 for the total scale, .894 for the marital satisfaction subscale, and .838 for the idealistic distortion subscale.

Beck Depression Inventory-II

Depression was measured using the Bangla version of Beck Depression Inventory-II (BDI-II) (Alim et al., 2020). This scale has 21 items rated on a 4-point Likert scale to measure the level of severity of depression. Each item could be rated from 0 (symptom not present) to 3 (symptom strongly present). The total score of this scale ranges from 0 to 63. Scores between 0-13 indicate minimal depression, 14-19 mild depression, 20-28 moderate depression, and 29-63 severe depression (Beck et al., 1996). The Bangla version of BDI-II uses the same severity score as the original. The Bangla adaptation has demonstrated excellent internal consistency (Cronbach's α = .993) and strong test–retest reliability (r = .960, Cronbach's α = .979). A partial confirmatory factor analysis revealed two distinct factors corresponding to Cognitive and Somatic-affective symptoms.

Procedure

About 390 married individuals living in Dhaka City were selected to participate in this study using a purposive sampling. This study was a part of an ongoing baseline survey of a PhD research, and the data were collected from February to April 2025. Before data collection, the goal and nature of the study were explained to each participant to collect their verbal and written consent. Participants were recruited through community centers, workplace contacts, and social networks in Dhaka city using purposive sampling. Prior to the data collection, they were assured that their provided information would be used only for research, and this information would be secured with high confidentiality. There was no time limit to complete the research instrument, but every participant took 30-40 minutes to complete the questionnaires. Each participant was provided with a pen and a chocolate as a token gift for participating in this study after data collection.

Data Processing and Statistical Analysis

At first, responses were scored according to the scoring guideline of the questionnaire. The data were analyzed using IBM SPSS Version 26, and the figures were created using R Studio software. Descriptive statistics, Pearson product-moment correlations, independent samples t-tests, one-way ANOVA, and multiple regression analyses were conducted to examine the relationships among study variables.

Ethical Consideration

The ethical standards of the institutional research committee were maintained for this study. The 1964 Helsinki Declaration was followed to conduct the following research. Also, Ethical approval for this study was obtained from the Ethical Review Board of the Faculty of Biological Science, University of Dhaka (Ref. No.230/Biol.Scs.) for the PhD study titled "Effects of Emotional Intelligence Training on Marital Satisfaction and Mental Health among Married People in Dhaka City".

Results

Before conducting a parametric analysis, the normality assumptions of the collected data were assessed. According to the guidelines of George and Mallery (2010) and Kline (2011), skewness and kurtosis values within the range of ±2 indicate the data is normally distributed (George, 2010; Kline, 2011). The skewness and kurtosis values of all the continuous variables in this study fall within the range of ±2. Therefore, all variables were considered to be approximately normally distributed, and *t*-test, ANOVA, Pearson correlation, and multiple regression analysis were performed.

Table 2
Descriptive Statistics of Study Variables (N = 390)

Variable	Min	Max	*M*	*SD*	Skewness	Kurtosis
Marital Satisfaction	10	50	35.97	8.160	-.502	.334
Depression	0	61	13.90	11.890	1.197	1.252
Age	21	55	34.14	5.265	.443	1.786
Conflict with spouse	1	5	2.13	1.077	.742	.044

Independent Sample *t*-test

To examine differences in marital satisfaction and depression based on gender and family type, an independent samples t-test was conducted. From the analysis, it was evident that there is no significant difference between males ($M = 35.83$, $SD = 7.66$) and females ($M = 36.13$, $SD = 8.72$) in marital satisfaction, $t(388) = –0.361$, $p = .718$. However, a significant

gender difference was found in depression, with females (M = 15.69, SD = 12.90) having higher levels of depression than males (M = 12.32, SD = 10.71), $t(386) = –2.808$, $p = .005$. In case of family structure, a significant difference was found in participants from joint families (M = 37.37, SD = 7.74) than those from nuclear families (M = 34.96, SD = 8.32), $t(388) = –2.914$, $p = .004$. In contrast, the difference in depression scores between nuclear (M = 13.62, SD = 11.65) and joint families (M = 14.29, SD = 12.24) was not statistically significant, $t(386) = –0.547$, $p = .584$.

Table 3

Independent Samples t-test Comparing Marital Satisfaction and Depression by Gender and Type of Family (N = 390)

Variable	Group	*N*	*M*	*SD*	*t*	*df*	*p*
Marital Satisfaction	Male	208	35.83	7.66	–0.361	388	.718
	Female	182	36.13	8.72			
	Nuclear	227	34.96	8.32	–2.914	388	.004 **
	Joint	163	37.37	7.74			
Depression	Male	206	12.32	10.71	–2.808	386	.005 **
	Female	182	15.69	12.90			
	Nuclear	226	13.62	11.65	–0.547	386	.584
	Joint	162	14.29	12.24			

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

One-way ANOVA

One-way ANOVAs were conducted to examine whether marital satisfaction and depression differed significantly according to educational qualification, occupation, and socioeconomic status. Table 4 indicates that there is no significant difference exists in marital satisfaction across educational groups, $F(3, 386) = 0.98$, $p = .402$, nor in depression, $F(3, 384) = 0.05$, $p = .986$. But the effect of occupation on marital satisfaction was not statistically significant, $F(4, 385) = 2.24$, $p = .064$. However, results also revealed a significant difference in depression across occupational groups, $F(4, 383) = 2.45$, $p = .046$. Post hoc analyses using Tukey HSD revealed that housewives (M = 17.22, SD = 13.95) reported significantly higher depression levels than individuals involved in business (M = 10.87, SD = 9.07), $p = .031$.

Table 4 also indicated a significant difference in marital satisfaction according to socioeconomic status, $F(4, 385) = 2.77$, $p = .027$. Results showed that participants from the middle class (M = 36.41, SD = 8.20) reported significantly higher marital satisfaction compared to those from the lower middle class (M = 32.80, SD = 7.85), $p = .043$. No significant differences were found in depression among the socioeconomic groups, $F(4, 383) = 0.74$, $p = .568$.

Table 4
One-Way ANOVA Summary Table for Marital Satisfaction and Depression Based on Educational Qualification, Occupation, and Socioeconomic Status

Factor	Variable	Source	SS	*df*	MS	*F*	*p*
Educational Qualification	MS	BG	195.65	3	65.22	0.98	.402
		WG	25706.92	386	66.60		
	Depression	BG	20.73	3	6.91	0.05	.986
		WG	54692.35	384	142.43		
Occupation	MS	BG	589.82	4	147.46	2.24	.064
		WG	25312.75	385	65.75		
	Depression	BG	1362.91	4	340.73	2.45	.046*
		WG	53350.17	383	139.30		
Socioeconomic Status	MS	BG	723.24	4	180.81	2.77	.027*
		WG	25179.33	385	65.40		
	Depression	BG	417.02	4	104.25	0.74	.568
		WG	54296.07	383	141.77		

Note: BG = Between Groups; WG = Within Groups; MS = Marital Satisfaction; D = Depression; SS = Sum of Squares; *df* = degrees of freedom; MS = Mean Square; *p* = probability value. * $p < .05$.

Pearson's Correlation Coefficient Analysis

Table 5 indicates that marital satisfaction has a strong negative correlation with conflict with spouse ($r = –.660$, $p < .01$), which suggests that greater conflict was linked with lower satisfaction. A small but significant negative relation was found between marital satisfaction and age ($r = –.104$, $p < .05$), suggesting that older participants tended to report slightly lower marital satisfaction. No significant relationships were found between marital satisfaction and either the number of children or the duration of marriage. Depression was found to be positively correlated with conflict with spouse ($r = .423$, $p < .01$), indicating that individuals having more conflict with their spouse experienced higher levels of depressive symptoms. Depression was strongly and negatively correlated with marital satisfaction ($r = –.530$, $p < .01$), suggesting that higher marital satisfaction was associated with lower levels of depression. This relationship is visually illustrated in Figure 1, with gender shown for reference.

Additionally, depression had a small but significant negative correlation with the number of children ($r = –.108$, $p < .05$), while its associations with age and duration of marriage were not statistically significant

Table 5

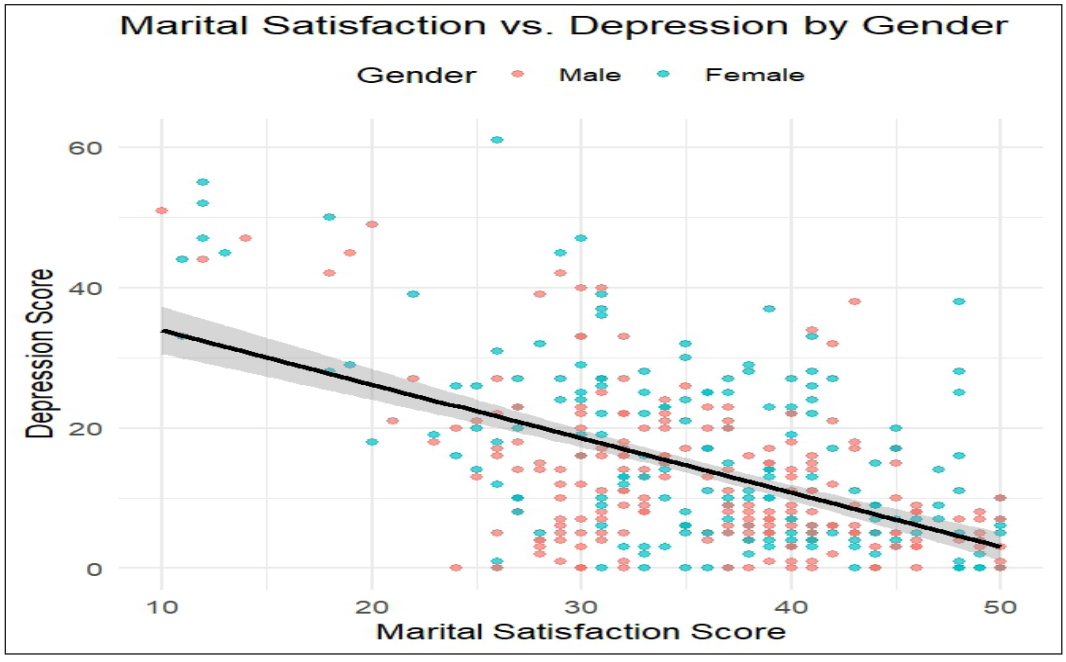
Correlations among the Variables

Variable	1	2	3	4	5	6
1. Age (in years)	—					
2. Number of Children	.409**	—				
3. Conflict with Spouse	.099*	.090	—			
4. Duration of Marriage	.707**	.456**	.069	—		
5. Marital Satisfaction	–.104*	–.006	–.660**	–.004	—	
6. Depression Total	–.091	–.108*	.423**	–.090	–.530**	—

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

Figure 1

Scatterplot of Marital Satisfaction and Depression Scores by Gender



Note. Each dot represents one participant. Marital satisfaction scores are plotted against depression scores, colored by gender. The linear regression line is presented by the black line with a 95% confidence band. The plot illustrates a significant negative association.

Multiple Regression

Prior to interpreting the regression coefficients, diagnostic statistics were examined. All Variance Inflation Factor (VIF) values were below 2.0 and tolerance values exceeded

.50, indicating no multicollinearity concerns. Examination of residuals confirmed that the assumptions of normality, linearity, and homoscedasticity were reasonably met. Table 6 reveals that depression was significantly predicted by marital satisfaction, gender, and type of family. Higher marital satisfaction was associated with lower levels of depression (β = –.55, $p < .001$). Gender was a significant predictor ($B = 3.690$, $\beta = .155$, $p = .001$), indicating that females had higher depression scores than males. Marital satisfaction ($B = –0.802$, β = –.551, $p < .001$) remained the strongest negative predictor, meaning that for every 1-point increase in marital satisfaction, depression scores decreased by 0.80 points. This table also indicates that participants from joint families had higher depression scores compared to those from nuclear families ($\beta = .12$, $p = .006$). But occupation and socioeconomic status were not found to be significant predictors. The overall model explained approximately 32% of the variance in depression scores, $R^2 = .318$, $F(5, 382) = 35.56$, $p < .001$.

Table 6

Multiple Regression Predicting Depression from Marital Satisfaction, Gender, Type of Family, Occupation, and Socioeconomic Status

Predictor	B	SE B	β	t	p
Marital Satisfaction	-0.802	0.063	-0.551	-12.80	< .001
Gender	3.690	1.097	0.155	3.36	.001
Type of Family	2.853	1.032	0.118	2.77	.006
Occupation	0.026	0.465	0.003	0.06	.955
Socioeconomic Status	0.053	0.896	0.003	0.06	.953

Note. $R^2 = .318$, Adjusted $R^2 = .309$, $F(5, 382) = 35.56$, $p < .001$.

Discussion

This study was designed to explore the association between marital satisfaction and depression among married individuals in Dhaka city. The findings of this study revealed a significant negative correlation between marital satisfaction and depression. This result indicated that higher levels of marital satisfaction are associated with lower levels of depressive symptoms. This finding is consistent with earlier studies and the Marital Discord Model of Depression (MDMD), which suggests that marital dissatisfaction leads to depressive symptoms (Maroufizadeh et al., 2018; Wang et al., 2013).

This study has another objective, which is to find out the contribution of sociodemographic factors in marital satisfaction and depression among married individuals in Dhaka city. The result of the t-test unveiled that females have suffered much more depression than males, but no significant gender difference was found in marital satisfaction. It is being observed that South Asian women are more vulnerable to depression due to the culture of this region (Fincham et al.,1997); (MANGAI, 2019). Some studies disprove the belief

that a joint family always creates stress and more tension. Although joint families reported higher marital satisfaction, they also showed higher depression after controlling for other variables (MANGAI, 2019). This may reflect unique stressors in joint-family settings—such as in-law conflicts or caregiving responsibilities—that increase depressive symptoms without reducing marital satisfaction. It may also be a suppression effect due to overlapping predictors (Munaf &Siddiqui, 2013; Mukherjee et al., 2016).

The regression results indicated that family type was a statistically significant predictor of depression, although its effect size was relatively small compared to marital satisfaction. In terms of socioeconomic status (SES) and Occupation, the results indicated a significant effect on marital satisfaction, with individuals from middle-class families reporting higher satisfaction than those from lower middle-class backgrounds. It is because by acquiring financial stability, it helps couples to achieve shared goals, reduce unnecessary conflict among themselves, and nurture harmony (Dalhatu & Muhammad, 2024).

However, SES does not have a significant association with depression, but occupation has a noteworthy relation with depression. Specifically, housewives had higher depression rates than individuals who own a business or are engaged in a job. Full-time homemakers, especially in urban regions, often experienced limited autonomy, economic dependence, and emotional burden (Islam et al., 2016).

Age showed a slight negative correlation with marital satisfaction, indicating that older participants reported slightly lower satisfaction. Although some studies (e.g., Wilmoth et al.) found a curvilinear age–satisfaction relationship, our data showed a linear, non-significant pattern. Future studies should test potential curvilinear or non-linear effects using larger and more age-diverse samples.

Lastly, multiple regression analysis confirmed that marital satisfaction, gender, and family type were significant predictors of depression. Marital satisfaction emerged as the strongest predictor, reinforcing the central hypothesis of this study. Together, these predictors described almost 32% of the variance in depression, highlighting the multifaceted nature of emotional distress in marriage. However, although conflict with spouse had a significant correlation with marital satisfaction and depression, it was not included in the regression model. Because it was measured by a single item.

Although one-way ANOVA results revealed significant differences in depression scores across occupational groups, occupation did not emerge as a significant predictor in the multiple regression analysis. The discrepancy between ANOVA and regression results likely reflects overlap between occupation and other sociodemographic variables, reducing occupation's unique effect in the multivariate model. This can be explained by the fact that ANOVA examines unadjusted mean differences between groups, whereas regression analysis estimates the unique effect of occupation after controlling for other predictors . The effect of occupation may overlap with these variables, thereby reducing its unique contribution in the regression model. Future studies with larger and more diverse samples may further clarify the independent role of occupation in predicting depression.

We note that the cross-sectional design precludes causal inferences. While we interpret results in light of theoretical models such as the Marital Discord Model of Depression, all findings should be understood as associations.

Limitations

Despite offering valuable insights, the present study has some limitations:

1. The use of non-random, purposive sampling is a limitation of this study because it limits the generalizability of the results to the larger population of Bangladesh.
2. All data were collected through self-report questionnaires; therefore, social desirability biases may influence the responses of the participants.
3. The study was limited to participants living in Dhaka city. Therefore, the findings may not represent the experiences of married individuals in rural or urban areas.
4. The study did not collect data on partners' psychiatric conditions, caregiving responsibilities, or chronic illness of family members, which may influence levels of depression. Future research should control for these variables to minimize potential confounding effects. These unmeasured variables may have confounded or inflated the observed association between marital satisfaction and depression.
5. Because conflict with spouse was measured by a single item, it was excluded from multivariate models. Future studies should include multi-item conflict measures to test its effect.

Conclusion

The study found a negative relationship exists between marital satisfaction and depression among married individuals in Dhaka city. Higher marital satisfaction was linked to lower depression levels. Sociodemographic factors like gender, family type, occupation, and socioeconomic status influenced these outcomes. These findings highlight the importance of marital satisfaction to promote mental well-being.

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Anxiety and Mental Health among Secondary School Students in Dhaka City: Role of Socio-demographic Factors

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Abstract

The objective of this study was to investigate the relationship of anxiety, mental wellbeing, and socio-demographic influences in adolescents. Data were collected from 499 high school students (12-17 years, 34.3 % male and 65.7 % female) of four Bangla-medium schools in Dhaka city using the Bangla version of the Beck Anxiety Inventory for Youth (BAI-Y), the Mental Health Continuum-Short Form (MHC-SF), and a demographic questionnaire during regular school hours. Correlation analysis demonstrated that anxiety was negatively associated with overall mental health and its emotional and social dimensions. Independent sample t-tests revealed that male students and those from joint families exhibited better wellbeing but higher anxiety. Similar patterns were observed among students involved in extracurricular activities or bearing additional familial responsibilities. One-way ANOVA indicated significant differences across class levels, with Class 10 students showing notably lower anxiety and wellbeing than their junior peers. Students perceived socioeconomic status showed small yet meaningful differences in their social and overall wellbeing. Multiple regression analyses showed that socio-demographic factors accounted for 10.3% of the variance in anxiety—predicted by gender, participation in extracurricular activities, and additional family responsibilities—and 7.8% of the variance in mental wellbeing, predicted by gender, family structure, perceived socio-economic status, and participation in extracurricular activities. Results highlight the need for school-based mental health programs that consider variations in grade level, gender, and familial responsibilities, as these factors significantly influence adolescents' anxiety and wellbeing, while considering the potential influence of additional factors on adolescent mental health.

Keywords: anxiety, mental health, socio-demographic factors, secondary school students

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Introduction

Adolescence is a crucial period of development with rapid physical, emotional and social changes, making young people prone to mental health difficulties (Das & Sajib, 2022; Sawyer et al., 2012). Anxiety, a widespread concern during adolescence, frequently develops in the presence of academic stress, familial and social issues, relationship with peers, and dilemmas of self-identity (Costello et al. 2003; Patel et al. 2007). When left untreated, teen anxiety can interfere with every aspect of life - learning, relationships, and long-term mental health (Izadinia et al., 2010). Mental health can be defined not only in terms of absence of mental illness, but presence of positive psychological, emotional and social functioning (Keyes 2002). In this regard, Keyes (2002, 2005) has developed a broader framework, the Mental Health Continuum (MHC), which categorizes that individuals can be languishing (low mental health), moderately mentally healthy or flourishing (high mental health). The MHC posits that mental health and mental illness represent related yet separate continua (Keyes, 2005). It suggests that an adolescent might not hit the mark for one of the anxiety disorders but still have subclinical difficulties which chip away at overall functioning and mire an individual somewhere at the languishing end. Therefore, characterizing where adolescents fall in the spectrum of the MHC and how anxiety intertwines with their MHC status is critical for buttressing the development of resiliency-focused, school-based approaches to mental health that target distress and wellbeing.

Malak and Khalifeh (2017) found that among 800 students from 10 public schools in Jordan, 42.1% of students reported anxiety symptoms, suggesting that adolescent anxiety is a global public health concern. The prevalence of anxiety was investigated among 11,924 Canadian middle and secondary school students by Tramonte and Willms (2010), and they discovered girls showed higher levels of anxiety. One recent study (Alharbi et al., 2019) with 1,245 Saudi Arabian high school students, aged 13–19, found that 36.5% reported no anxiety, followed by 34.1% with mild anxiety, 19.5% showed moderate anxiety, and 9.8% showed severe anxiety among whom females had higher rates of anxiety than males. A cross-sectional study with 146 school students in Jamshedpur, India found that 11% of high school students with a high level of anxiety, significantly higher among girls (Bakhla et al., 2013). A further investigation with 460 Indian high school students, aged 13 to17 years, indicated that 20.1% of the boys and 17.9% of the girls manifested with high level anxiety, with the Bengali-medium students and middle-income families reporting more anxiety (Deb et al., 2010).

Although there is increasing interest in mental health of adolescents all over the world, several recent studies in Bangladeshi school setting have emphasized the rising issue of adolescent mental health. For instance, in a cross-sectional study among 563 students of secondary schools in Dhaka city, aged 13–18 years, 18.1% had moderate to severe anxiety symptoms (Islam et al., 2021). Anjum et al. (2022) reported that 20.1% out of 2,313 adolescent students from nine high schools in Dhaka city had moderate to severe anxiety with females having considerably higher anxiety. Age, grade, parental education, family size and living in urban/rural areas emerged as significant predictors of

anxiety, as well as lifestyle factors such as infrequent physical activity, high screen time, sleep dissatisfaction and underweight body image. Khan and Khan (2020) revealed that 4.7% of 2,989 Bangladeshi adolescents suffered from anxiety, with a higher rate among female adolescents than males. Feeling of loneliness, being bullied by peers, and exposure to physical violence were reported as significant psychosocial risk factors, while poor parent–child communication and inadequate peer support had appeared as crucial socio-environmental determinants. A more recent study by Karim et al. (2025) with 260 high school students in a rural district of southern Bangladesh claimed that 22.3% of adolescents experienced moderate to acute levels of anxiety symptoms. Being female, insufficient and poor quality of sleep, overuse of social media, and unsatisfactory academic performance were stated as noteworthy predictors of intensified anxiety.

Along with individual gender, a variety of socio-demographic and lifestyle factors have been found to play considerable role in forming adolescents' mental health across different cultural and national contexts. Though majority of the studies indicated that female adolescents show higher vulnerability towards anxiety and wellbeing outcomes (Tramonte & Willms, 2010; Bakhla et al., 2013; Alharbi et al., 2019; Anjum et al., 2022; Khan & Khan, 2020; Karim et al., 2025), some studies have also reported better mental health among female adolescents compared to males (Agarwal & Bahadur, 2023; Deb et al., 2010). However, no significant gender difference was reported by Shaheen and Shaheen (2016) for secondary school students' psychological wellbeing in India. Another two factors which are also crucial for mental health are family structure and socio-economic condition. Emotional adjustment of adolescents can be affected by their family structure, as adolescents from joint families hold greater social maturity, emotional stability, personal and interpersonal competency than those from nuclear families (Singh et al., 2014; Agarwal & Bahadur, 2023). On the other hand, extended or joint family systems can also contribute to stress with role overlaps, disharmony, loss of control and limited privacy (Fingerman, 2016). In a cohort study involving 2,111 participants aged 7 to 17 years, Reiss et al. (2019) found that lower socioeconomic status (SES) was significantly associated with higher levels of mental health problems in young people. Anjum et al. (2022) reported adolescents' class or grade level as a significant predictor of mental health as it is linked to academic pressure of students.

The growing culture of engaging in private tuition before or after classes has mixed effects on students and their families. While it can boost confidence, motivation, discipline, and provide emotional support, it may also increase academic stress, reduce family and leisure time, impose financial burdens, and promote unhealthy comparison, competition and peer-related pressure, potentially leading to mental health issues (Tabassum et al., 2014; Kim et al., 2022; Fan et al., 2025). Moreover, Mudunna et al., (2025) reported that participation in extracurricular activities such as joining debate club, science club, or photography club; engaging in music, dance, drama, or art and crafts classes; practicing yoga; or taking part in sports like football, cricket, basketball, or volleyball etc. can promote better mental health outcomes. However, intensive involvement or performance pressure

in such activities may also elevate anxiety, suggesting a complex interaction between role strain and the social support benefits these activities offer (Mudunna et al., 2025; Fredricks, 2012). On the other hand, bearing additional familial responsibilities such as cleaning, cooking, washing dishes, laundry, sweeping, grocery shopping, caring for siblings or elderly family members etc. may influence adolescents' mental health in both positive and negative ways. While moderate involvement in everyday household chores can boost mental wellbeing (Castillo-Miñaca et al., 2025), excessive caregiving responsibilities are connected to higher anxiety, depression, and poor academic performance (Armstrong-Carter et al., 2025).

While earlier Bangladeshi studies have observed the prevalence and correlates of adolescent anxiety, no study have integrated the MHC framework to examine how socio-demographic and lifestyle factors collectively shape both negative (anxiety) and positive (emotional, social, and psychological wellbeing) dimensions of adolescent mental health. Addressing this gap, the present study employs the MHC model to investigate how anxiety is interrelated to overall wellbeing among secondary school students in Dhaka City, considering gender, family structure, perceived socioeconomic status, class level, engagement in private tuition, extracurricular activities, and additional household responsibilities. Output from this study is expected to apprise the design and implementation of context-specific evidence-based interventions for the Bangladeshi adolescents.

Objectives of the study

The study aimed to: (i) examine correlations between anxiety and students' positions on the MHC; (ii) assess group differences in anxiety and mental health across gender, family structure, perceived socioeconomic status, class-level, private tuition, extracurricular activities, and additional familial responsibilities; and (iii) evaluate predictive power of the mentioned socio-demographic variables in explaining variations in students' anxiety level and mental health conditions.

Research Questions

The research questions of the study were: (i) What is the relationship between anxiety and adolescents' positions on the Mental Health Continuum (MHC)? (ii) Do anxiety and mental health significantly differ across gender, family structure, perceived socioeconomic status, class level, private tuition involvement, extracurricular participation, and additional familial responsibilities? and (iii) To what extent do these socio-demographic and lifestyle factors predict variations in anxiety and mental health among Bangladeshi adolescents?

Method

Ethical Considerations

Ethical approval for the present study was obtained as part of the doctoral research project titled "*Promoting Mental Health of Secondary School Teachers and Students Through Enhancing Their Emotional Intelligence in Dhaka City*", approved by the Ethical Review Committee of the Faculty of Biological Sciences, University of Dhaka (Ref. No. 217/Biol. Scs. & Date: August 30, 2023). Following approval from school authorities, the purpose and procedures of the study were explained to students in their classrooms in the presence of teachers. Parental or guardian consent forms were distributed to the students to take home, and only those who returned signed consent forms were eligible to participate. On the scheduled day of data collection, written assent was obtained from the students whose parents or guardians had provided consent. Both the parents/ guardians and students were informed that participation was voluntary, and their personal information would remain confidential. Participants were allowed to pause or discontinue participation at any point. For additional support to maintain wellbeing, up to two free support sessions were offered if required, along with a list of accessible mental health organizations for all.

Participants and Sampling

The study was conducted between April and June 2025 in four Bangla-medium schools of Dhaka city, with two schools from Dhaka North City and two from Dhaka South City. Schools were selected through convenience sampling based on their willingness to participate and availability of administrative approval. The preliminary sample comprised 506 students. After the first screening, the incomplete responses and extreme outliers were removed and the final sample comprised 499 students (34.3% male and 65.7% female, aged between 12 and 17 years) for whom we retained the data for analysis. Sample demographic characteristics are presented in Table 1. Age is reported as mean ± standard deviation.

Table 1
Demographic Characteristics of the Sample (N = 499)

Variable	Category	*n*	%
Gender	Male	171	34.3
	Female	328	65.7
Class level	Class 7	85	17.0
	Class 8	142	28.5
	Class 9	136	27.3
	Class 10	136	27.3
Family structure	Nuclear	328	65.7
	Joint	171	34.3

Variable	Category	*n*	%
Perceived socioeconomic status (SES)	Very Low	21	4.2
	Low	118	23.6
	Average	252	50.5
	High	98	19.6
	Very High	10	2
Private tuition	Yes	350	70.1
	No	149	29.9
Extracurricular activities	Yes	309	61.9
	No	190	38.1
Additional familial responsibilities	Yes	274	54.9
	No	225	45.1

Note. Age (years): Mean ± *SD* = 14.21 ± 1.26.

Procedure

Before data collection, permission was obtained from the school official. The students were selected using convenience sampling and participated on a voluntary basis with assurance of confidentiality. The questionnaires were filled out during normal school hours in classrooms under researchers' observation, and friendly atmosphere was preserved. All ethical guidelines for human subjects were duly followed.

Measures

Beck Anxiety Inventory- Youth

The BAI-Y (Beck et. *a*l., 2005) is a 20-item self-report questionnaire designed to measure anxiety symptoms in individuals aged 7 to 18 years based on a 4-point Likert scale ranging from 0 (never) to 3 (always). Higher scores indicate severe levels of anxiety. The BAI-Y is one of the five measures included in Beck Youth Inventories–Second Edition (BYI-II) that has shown good psychometric quality. Internal consistency was good, with Cronbach's alpha of .86 to .91 for ages 7–10, .86 to .92 for ages 11–14, and .91 to .96 for ages 15–18. Test–retest reliability with a subsample of 105 youth and one week interval demonstrated correlation coefficients between .74 and .93. For the Bangla version (Uddin et al., 2011), satisfactory psychometric properties have been demonstrated with internal consistency coefficients that ranged between .85 for males and .88 for females. Test-retest reliability was .79 with a 10-day interval. The Cronbach's alpha of the BAI-Y was 0.96 for the present sample.

Mental Health Continuum -Short Form (MHC-SF)

The MHC-SF (Keyes et al., 2008) was used to assess students' position on the MHC. It is a 14-item self-report measure in which individuals rate their emotional (EWB), social (SWB) and psychological wellbeing (PWB), using a 6-point Likert type scale ranging from 0 (never) to 5 (every day). Subscale scores (EWB: 0–15; SWB: 0–25; PWB: 0–30) and a total wellbeing score (0–70) can be computed. Higher scores indicate better mental wellbeing. Internal consistency is good (α >.80). The MHC-SF Bangla (Hiramoni and Ahmed, 2022) has good psychometric properties and is a reliable (α = 0.80–0.86) and valid (*AVE* = 0.55–0.63) instrument to measure mental wellbeing in adolescents and adults in Bangladesh. For the present sample, Cronbach's alpha was .91 for the total scale and .87, .81, and .85 for the emotional, social, and psychological wellbeing subscales, respectively.

Personal Information Form

It was used to collect demographic information, including students' age, gender (male or female), class level, family structure (joint or nuclear), perceived socio-economic status, participation in private tuition, involvement in extracurricular activities, and additional familial responsibilities. For items on private tuition, extracurricular activities, and familial responsibilities, students provided dual response options (Yes or No). Perceived socioeconomic status (SES) was measured using a single subjective item: "How would you rate your family's socioeconomic position on a scale from 1 to 5, where 1 indicates very low and 5 indicates very high?" This item was projected to obtain students' self-perceived social and economic standing.

Results

Data analysis was carried out using IBM SPSS (Version 25). Outliers and incomplete data were excluded prior to the analysis. Normality of the study variables was assessed using skewness and kurtosis values, which were found to be within the acceptable range (–3 to +3; Kline, 2011), indicating approximate normal distribution. Descriptive statistics (mean, standard deviation, skewness, and kurtosis values) for all continuous study variables are presented in Table 2.

Table 2

Descriptive Statistics and Tests of Normality for Study Variables (N = 499)

Variable	Mean	Standard Deviation	Skewness	Kurtosis
Anxiety	32.69	15.67	0.30	–0.43
Emotional Wellbeing	9.65	4.09	–0.53	–0.77
Social Wellbeing	12.80	6.15	0.23	–0.64
Psychological Wellbeing	18.66	7.06	–0.24	–0.81
Overall Mental Health	41.12	14.91	–0.21	–0.55

Correlations among Anxiety and Mental Health Variables

Pearson product-moment correlation coefficients were computed to assess the relationships among anxiety and mental health (Table 3). Results indicated that anxiety was negatively correlated with overall mental health, (r = -.16, p < .001) and its two dimensions emotional (r = -.18, p < .001) and social wellbeing (r = -.19, p < .001). Strong, positive, and significant correlations were observed among overall wellbeing and its three dimensions. The strongest association was found between psychological wellbeing and overall wellbeing.

Table 3

Intercorrelations among Anxiety and Mental Health Variables (N = 499)

Variables	1	2	3	4	5
1. Anxiety	—				
2. Emotional Wellbeing	–.18**	—			
3. Social Wellbeing	–.19**	.51**	—		
4. Psychological Wellbeing	–.07	.64**	.64**	—	
5. Overall Wellbeing	–.16**	.79**	.85**	.91**	—

Note. **p < .01.

Group Differences in Anxiety and Mental Health by Gender and Family Structure

Independent sample t-tests were conducted to examine group differences in anxiety and mental health by gender and family structure (Table 4). Results revealed that male students reported significantly higher anxiety (M = 36.77, SD = 12.90) and overall wellbeing (M = 44.94, SD = 14.01), as well as higher emotional, social, and psychological wellbeing scores than female students, with small-to-moderate effect sizes (d = 0.31–0.42). Students from joint families scored significantly higher on anxiety (M = 35.33, SD = 15.35), overall wellbeing (M = 43.84, SD = 14.00), and its subdomains compared to students from nuclear families, with smaller effect sizes (d = 0.23–0.28).

Table 4

Group Differences in Study Variables by Gender and Family Structure (N = 499)

Variable	Group	Mean	*SD*	*t*	*p*	Cohen's *d*	95% CI (Lower-Upper)
Anxiety	Male	36.77	12.90	3.74	< .001	0.40	2.587 - 8.320
	Female	30.56	16.65				
	Joint	35.33	15.35	2.18	.048	0.23	.319 - 6.104
	Nuclear	31.70	15.74				

Variable	Group	Mean	*SD*	*t*	*p*	Cohen's *d*	95% CI (Lower-Upper)
Emotional Wellbeing	Male	10.76	3.77	4.45	< .001	0.42	.940 - 2.428
	Female	9.08	4.14				
	Joint	10.26	4.05	2.42	.016	0.23	.173 - 1.682
	Nuclear	9.34	4.08				
Social Wellbeing	Male	14.06	6.41	3.34	.001	0.31	.791 - 3.045
	Female	12.15	5.91				
	Joint	13.76	6.21	2.52	.012	0.24	.323 - 2.588
	Nuclear	12.30	6.06				
Psychological Wellbeing	Male	20.12	6.48	3.36	.001	0.32	.919 - 3.510
	Female	17.90	7.24				
	Joint	19.82	6.48	2.660	.008	0.25	.460 - 3.061
	Nuclear	18.06	7.28				
Overall Wellbeing	Male	44.94	14.01	4.20	< .001	0.40	3.098 - 8.535
	Female	39.13	15.00				
	Joint	43.84	14.00	2.97	.003	0.28	1.402 - 6.886
	Nuclear	39.70	15.20				

Note. SD = Standard Deviation. Cohen's *d* was computed for all t-tests. Sample sizes were: Gender – Male = 171, Female = 328; Family Structure – Joint = 171, Nuclear = 328. Degrees of freedom for all comparisons = 497.

Group Differences in Anxiety and Mental Health by Private Tuition, Extracurricular Activities, and Additional Family Responsibilities

To explore differences in study variables based on students' engagement in private tuition, participation in extracurricular activities and bearing additional familial responsibilities, a number of independent sample *t*-tests were carried out (see Table 5). No significant differences were observed in any research variable among students who got private tuition and those who did not. Students who participated in extracurricular activities reported significantly higher scores in overall wellbeing ($t(497) = 3.613$, $p < .001$, $d = 0.33$) and its three domains—emotional, social, and psychological wellbeing—than those who did not. Interestingly, these students also experienced higher levels of anxiety($t(497) = 5.685$, $p < .001$, $d = 0.52$) than their non-participating counterparts. Similarly, students with additional family responsibilities reported significantly higher anxiety ($t(497) = 4.835$, $p < .001$, $d = 0.44$) compared to those without such responsibilities, whereas they scored significantly higher in psychological ($t(497) = 2.95$, $p = .003$, $d = 0.27$) and overall wellbeing ($t(497) = 2.539$, $p = .011$, $d = 0.23$) than their counterparts without these responsibilities. No significant differences were found for emotional or social wellbeing.

Table 5

Group Differences in Study Variables by Private Tuition (PT), Extracurricular Activities (ECA) and Additional Familial Responsibilities (AFR) (N = 499)

Variable	*N* Yes (No)	*M* Yes (No)	*SD* Yes (No)	*t*	*p*	*d*	95% CI Lower (Upper)
Anxiety							
PT	350 (149)	33.17 (33.32)	15.99 (14.96)	-.092	.927	.01	-3.155 (2.873)
ECA	309 (190)	36.25 (28.28)	15.13 (15.31)	5.685	<.001	.52	5.212 (10.718)
AFR	274 (225)	36.22 (29.56)	14.98 (15.74)	4.835	<.001	.44	3.958 (9.376)
Emotional Wellbeing							
PT	350 (149)	9.61 (9.77)	4.02 (4.25)	-.398	.691	.04	-.946 (.627)
ECA	309 (190)	10.09 (8.95)	3.99 (4.16)	3.048	.002	.28	.405 (1.875)
AFR	274 (225)	9.97 (9.27)	4.09 (4.07)	1.918	.056	.17	-.017 (1.425)
Social Wellbeing							
PT	350 (149)	12.61 (13.25)	6.14 (6.15)	-1.055	.292	.10	-1.815 (.547)
ECA	309 (190)	13.34 (11.93)	6.17 (6.02)	2.499	.013	.23	.301 (2.515)
AFR	274 (225)	13.18 (12.35)	6.19 (6.08)	1.492	.136	.13	-.261 (1.909)
Psychological Wellbeing							
PT	350 (149)	18.36 (19.38)	6.87 (7.47)	-1.477	.140	.14	-2.374 (.337)
ECA	309 (190)	19.56 (17.20)	6.77 (7.30)	3.670	<.001	.34	1.097 (3.623)
AFR	274 (225)	19.50 (17.64)	7.15 (6.83)	2.950	.003	.27	.621 (3.099)
Overall Wellbeing							
PT	350 (149)	40.58 (42.39)	14.59 (15.63)	-1.243	.215	.12	-4.677 (1.053)
ECA	309 (190)	42.99 (38.08)	14.24 (15.51)	3.613	<.001	.33	2.239 (7.577)
AFR	274 (225)	42.65 (39.26)	14.88 (14.78)	2.539	.011	.23	.766 (6.010)

Note. *M* = Mean, *SD* = Standard Deviation. Cohen's *d* was computed for all *t*-tests. Degrees of freedom for all comparisons = 497.

Class-Level Differences in Anxiety and Mental Health

Descriptive statistics and ANOVA results for study variables by class level are presented in Table 6. Significant differences were observed across class levels for all variables. Anxiety differed substantially, with Class 10 reporting notably lower anxiety scores ($M = 18.20$, $SD = 9.31$) compared to other classes (Class 7: $M = 39.80$, $SD = 14.50$; Class 8: $M = 40.23$, $SD = 14.39$; Class 9: $M = 36.79$, $SD = 12.35$), $F(3, 495) = 89.83$, $p < .001$, $\eta^2 = .35$, indicating a large effect (Cohen, 1988). Similarly, emotional, social, psychological and overall wellbeing differed significantly across classes ($\eta^2 = .09$, .05, .14, and .12, respectively), representing medium to large effects.

Table 6

Descriptive Statistics and ANOVA Results for Study Variables by Class Level (N = 499)

Variable	Class 7 (n = 85) M (SD)	Class 8 (n = 142) M (SD)	Class 9 (n = 136) M (SD)	Class 10 (n = 136) M (SD)	F (3, 495)	η^2
Anxiety	39.80 (14.50)	40.23 (14.39)	36.79 (12.35)	18.20 (9.31)	89.83***	.35
EWB	10.26 (4.09)	10.06 (4.07)	10.79 (3.40)	7.71 (4.12)	16.27***	.09
SWB	12.61 (5.84)	13.68 (6.43)	14.19 (6.37)	10.63 (5.18)	9.45***	.05
PWB	19.79 (7.01)	20.29 (6.42)	20.51 (6.48)	14.41 (6.57)	26.21***	.14
OWB	42.66 (14.27)	44.03 (14.12)	45.49 (13.68)	32.74 (14.07)	22.99***	.12

Note. ***p < .001, M = Mean, SD = Standard Deviation, EWB = Emotional Wellbeing; SWB = Social Wellbeing; PWB = Psychological Wellbeing; OWB = Overall Wellbeing; η^2 = effect size.

Table 7 presents the pairwise comparisons of anxiety and wellbeing across class levels. Results indicated that Class 10 students scored significantly lower than students in Classes 7–9 on all variables. Specifically, anxiety levels were substantially lower in Class 10 (mean differences = 18.596–22.034, p < .05), while emotional, social, and psychological wellbeing, as well as overall wellbeing, were also significantly reduced (mean differences ranging from 2.357 to 12.750, p < .05). These findings suggest that Class 10 students experience notably lower anxiety and wellbeing compared to their junior peers, highlighting a pronounced decline across all aspects of mental health in the final year students.

Table 7

Pairwise Comparisons Between Class Groups for Study Variables (N = 499)

Dependent Variable	(I) Class	(J) Class	Mean Difference (I–J)	SE
Anxiety	7	10	21.601*	1.75
	8	10	22.034*	1.52
	9	10	18.596*	1.53
Emotional Wellbeing	7	10	2.553*	0.54
	8	10	2.357*	0.47
	9	10	3.088*	0.48
Social Wellbeing	8	10	3.051*	0.72
	9	10	3.566*	0.73
Psychological Wellbeing	7	10	5.376*	0.91
	8	10	5.877*	0.79
	9	10	6.096*	0.80

Dependent Variable	(*I*) Class	(*J*) Class	Mean Difference (*I–J*)	*SE*
Overall Wellbeing	7	10	9.916*	1.94
	8	10	11.286*	1.68
	9	10	12.750*	1.70

Note. SE = Standard Error; *$p < .05$. Only significant pairwise comparisons are reported.

Differences in Anxiety and Mental Health by Perceived Socio-economic Status

One-way ANOVA was conducted to observe differences in study variables across students perceived socioeconomic condition (Table 8). No significant differences were found for anxiety, emotional or psychological wellbeing. Significant group differences were found only for social ($F(4, 494) = 2.90$, $p < .05$, $\eta^2 = .023$) and overall wellbeing ($F(4, 494) = 3.24$, $p < .01$, $\eta^2 = .026$), indicating small but meaningful effect sizes.

Table 8

Descriptive Statistics and ANOVA Results for Study Variables by Socio-Economic Status

Variable	Very Low (n = 21) M (SD)	Low (n = 118) M (SD)	Average (n = 252) M (SD)	High (n = 98) M (SD)	Very High (n = 10) M (SD)	F (4, 494)	η^2
Anxiety	33.00 (14.99)	32.55 (14.97)	33.49 (15.57)	33.77 (17.16)	29.20 (14.54)	0.267	.002
EWB	9.43 (3.83)	10.58 (3.56)	9.44 (4.15)	9.20 (4.43)	8.90 (4.68)	2.08	.017
SWB	12.05 (7.07)	14.30 (6.19)	12.55 (6.21)	12.13 (5.44)	9.70 (6.15)	2.90*	.023
PWB	17.76 (7.75)	20.17 (6.83)	18.36 (6.98)	18.17 (7.34)	15.20 (5.69)	2.29	.018
OWB	39.24 (16.59)	45.04 (14.37)	40.35 (14.82)	39.51 (14.99)	33.80 (12.14)	3.24**	.026

Note. *$p < .05$, **$p < .05$. *M* = Mean, *SD* = Standard Deviation, EWB = Emotional Wellbeing; SWB = Social Wellbeing; PWB = Psychological Wellbeing; OWB = Overall Wellbeing; η^2 = effect size.

Table 9 presents the significant pairwise comparisons for overall wellbeing, where differences were observed between Low vs. Average and Low vs. High SES groups. Although, the overall ANOVA for social wellbeing was significant, post-hoc comparisons using Tukey's HSD test did not reach significance, likely due to small effect size and unequal group sizes.

Table 9

Post Hoc Comparisons Between Socio-Economic Status Groups for Study Variables (N = 499)

Dependent Variable	(*I*) SES	(*J*) SES	Mean Difference (*I–J*)	*SE*
Overall Wellbeing	Low	Average	4.689*	1.65
	Low	High	5.532*	2.02

Note. SE = Standard Error. * p <.05. *Only significant pairwise comparisons are reported.*

Predictors of Students' Anxiety and Mental Health: Multiple Regression Analyses

Multiple linear regression analyses were conducted to examine the extent to which socio-demographic factors predicted adolescents' anxiety and overall mental health. All predictors were entered simultaneously in the regression models. Categorical variables were dummy coded with the first category as reference. Model diagnostics indicated no violations of assumptions, with VIF values below 1.1 and Durbin–Watson statistics within the acceptable range. The regression model for anxiety was significant, $F(6, 492) = 9.45$, $p < .001$, explaining 10.3% of the variance (Adjusted $R^2 = .092$), while the model for overall mental health was also significant, $F(6, 492) = 6.92$, $p < .001$, accounting for 7.8% of the variance (Adjusted $R^2 = .067$). The results are presented in Table 10.

Table 10

Model Summary and Fit Indices for Multiple Regression Predicting Anxiety and Mental Health (MH) (N = 499)

Model	R	R^2	Adjusted R^2	SE	Durbin-Watson	F	df (Regression, Residual)	*p*
Anxiety	.321	.103	.092	14.93	1.41	9.45	6, 492	< .001
MH	.279	.078	.067	14.41	1.92	6.92	6, 492	< .001

Note. Predictors: Gender, Family structure, SES, Private tuition, Extracurricular activities, Additional family responsibilities. The model was statistically significant, indicating that predictors collectively explain a significant portion of variance in anxiety and mental health.

For anxiety, significant positive predictors included gender (male; $\beta = .10$, $p = .023$), participation in extracurricular activities ($\beta = .20$, $p < .001$), and extra family responsibilities ($\beta = .15$, $p = .001$). Family structure, socio-economic status, and private tuition were not significant predictors of anxiety in the present sample. For mental health, significant predictors were gender (male; $\beta = .14$, $p = .002$), family structure (joint; $\beta = .09$, $p = .044$), socio-economic status ($\beta = -.10$, $p = .017$), and participation in extracurricular activities ($\beta = .12$, $p = .006$), whereas private tuition and extra family responsibilities were non-significant (see Table 11).

Table 11
Regression Coefficients Predicting Anxiety and Mental Health

Predictor	Anxiety						Mental Health					
	B	*SE*	*β*	*t*	*p*	*VIF*	*B*	*SE*	*β*	*t*	*P*	*VIF*
Constant	23.91	2.88	—	8.29	< .001	—	42.07	2.78	—	15.11	< .001	—
Gender (Male=1)	3.34	1.46	.101	2.29	.023	1.08	4.47	1.41	.142	3.17	.002	1.08
Class Level	1.58	1.44	.048	1.10	.273	1.04	2.80	1.39	.089	2.02	.044	1.04
FS (Joint=1)	0.29	0.82	.015	0.35	.725	1.01	-1.89	0.79	-.104	-2.41	.017	1.01
SES	0.22	1.47	.006	0.15	.883	1.01	-1.53	1.41	-.047	-1.08	.280	1.01
PT	6.49	1.41	.201	4.60	< .001	1.05	3.77	1.36	.123	2.77	.006	1.05
ECA	4.77	1.39	.151	3.43	.001	1.07	1.49	1.34	.050	1.11	.269	1.07
AFR	23.91	2.88	—	8.29	< .001	—	42.07	2.78	—	15.11	< .001	—

Note. *B* = Unstandardized Coefficient; *SE* = Standard Error; *β* = Standardized Coefficient. PT = Private Tuition, FS = Family Structure, ECA = Extracurricular Activities, AFR = Additional Family Responsibilities. *VIF* < 1.1 indicates no multicollinearity.

Discussion

The present study investigated a number of variables affecting adolescent mental health and anxiety in the secondary schools of Dhaka city. Correlational findings (Table 3) revealed that students with higher anxiety levels reported worse mental wellbeing, especially in the emotional and social domain, allying with previous studies (Izadinia et al., 2010). School-going adolescents are more vulnerable to psychological difficulties. Endless pressures like maintaining appearance, achieving good grades, and dealing with peer relationships can expand worry among students, affect their ability of regulating emotions, handling stress, and engaging in healthy social interactions (Tramonte & Willms, 2010). Additionally, strong positive intercorrelations among the three dimensions of wellbeing and overall mental health underlines the interconnected nature of mental health components.

This study found remarkable gender differences (Table 4). Male students showed significantly higher anxiety along with better mental health across emotional, social, and psychological domains compared to females. Although maximum studies report higher anxiety among females (Anjum et al., 2022; Alharbi et al., 2019; Bakhla et al., 2013), some prior studies support the current findings (Agarwal & Bahadur, 2023; Deb et al., 2010). In the socio-cultural context of Bangladesh, boys often go through heightened expectations and pressures regarding academic achievement, future career responsibilities, and family duties, while being discouraged from openly expressing emotional vulnerability (Streatfield et al., 2023). Cultural expectations around gender roles and support, as well as social desirability bias, may influence how boys answer questions on wellbeing. Table

4 also showed that adolescent students, coming from joint family environment, reported higher anxiety, but better emotional, social and psychological wellbeing with small-to-moderate effect sizes compared to those from nuclear family settings. Prior studies show that extended family contexts can pose stress as well as provide social-emotional protection (Fingerman, 2016). As adolescents living in joint families are frequently under crowdedness, lack of privacy, family pressure, overloaded roles and interpersonal conflict, they may experience higher anxiety. In contrast, sources of emotional support and bonding within such homes can potentially enhance mental health as adolescents from joint families hold greater social maturity, emotional stability, personal and interpersonal competency than those from nuclear families (Singh et al., 2014; Agarwal & Bahadur, 2023).

No significant difference was found for anxiety or mental health outcomes among students who receive private tutoring compared to those who did not receive such tutoring (Table 5). Since tutoring primarily focuses on academics, other factors like individual coping strategies, the school environment, and family support may be more important in determining mental wellbeing. In addition, participation in extracurricular activities (Table 5) was associated with better mental health but higher anxiety. While extracurricular involvement is beneficial for adolescents' personal growth, social interaction, and a feeling of accomplishment, excessive involvement or poor balance can lead to increase stress, burnout and reduced wellbeing due to additional responsibilities, performance pressure, and time management challenges, especially when academic demands are high (Fredricks, 2012; Mudunna et al., 2025). Findings also revealed that students with additional family duties reported considerably higher levels of anxiety, but better psychological wellbeing and overall mental health compared to students who did not have such commitments. These outcomes suggest that while added responsibilities might lead to stress, they can also foster resilience, maturity, and a sense of purpose (Castillo-Miñaca et al., 2025; Armstrong-Carter et al., 2025).

Significant variations with medium to large effects across class levels in all mental health outcomes were revealed in Table 6. The findings that Class 10 students reported lower anxiety, but also lower wellbeing compared to their junior peers (Table 7) make psychological sense within the academic and socio-cultural context of Bangladesh. Students of class 10 may face intense study load, long study hours, and higher self, parental and societal expectations as examinees of the upcoming public examination (SSC), which may lead them to suppress emotional expression, reduce engagement in enjoyable activities or become numbed by chronic stress, ultimately manifesting as lower reported anxiety but poorer wellbeing (Deb et al., 2015; Salmela-Aro & Upadyaya, 2014 Gross & John, 2003). Continuous academic pressure can desensitize physiological and emotional reactivity (Compas et al., 2017). Moreover, adolescents often experience transitional challenges like uncertainty about future education and career paths, which may diminish their wellbeing (Guo, 2025). However, these factors suggest that final-year students may not experience less stress, rather show signs of emotional suppression and fatigue that reduce their overall sense of wellbeing.

Table 8 demonstrates that perceived socioeconomic status had an impact on social and overall wellbeing. Mean scores revealed that students who perceived themselves as having a Low or Average background reported comparatively higher levels of social and overall well-being than those in the Very Low and High groups. Interestingly, individuals who rated themselves as having a Very High position showed the lowest mean scores on both social and overall wellbeing. This pattern supports evidence that income inequality and perceived social distance can affect wellbeing (Pickett & Wilkinson, 2015). Adolescents may feel more socially connected, who place themselves in the middle range (Low to Average). In contrast, those who perceive themselves at extremes Very Low or Very High) showed comparatively poor social or overall wellbeing, probably due to struggling with limited resources, social stigma or self-doubt at the lower end, and to experiencing greater social isolation, performance pressure, or reduced peer acceptance at the higher end.

Table 9 presents the significant pairwise comparisons for overall wellbeing, where differences were observed between Low vs. Average and Low vs. High SES groups. Though the overall ANOVA for social wellbeing was significant, the pairwise post-hoc comparisons did not reveal any significant differences due to several factors (Morse, 2023). First, the effect size for SWB was very small ($\eta^2 = .023$), indicating that the degree of the differences between SES groups were minimal. Second, the SES groups had unequal and very small sample sizes (e.g., Very Low: $n = 21$, Very High: $n = 10$), which can affect the statistical power of the post-hoc tests and may lead to less precise estimates of group means and increased variability, making it harder to detect significant differences. Third, running multiple pairwise comparisons increase the risk of Type I errors, and post-hoc adjustments to control this error can make it more challenging to detect pairwise statistically significant differences. Future research with larger and more balanced sample sizes may provide clearer insights into the impact of SES on wellbeing dimensions.

Multiple regression analyses showed that key socio-demographic factors explained 10.3% of the variance in students' anxiety and 7.8% in their mental wellbeing. Among the predictors, students' gender, participation in extracurricular activities, and additional family responsibilities significantly predicted anxiety levels. In contrast, students' gender, family structure, socio-economic status, and participation in extracurricular activities were significant predictors of mental wellbeing, while the remaining variables were non-significant. These results emphasize how essential the social and familial contexts of students are in shaping their emotional outcomes.

Although the study sheds light on important factors that influence school students' mental health, its cross-sectional design and dependence on self-reports limit the ability to draw conclusions about causality. Future research should adopt longitudinal design, and context-specific qualitative or mixed-method approaches to deepen understanding of adolescent mental health.

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Adaptation and Validation of the Bangla Resilience Evaluation Scale

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Abstract

Psychological resilience is one of the most important areas of study in positive psychology. A lot of research has been done on this construct in the Bengali population. Most research to measure the resilience of the Bangladeshi population has been conducted using a translated resilience scale. Although very few studies have been conducted examining the psychometric properties of the Bangla Resilience Evaluation Scale in Bangladeshi culture, they are not at all extensive. Therefore, the present study aimed to validate the Bangla Resilience Evaluation Scale (BRES) with comprehensive psychometric properties. This study was conducted through a cross-sectional survey design, which included 786 Bangladeshi adults aged 18 to 64 years. Exploratory factor analysis (EFA) considering sub-sample-1 (n = 400) revealed a single-factor structure for the BRES, which explained 62.53% of the total variance. The fit indices for the BRES obtained through confirmatory factor analysis (CFA) on subsample-2 (n=386) were found to be good ($\chi 2/df$=3.07, GFI=.967, CFI=.964, SRMR=.042, and RMSEA=.073). The single-factor structure of the BRES was similar to the Chinese version. Good internal consistency reliability (α=.874, ω=.875), and both convergent and discriminant validity were established in the BRES through various statistical analyses. Thus, the one-factor BRES can be used as a valid and reliable measure to assess the psychological resilience of the Bangladeshi population.

Keywords: BRES, psychological resilience, factorial validity, psychometric validation, Bangla adaptation

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Introduction

Research indicates that the majority of individuals encounter at least one traumatic event during their lifetime (Bryant, 2019), including the loss of a loved one, natural disaster, serious accidents (industrial or other), interpersonal violence, and trauma of war. Despite the inherently upsetting nature of traumatic events, over 80% of individuals cope effectively and experience minimal impact from the adverse effects (Qing et al., 2022). This phenomenon is known as resilience, which is defined as the ability to recover from social disadvantages or extremely adverse conditions (Shi et al., 2021). It reflects a dynamic process involving behavioral adaptation, emotional regulation, and cognitive flexibility that enables people to thrive despite adversity. In both theoretical and applied domains, resilience is increasingly recognized as a protective factor against mental health disorders, such as depression, anxiety, and post-traumatic stress (Bonanno, 2004; Connor & Davidson, 2003).

While early conceptualizations of resilience focused on trait-like personal attributes, contemporary perspectives emphasize its process-oriented and context-sensitive nature. Researchers now recognize that resilience is shaped by a complex interplay of individual, relational, and sociocultural factors. As such, accurately measuring resilience requires tools that are both theoretically sound and culturally sensitive.

Various resilience scales were developed to measure psychological resilience, with limitations such as the Connor-Davidson Resilience Scale (Connor & Davidson, 2003), which contains 25 items with 5 factors. This scale has an inconsistent factor structure across cultures and mixes resilience with other traits such as hardiness and optimism. Next, the Resilience Scale for Adults (Friborg et al., 2006) was found to contain 33 items with 6 factors. But this scale is difficult to interpret, complex, and requires a high level of literacy. Then, the Brief Resilience Scale (Smith et al., 2008) was found, which is used globally and contains 6 items with one factor. But this scale is very narrow in focus: it only measures "bounce-back" ability. It doesn't assess deeper psychological resources. Next, one is the Wagnild and Young's Resilience Scale (Wagnild & Young, 1993). It consists of 25 items with 5 factors, but the items are somewhat abstract and based on individualistic values such as independence and self-control. Then, the Scale of Protective Factors (Ponce-Garcia et al., 2016) also measures resilience, which consists of 24 items with 4 factors; its short form contains 12 items. However, it emphasizes external (environmental) factors over internal resilience resources. Next, the Predictive 6-Factor Resilience Scale (Rossouw & Rossouw, 2016) contains 16 items. This scale has limited independent validation studies and a complex model with six overlapping domains. Then, the Ego Resilience Scale (Denovan et al., 2022) contains 14 items, but the revised version contains 10 items with 2 factors; more focus on personality flexibility rather than resilience per se. Finally, the Academic Resilience Scale (Cassidy, 2016) has 30 items and three factors; it is domain-specific (academic setting) and not appropriate for general population studies.

One widely used instrument in psychological resilience is the Resilience Evaluation Scale (RES), originally developed by Meer et al. (2018). This scale overcomes key limitations in existing above-resilience scales by offering theoretical clarity (self-efficacy

and self-confidence), a brief and practical format (9 items), an internal focus relevant across domains, a strong psychometric foundation, and cross-cultural adaptability. Unlike broader multidimensional measures, the RES provides a concise, psychometrically sound assessment of core evaluative beliefs that underpin resilient behavior. This RES scale has good reliability, factorial validity, and predictive utility in both clinical and non-clinical populations across diverse cultures.

Qing et al. (2022) translated the RES into Chinese and tested it on university students in a cross-cultural study. Their tested version was highly consistent (Cronbach's α = 0.92). The original two-factor structure was not apparent in their Chinese version. Instead, exploratory factor analysis revealed a one-dimensional structure with acceptable model fit indices (RMSEA = 0.081; CFI = 0.964). This scale's positive correlation with academic self-efficacy provided further evidence of construct validity. However, the absence of configural invariance indicates cultural variability in the conceptualization of psychological resilience (Qing et al. 2022). Primasari et al. (2022) conducted a psychometric evaluation of the RES among 327 Indonesian undergraduate students. They found that high internal reliability (α > .80) and the original two-factor structure through confirmatory factor analysis. The CFI, TLI, and RMSEA indicated a good model fit (CFI = 0.98, TLI = 0.96, and RMSEA = 0.05). Convergent validity was evidenced by meaningful associations with global functioning (r=.47), self-efficacy (r=.71), self-esteem (r=.65), and adapting coping (r=.31) (Primasari et al., 2022). Aghababaeian et al. (2024) validated the RES in the Persian language in the Iranian general population. Their translated version demonstrated high internal consistency (α =.82). Their exploratory factor analysis revealed two factors similar to the original scale. The confirmatory factor analysis's goodness of fit was satisfactory (RMSEA = 0.084, CFI = 0.98, SRMR = 0.064, and TLI = 0.97). The convergent validity of the RES with the Connor-Davidson Resilience Scale was r =.65 (Aghababaeian et al. 2024).

In conclusion, it can be said that despite its promise, the RES has not yet been adapted or validated in the Bangla language. Most resilience measures used in Bangladesh are either untranslated or lack rigorous psychometric validation. For example, the Bangla version of the Resilience Scale for Adults was translated into Bangla by Prokrity et al. (2018), but the psychometric properties were not documented well. Given the RES's conciseness, clarity, and solid theoretical foundation, it is well-suited for use with Bangladeshi populations.

Objectives of the Study

The current study aimed to investigate the psychometric qualities of the Bangla Resiliene Evaluation Scale (BRES) using item analysis, EFA, CFA, reliability, and validity.

Rationale of the Study

Bangladesh is a country that is frequently affected by natural disasters (floods, cyclones), economic instability, and widespread poverty (Mahmud et al., 2021). Thus, psychological Resilience is essential for psychological well-being and growth. In Bangladesh, mental health services are still expanding. So, culturally appropriate tools are urgently required to support both research and mental health intervention. If we adapt a practical and psychometrically sound Bangla version of RES, Bangladeshi researchers, clinicians, and mental health practitioners will benefit. Furthermore, it contributes to the global literature on the cross-cultural validity of psychological constructs and promotes culturally informed resilience research in low- and middle-income countries.

Method

Participants

This study included a total of 786 Bangladeshi adults using a convenience sampling method. Their age range was from 18 to 64 years (M = 35.25, SD = 13.26). Apart from the total sample, 50 participants participated in this study separately to help determine the scale's translation reliability. To perform EFA and CFA, different data sets were used. The total sample was divided into two subsamples (one with 400 participants and the other with 386). Distributions of the sample on key variables are presented in Table 1. Inclusion criteria required participants who were above the age of 18 and had no serious illness. Participants with a history of serious illness (physical or psychiatric), and incomplete data were excluded from the study.

Table 1
Distribution of Participants by Socio-Demographics and Sub-Sample (n=786)

Demographic	Total (n=786)	Subsample 1 (n=400)	Subsample 2 (n=386)	Sig. test
	n(%)	n(%)	n(%)	
Gender				
Male	400 (50.9)	244(61.0)	236(61.1)	χ^2=.01, df=1, p=.968
Female	386 (49.1)	156(39.0)	150(38.9)	
Residence				
Urban	628 (79.9)	318(79.5)	310(80.3)	χ^2=.08, df=1, p=.777
Rural	158(20.1)	82(20.5)	76(19.7)	
Occupation				
Agriculture	16 (2.0)	8(2.0)	8(2.1)	χ^2=1.44, df=6, p=.964
Business	110(14.0)	60(15.0)	50(13.0)	

Demographic	Total (*n*=786)	Subsample 1 (*n*=400)	Subsample 2 (*n*=386)	Sig. test
	n(%)	*n*(%)	*n*(%)	
Service holder	240(30.5)	120 (30.3)	120(31.1)	χ^2=1.44, *df*=6, *p*=.964
Job seeker	30 (3.8)	16(4.0)	14(3.6)	
Student	228(29.0)	114(28.5)	114(29.5)	
Housewife	112 (14.2)	59(14.8)	53(13.7)	
Others	50 (6.4)	23(5.8)	27(7.0)	

Instruments

Three psychological assessment tools and a personal information form were used in this research. One assessment tool was used to measure psychological resilience, and the other two were used to measure the other two constructs.

Bangla Resilience Evaluation Scale (RES)

The English original Resilience Evaluation Scale (Meer et al., 2018) is a brief, self-report measure of Psychological Resilience, consisting 9 items rated on a 5-point Likert-type scale (0 = completely disagree to 4 = completely agree). This scale has two components: self-efficacy and self-confidence. For the present study, the RES was translated into Bangla following the guidelines by the International Testing Commission (Hernández et al., 2020).

Psychological Well-being (PWB) Scale

The Bangla version of the WHO-5 Well-Being Index (Faruk et al., 2021) was used in this study, which was originally developed by WHO (1998). This scale includes 5 items with a 6-point Likert-type scale (0 = none of the time, 5=All of the time). The minimum possible score in this scale is 0, while the maximum score could be 25. Higher scores indicate better psychological well-being. The cut-off point of this scale is 13, which means a score below 13 indicates poor well-being. The test-retest reliability of the scale was 0.713. The convergent and divergent validity of the scale were found to be good.

Cognitive Functioning Self-assessment Scale (CFSS)

The Cognitive Functioning Self-Assessment Scale was employed to measure the participants' cognitive impairment in this study. This scale consists of 18 items (e.g. ''I find it difficult to concentrate'') with a 5-point Likert-type scale (1=never to 5=always). The total score was calculated as the mean of the 18 items; this procedure allowed the total score to remain within the same score range of each item (1-5). A higher score indicates more cognitive impairment. The internal consistency (α) and Guttmann Split-Half reliability were 0.911 and 0.865, respectively.

Personal Information Form (PIF)

A PIF was given to all the participants along with the above questionnaire to collect data on socio-demographic variables such as gender, age, place of residence, and occupational status.

Procedure

Participants were given an informed consent form at the start of the study, which included information about the study's purpose, confidentiality and ethics, risks and benefits, and their freedom in this research. Before participating in the study, they signed a written 'informed consent form'. The overall study procedure for this study was facilitated by a trained individual with a psychology degree. After receiving the 'informed consent form' from the participants, a set of questionnaires was distributed to each participant individually. Participants were instructed to carefully read each item and respond by marking a tick (✓) on one of the answer alternatives. Finally, after finishing, all the participants were warmly thanked for their cooperation.

Cross-cultural Translation of the BRES

The RES was methodically translated into Bangla from its original English version. The multi-stage procedure suggested by Sousa and Rojjanasrirat (2011) was followed in the translation and pertinent cultural adaptation process.

First, three multilingual translators worked individually to translate English into Bangla. All translators are native Bangla speakers who speak and read English fluently.

Second, the first author, a native Bengali speaker, compared the three versions of the forward translations. Ambiguities and discrepancies in words, sentences, and meaning between the three versions were discussed in a committee constituted only by academic members from the psychology department and co-authors. After that, translators of the forward translation worked together to resolve the noted ambiguities and discrepancies, resulting in a preliminary translated version of BRES.

Third, another multilingual translator reverse-translated the previously translated Bangla version into English. Fourth, the author and co-author reviewed the back translation to the original RES to ensure conceptual, semantic, and content consistency between the two English versions.

The next and final step was to conduct an online pilot test among ten Bengali-speaking adults, representing the target group of interest for future use of the BRES. Participants were asked to answer the BRES without viewing the English version in order to facilitate cultural adaptation.

Later, they were asked to provide feedback on the instructions' clarity, answer structure, and items. Feedback indicated that the BRES was simple to understand, readable, and quick to answer.

Results

Item Analysis

The corrected item-total correlations for the BRES scale items ranged from .521 to .654 (Table 2). The 9 items from the original RES received inclusion in the BRES because they exhibited acceptable corrected item-total correlations (above .199; Hobart and Cano, 2009). Two correlational associations were performed between BRES items. One was the inter-item correlation, which indicated that each item on the scale was positively associated with the others (Table 2). The other one was the association of individual item scores with their related factor scores. Each item was highly and positively associated with its factor score, as well as with the other items assessing the same construct (Table 2). Mean inter-item correlation is .437, indicating sufficient item homogeneity without excessive redundancy. Item-total correlations ranging from .521 to .654, all are acceptable based on the criterion of.199 suggested by Hobart and Cano (2009).

Table 2

Inter-Item Correlations and Descriptive Statistics of Scale Items (n=786)

	Inter-item correlations								Descriptive statistics				r_{iT}
Item	R1	R2	R3	R4	R5	R6	R7	R8	*M*	*SD*	*Skew.*	*Kurt.*	
R1									2.46	1.04	-.19	-.63	0.607
R2	.400**								2.68	1.16	-.47	-.88	0.650
R3	.411**	.545**							2.62	1.09	-.40	-.68	0.647
R4	.339**	.517**	.454**						2.75	1.02	-.38	-.68	0.591
R5	.407**	.440**	.495**	.475**					2.54	1.08	-.42	-.51	0.608
R6	.380**	.591**	.528**	.538**	.454**				2.77	1.04	-.39	-.71	0.654
R7	.542**	.445**	.410**	.364**	.466**	.434**			2.57	1.11	-.28	-.76	0.633
R8	.467**	.349**	.429**	.293**	.317**	.325**	.428**		2.43	1.13	-.31	-.67	0.521
R9	.510**	.404**	.390**	.400**	.415**	.451**	.509**	.405**	2.59	1.05	-.30	-.49	0.610

Note. Skew. =Skewness; Kurt. =Kurtosis, riT = Item total correlations.

**p< .01.

Exploratory Factor Analysis (EFA)

To determine whether the current data are appropriate for EFA, a sampling adequacy test, known as the KMO (Kaiser-Meyer-Olkin), was used. The observed KMO value of .904 exceeded the recommended KMO value of .600 (Tabachnick & Fidell, 2013), indicating that the current data were adequate for factor analysis. The Bartlett's test of sphericity (χ^2= 1434.33, df=36, p<.01) was also calculated, which indicates the suitability of factor analysis in the present sample. Shared variance by commonalities (ranging from .316 to .516) indicated that the factor analysis can be carried out with BRES data.

Table 4

Confirmation of Number of Factors for BRES by Exploratory Factor Analysis (EFA) and Minimum Average Partial (MAP) Test (Subsample-1, N=400)

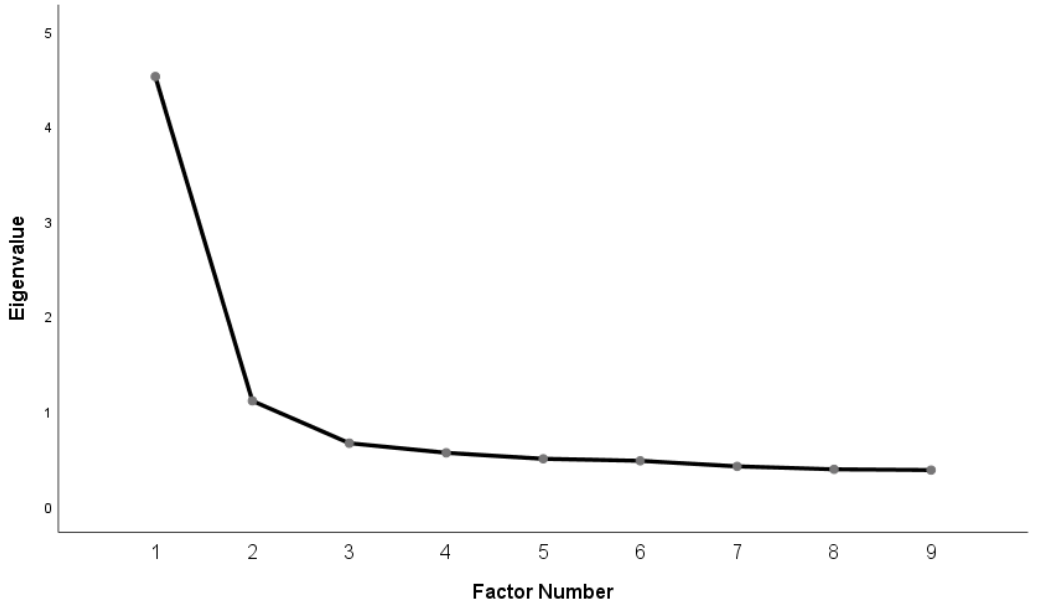
Factor structure by EFA				Confirmation of factors by MAP test		
Item	h^2	*F1*	*F2*		Average squared partial correlation	Average 4th power partial correlation
R4	.424	**.799**	-.119	.0000	.1993	.0455
R6	.516	**.775**	.015	**1.0000**	**.0351**[a]	**.0023**[b]
R2	.493	**.722**	.051	2.0000	.0403	.0042
R5	.421	**.607**	.110	3.0000	.0723	.0185
R3	.455	**.596**	.147	4.0000	.1133	.0306
R1	.447	-.060	**.827**	5.0000	.1761	.0673
R8	.316	-.038	**.641**	6.0000	.2791	.1364
R9	.439	.167	**.582**	7.0000	.4582	.3255
R7	.442	.195	**.565**	8.0000	1.0000	1.0000
Eigenvalues (>1)		4.52	1.11			
Variance by factor (%)		50.23	12.30			
Total variance (%)		62.53				
KMO		.904				
Bartlett's sphericity test		χ^2=1434.33, *df*=36, *p*<.01				

Note. KMO= Kaiser-Meyer-Olkin; h2=Communality.
Extraction method: Principal Axis Factoring; Rotation method: Direct Oblimin with Kaiser Normalization

a & b = both the smallest average squared partial correlation and the smallest average 4th power partial correlation indicate a single factor for the scale

Figure 1

A Scree Plot Depicting the Factors of BRES based on Eigenvalues



An EFA was performed on subsample 1 *(N* = 400) using principal axis factoring and the direct oblimin rotation method. Based on eigenvalues, the BRES revealed a two-factor structure. A scree plot revealed a clear two-factor structure of the BRES (Figure 1). The BRES's two-factor structure explained 62.53% of the total variance, with factors 1 and 2 accounting for 50.23% and 12.30% of the variance, respectively (Table 4). The BRES extracted 9 items into two factors, which were similar to the factor structure of the original scale. The BRES's two-factor structure revealed the loading of 5 items (items 2, 3, 4, 5, and 6) on factor 1 (self-efficacy) and 4 items (items 1, 7, 8, and 9) on factor 2 (self-confidence).

Although this scale was originally a two-factor scale, in some cultures (such as Chinese), it had a one-factor structure. Thus, we checked our data using the Minimum Average Partial (MAP) test to determine whether our BRES was unidimensional or bidimensional. In contrast, the MAP test revealed that one factor was best suited to our culture. The MAP test results revealed that the average squared partial correlation and average 4th power partial correlation were the smallest for one factor structure (see Table 4). That clearly indicates that our BRES scale is better suited for one dimension of our culture rather than two factors.

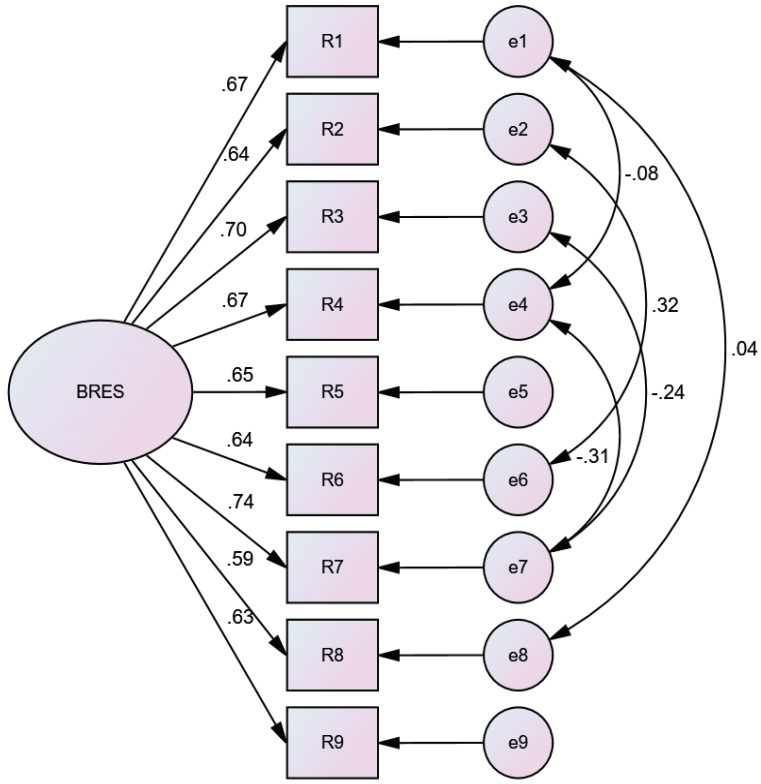
Confirmatory Factor Analysis (CFA)

Since the MAP test showed one factor structure for BRES. Whether this one-factor scale shows good fits through the CFA model with correlated error terms. The model fit index

of the single-factor structure of the BRES was revealed by the CFA result for subsample 2 (N=386): χ2/df=3.07, GFI= .967, CFI=.964, SRMR = .042, RMSEA=.073 (90% *CI*: .054, 0.94). An acceptable model fit summary was estimated in the one-factor CFA model of the BRES, according to the cutoff ratio of Chi-square and df ($\chi^2/df \leq 5$), Goodness of Fit Index (GFI ≥ .95), Comparative Fit Index (CFI ≥ .90), Standard Root Mean Square Residuals (SRMR ≤ .08), and Root Mean Square Error of Approximation (RMSEA ≤ .08) (Browne & Cudeck, 1992; Hu & Bentler, 1999; Schermelleh-Engel et al., 2002). Thus, the CFA model confirmed 9 items for the BRES based on a single independent factor. Beyond the regression values of the scale items, some correlations between error variances were considered to establish the good fit of the one-factor CFA model of the BRES. When considering correlations between error variances, correlations whose modification index value was greater than or equal to 8 were considered.

Figure 2

A One-factor CFA Model of BRES (Subsample 2, n=386)



Reliability Analysis

Two types of reliability were performed in the present study. First, reliability was a Cronbach's alpha (α) and McDonald's omega (ω) (i.e., internal consistency between the scale items) was determined in the full scale. Cronbach's alpha (α) is .874, and McDonald's omega (ω) is .875, which were obtained on the total scale score (see Table 5). Alpha and omega greater than .70 indicate good internal consistency of scale items (George & Mallery, 2019; Wuang et al., 2011), and the higher the Cronbach's alpha, the more reliable the generated scale is. Second, A two-week test-retest reliability study was also conducted for the BRES scale. The test-retest value (r=.721) demonstrated that the BRES scale was consistently applicable to over-time stability.

Table 5

Internal Consistency and Test-Retest Reliability of the BRES (n=786)

Internal consistency reliability		Test-retest reliability, *r* (2-week interval and sample size, *n*=50)
Cronbach alpha (α)	McDonald's omega (ω)	
.874	.875	.721**

Note. **$p < .01$.

Convergent and Discriminant Validity

Validity refers to the scale's strength, or the ability to measure what it is intended to measure. The validity of the BRES refers to the scale's ability to measure Bangladeshi people's psychological resilience. This study assessed the convergent and discriminant validity. Convergent validity of the BRES was administered with the Bangla version of the WHO-5 Well-Being Index (Faruk et al., 2021). The BRES total score and the Bangla WHO-5 PWB Index showed a moderate positive association ($r = .354$, $p < .01$). Discriminant validity was assessed using the Bangla-translated version of the Cognitive Impairment Scale (Rahman, 2023). A significant negative association ($r = -.166$, $p < .01$) was discovered between the total score of BRES and the Bangla Cognitive Impairment Scale. These two correlations demonstrate the convergent and discriminant validity of BRES (see Table 6).

Table 6

Correlation of BRES with other constructs considered in the study (n=786)

	Resilience scale (BRES)
Psychological Well-Being Scale	.354**
Cognitive impairment scale	-.166**

Note. **$p < .01$.

Convergent and discriminant validity are further assessed through some statistical indicators (Table 7). Most of the evaluation criteria for BRES found above the cut-off point (Hair et al., 2019), indicating a satisfactory level, except AVE. According to Hair et al. (2019), an AVE value less than 0.5 may indicate construct validity issues, implying that the latent variable explains less than half of the variance in the indicators. However, AVE values greater than 0.40 are acceptable if the composite reliability (CR) exceeds .70, as suggested by Fornell and Larcker (1981) and Maruf et al. (2021). In our data, CR is found to be .88, which is above .70. Thus, the AVE value of our data is also acceptable.

Table 7
Convergent and discriminant validity of the BRES based on data from CFA (sub-sample 2, n=386)

Evaluation criteria	Statistic	Cut-off criteria	Confirmation of validity
Composite reliability (CR)	.88	CR ≥ .70	Convergent
Average variance extraction (AVE)	.47	AVE ≥ .50	Convergent
Average shared variance (ASV)	.01	ASV < AVE	Discriminant
Maximum shared variance (MSV)	.02	MSV < AVE	Discriminant

Measurement Invariance Test

The BRES has been widely administered to people from different socio-economic-demographic backgrounds under the assumption that it measures resilience equally across different population groups. Therefore, we wanted to know whether the BRES scale is invariant for gender and residence in our Bangladeshi population. Five comparative models (i.e., configural, measurement weights, measurement intercepts, measurement residuals, and structural covariance) were considered for the invariant test measurements. For comparison of models, values of fit indices (e.g., chi-square, CFI, RMSEA) and invariant values of $\Delta CFI \leq -.01$ and $\Delta RMSEA \leq .015$ (Chen, 2007) were used. Considering all invariance results, the comparison models did not exhibit any meaningful reduction in model fit indices. Thus, the one-factor structure of BRES was invariant based on gender and residence (see Table 8).

Table 8

Measurement Invariance Test of BRES by Gender and Residence (n=786)

Variable	Model	Model fit						Model comparison*	
		χ^2	*DF*	χ^2/DF	*CFI*	*RMSEA* **(90%** *CI***)**		*ΔCFI*	*ΔRMSEA*
Gender	M1	179.307	44	4.075	0.950	0.063 (.053-.072)			
	M2	186.637	52	3.589	0.951	0.057 (.049-.066)	M1-M2	-0.001	0.006
	M3	195.195	61	3.2	0.951	0.053 (.045-.061)	M2-M3	0.000	0.004
	M4	195.3	62	3.15	0.951	0.052 (.044-.061)	M3-M4	0.000	0.001
	M5	231.874	76	3.051	0.943	0.051 (.044-.059)	M4-M5	0.008	0.001
Residence	M1	183.721	44	4.175	0.947	0.064 (.054-.073)			
	M2	197.913	52	3.806	0.945	0.060 (.051-.069)	M1-M2	0.002	0.004
	M3	249.343	61	4.088	0.929	0.063 (.055-.071)	M2-M3	0.016	-0.003
	M4	249.468	62	4.024	0.929	0.062 (.054-.070)	M3-M4	0.000	0.001
	M5	376.665	76	4.956	0.887	0.071 (.064-.078)	M4-M5	0.042	-0.009

Notes. M1 = Unconstrained model; M2 = Measurement weights; M3 = Measurement intercepts; M4 = Structural covariances; M5 = Measurement residuals; Δ= Change in any variable quantity.

*Cut-off criteria for model comparison: ΔCFA: <.01 and ΔRMSEA: <.015 (Chen, 2007)

Discussion

The purpose of this present study is to assess the psychometric properties of the BRES among the Bangladeshi population by examining item characteristics, factor structure, reliability, and validity. The findings provide strong evidence that the BRES is an appropriate tool for evaluating psychological resilience in Bangladeshis.

The exploratory factor analysis initially showed a two-factor structure (Factor 1: self-efficacy and Factor 2: self-confidence), which is consistent with the original RES. These factors collectively explain 62.53% of the total variance. This finding suggested a strong construct representation. However, the MAP test indicated that a unidimensional structure was more appropriate for the Bangladeshi cultural context. This finding contradicts the original proposed two-factor structure (Meer et al., 2018). However, our findings are consistent with those of Chinese culture (Qing et al., 2022), who found only one factor loaded in their validation study. The appearance of a unidimensional structure in the Bangladeshi context may reflect cultural interpretations of resilience that emphasize holistic, integrated adaptive capacities over separate elements of self-efficacy and self-confidence. In Bangladeshi culture, psychological constructs are frequently perceived as interdependent, with less emphasis on distinguishing between specific aspects of self-perception (Dai et al., 2024).

Multiple fit indices utilizing CFA revealed a satisfactory fit of the one-factor BRES model among the Bangladeshi population. The GFI, CFI, TLI, SRMR, and RMSEA values were all acceptable, supporting the single-factor CFA model. The model fit indices of the

BRES were in contradiction with previous researchers (Browne & Cudeck, 1992; Hu & Bentler, 1999; Schermelleh-Engel et al., 2002) but in line with Meer et al. (2018). Instead of assuming that Western-developed measurement models are universally applicable, this cultural adaptation highlights the significance of empirically testing factor structures across diverse populations. The MAP test provided critical evidence for determining the most efficient and culturally appropriate factor structure. This demonstrates the significance of employing multiple analytical approaches in cross-cultural validity research.

Items in the BRES have strong internal consistency. The whole BRES scale exhibited good Cronbach alphas (α) and McDonald omegas (ω) (both greater than 0.70), in contrast to the Cronbach alphas and McDonald omegas suggested by the researcher (George & Mallery, 2019; Wuang et al., 2011). These values exceed those reported in other RES validations, including the original English/Dutch version (α = .86-.87; van der Meer et al., 2018), the Indonesian version (α = .80; Primasari et al., 2022), and the Chinese version (α = .87; Qing et al., 2022). The high internal consistency indicates that the 9 items of the BRES reliably measure a cohesive construct at each administration. The scales' test-retest reliability over 2 weeks was also found to be good. This result was consistent with previous studies (Aghababaeian et al., 2024; Meer et al., 2018; Primasari et al., 2022).

The BRES demonstrated appropriate construct validity through both convergent and discriminant validity evidence. The moderate positive correlation with the Bangla WHO-5 Well-Being Index supports the convergent validity of the BRES scale, as resilience is theoretically and empirically associated with positive mental health outcomes (Primasari et al., 2022; Meer et al., 2018). This correlation magnitude is consistent with the expectation that resilience and well-being are related but distinct constructs. Resilience represents adaptive abilities, whereas well-being reflects the current psychological state. The significant negative correlation with cognitive impairment provides evidence of discriminant validity. This finding demonstrated that the BRES measures a construct distinct from cognitive functioning. The conceptual independence of resilience (a psychosocial adaptable skill) from cognitive abilities is adequately reflected by this low connection, even if it acknowledges possible indirect links through processes like problem-solving or adaptive thinking.

Furthermore, the scale showed sufficient composite dependability, above the suggested threshold. However, the AVE little lower and remained acceptable considering the strong CR. The AVE provides a plausible variance explanation for a small nine-item resilience assessment. The fact that ASV (.01) and MSV (.02) were significantly below the AVE further supported discriminant validity. Overall, these results showed that the BRES is suitable for the Bangladeshi population and has strong construct validity.

Contemporary resilience theory views resilience as both a stable trait-like capacity and a dynamic state-like process that shifts with life experiences (Primasari et al., 2022; Qing et al., 2022). The RES and its cultural adaptations, including the BRES, measure self-perceived resilience—individuals' confidence in coping with adversity—which naturally varies with recent events and contextual changes. Because resilience reflects an ongoing

interaction between personal resources and environmental demands (van der Meer et al., 2018). This is expected for brief self-report tools like the BRES that capture current perceptions rather than fixed traits.

Limitations and Future Directions

There are several limitations to our current investigation. First and foremost, the study used non-probability convenience sampling methods rather than probability sampling. That reduces the power of this investigation. Second, demographic characteristics were not precisely controlled in this study; therefore, significant deviations from population parameters were identified in various demographics, such as gender. In the future, one could perform the same analysis using probability sampling while controlling for demographic factors. Third, we discovered weaker discriminant validity in this study. In the future, one could include a more theoretically relevant measure of discriminant validity, such as neuroticism. Finally, the sample may not generalize to all Bangladeshi groups, and the study relied solely on self-report data. Thus, further work is needed to clarify the scale's factor structure and to examine predictive validity across diverse populations.

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Bengali Resilience Evaluation Scale (BRES)

আপনি নিজের সম্পর্কে কেমন ভাবেন এবং জীবনের খারাপ পরিস্থিতিতে স্বাভাবিকভাবে কেমন প্রতিক্রিয়া করেন তা নীচের কতগুলো উক্তির মাধ্যমে বর্ণনা করা হয়েছে। অনুগ্রহ করে প্রতিটি উক্তি আপনার জন্য কতটুকু প্রযোজ্য তা টিক চিহ্ন (✓) দিয়ে নির্দেশ করুন।

ক্রমিক নং	উক্তি	সম্পূর্ণ দ্বিমত	দ্বিমত	নিরপেক্ষ	একমত	সম্পূর্ণ একমত
১	নিজের উপর আমার আত্মবিশ্বাস আছে।	০	১	২	৩	৪
২	আমি সহজেই কঠিন পরিস্থিতিতে নিজেকে খাপ খাওয়াতে পারি।	০	১	২	৩	৪
৩	লক্ষ্য অর্জনে আমি দীর্ঘ সময় ধরে কাজে লেগে থাকতে পারি।	০	১	২	৩	৪
৪	জীবনে বাধা-বিপত্তি কারণে, আমি যে অবস্থায় থেমে গিয়েছিলাম, বিপত্তি শেষে সে অবস্থা থেকে আবার সহজেই নতুন করে জীবন শুরু করতে পারি।	০	১	২	৩	৪
৫	আমি দুর্ভাগ্য বা খারাপ অবস্থা থেকে সহজেই স্বাভাবিক অবস্থায় ফিরে আসতে পারি।	০	১	২	৩	৪
৬	অপ্রত্যাশিত সমস্যাগুলোকে আমি ভালোভাবে মোকাবেলা করতে পারি।	০	১	২	৩	৪
৭	আমি নিজেকে গুরুত্ব দেই।	০	১	২	৩	৪
৮	আমি একই সাথে অনেক কিছু সামলাতে পারি।	০	১	২	৩	৪
৯	আমার নিজের উপর ভরসা আছে।	০	১	২	৩	৪

Scoring: The minimum possible score of this scale is 0, and the maximum score of this scale is 36. Higher scores indicate higher Psychological Resilience.

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Feedback, Metacognitive Judgement and Task Difficulty: Determinants of Cognitive Task Performance

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Abstract

This study investigated the interactive effects of feedback, task difficulty, and metacognitive judgment on cognitive task performance. Sixty university students (aged between 20–25 years) were randomly assigned to either a feedback or a no-feedback group. The shortened version of Raven's Progressive Matrices (consisting of three task sets) was used to assess the cognitive task performance. Task difficulty was increased with task sets. After each set, they rated their confidence on a 4-point Likert scale. The feedback group was informed of the number of correct responses. A 2 (feedback: yes vs no) × 3 (task difficulty: low vs medium vs high) × 2 (metacognitive judgement: low vs high) three-way mixed analysis of variances revealed a significant main effect of feedback on performance: participants who received feedback consistently outperformed those who did not. A significant interaction between feedback and task difficulty, $F(1, 11) = 30.994$, $p < .001$, $\eta^2 = .156$, indicated that feedback was particularly effective under high-difficulty conditions. However, none of the other main effects and interaction effects was found to be significant. The results emphasize the importance of feedback under high cognitive load. Future research should examine how individual differences and feedback types shape learning and strategy use.

Keywords: feedback, metacognitive judgment, task difficulty, cognitive task performance

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Introduction

Cognitive task performance refers to an individual's capacity to efficiently and accurately engage in activities that require mental effort. It encompasses skills such as reasoning, problem solving, and working memory, all of which are closely related to basic activities of daily life. Key factors such as feedback (Hammer et al., 2015) and metacognitive judgment (Souchay et al., 2004) have been shown to influence task performance. For example, feedback associated with the expectation of larger rewards improves visuo-spatial working memory in children. Wang and Yang (2021) found that the effect of feedback on memory depend on initial correctness and confidence levels. Similarly, Unsworth et al. (2016) also reported that feedback reduced failures of cognitive performance. Feedback provides external information that helps learners monitor and correct their performance, but excessive feedback in difficult tasks may even influence metacognitive judgement (Luo & Liu, 2023). Metacognitive judgment, such as confidence and self-assessments, influence how individuals allocate effort and adjust strategies. Together, these factors interact to determine how effectively individuals learn, adapt, and perform across cognitive domains.

Cognitive Task Performance and Feedback

Feedback acts as a catalyst for improvement by informing learners of their progress and guiding strategy adjustment. It has a significant role in achievement (Hattie & Timperley, 2007), especially when it is specific, timely, and task-focused (Shute, 2008). As a metacognitive cue, feedback prompts reflection, helping learners assess progress and refine strategies (Butler & Winne, 1996). Research shows that interactive or elaborative feedback enhances cognitive abilities, such as reasoning, working memory, and transfer of judgment skills (Zhang & Hyland, 2022). However, feedback effectiveness depends on task characteristics. For example, Haddara and Rahnev (2022) found that trial-by-trial feedback improved confidence calibration but not metacognitive sensitivity, while Luo and Liu (2023) showed it enhanced performance in easy tasks but impaired it in difficult ones—highlighting task difficulty as a key moderator.

Cognitive Task Performance and Metacognitive Judgment

Metacognition—the awareness and regulation of one's thinking—is central to effective learning and performance (Flavell, 1979). It involves planning, monitoring, and evaluating one's cognitive processes and predicts academic and problem-solving success (Veenman et al., 2006; Zimmerman, 2000). Metacognitive judgments influences reasoning and decision accuracy (Ackerman & Thompson, 2017) and typically decreases as task difficulty increases (Arnold et al., 2024). Because metacognitive monitoring allows error detection, performance adjustment, and knowledge transfer (Dunlosky & Bjork, 2008). Although feedback generally enhances performance (Thorndike, 1927), it can sometimes distort metacognitive judgments, especially under extreme task difficulty (Chitac, 2022; Fleming & Lau, 2014). Nelson and Narens (1990) found that monitoring produces judgments (e.g., confidence) that guide control decisions and monitoring and control interact in a feedback

loop. Metacognitive judgments (e.g., judgments of learning) are direct expressions of monitoring. Learners rely on cues to make metacognitive judgments. These cues arise during monitoring of cognitive processing and it explains how monitoring gives rise to judgments (Koriat, 1997).

Feedback, Task Difficulty, and Metacognitive Judgment in Cognitive Task Performance

Feedback effectiveness varies with task difficulty. It is most beneficial for moderately difficult tasks, supporting deeper learning and concept formation (Kulhavy & Stock, 1989; Shute, 2008). Feedback tends to improve performance in moderately difficult tasks but can be less effective or even detrimental in very easy or very hard tasks (Vollmeyer & Rheinberg, 2005). Confidence typically decreases as task difficulty increases, because overconfidence or underconfidence can distort learning (Ackerman & Thompson, 2017; Roderer & Roebers, 2010). Metacognitive sensitivity also tends to decline on challenging tasks (Burson et al., 1997; Shekhar & Rahnev, 2020). In this regard, Zimmerman's (2000) self-regulated learning model shows clear links to feedback, metacognitive judgment, and difficulty level. Zimmerman and Kitsantas (2014) found that formative feedback improved self-regulated learning processes, especially goal-setting, strategy use, and self-evaluation. Pajares and Graham (1999) found that students' metacognitive self-evaluations were strong predictors of self-regulated learning strategy use and academic performance. Together, feedback and metacognitive judgment form a reciprocal system that determines how effectively individuals regulate cognition, adapt to task demands, and achieve optimal performance.

The Present Study

Based on the reviewed literature, feedback plays an essential role in cognitive task performance, while metacognition also contributes significantly. Both feedback and metacognitive judgment are related to task difficulty. However, most studies have examined these variables in isolation. The present study aims to investigate how three factors—feedback, task difficulty, and metacognitive judgment—interact to explain cognitive task performance. In this study, we use Raven's Progressive Matrix as a measure cognitive task performance. The term progressive refers to how the test is organized and progressively harder across sets of items. This allows the test to gradually challenge the individual's reasoning ability and distinguish between different levels of cognitive ability. Overall, we formulated the following research questions.

Research Questions

1. Does feedback play a role in cognitive task performance?
2. Does metacognitive judgment contribute to explain cognitive task performance?
3. Does cognitive performance change with different task difficulty level?
4. Do feedback, task difficulty, and metacognitive judgment jointly contribute to cognitive task performance?

Method

Participants

A total of 60 university students (38.3% male and 61.67% female) were taken for this study. The age range of them were between 20 to 25 years. Most of their fathers were businessman (53.4%) and few were employee (46.6%). Most of the mothers were housewife (78.4%) and few were employee (21.6%). Participants were randomly assigned into two groups – feedback and no feedback group. Each group consisted of 30 participants.

Measures

Shortened Raven's Progressive Matrices Test

Raven's Progressive Matrices (RPM) is a non-verbal test developed by Raven (1936) to measure abstract reasoning and fluid intelligence (i.e., the ability to solve new problems without relying on prior knowledge). In this study the shortened RPM used, which was developed by van der Elst et al. (1994). The shortened Raven SPM comprise 36 items (sets B,C,D) rather than 60 items (sets A, B, C, D, and E) which reduce the test administration time by about 40% (Bouma et al., 1996). It relies on shapes and patterns rather than language or culture-specific knowledge, it is considered a culture-fair measure of intelligence. The test presents a series of visual patterns with a missing piece, and the individual must select the correct piece that completes the pattern. RPM represents consists of several sets or levels, each increasing in complexity. In this study, level B, C, D were used. We recognized B as low task difficulty level, C as a medium task difficulty level and D as a high task difficulty level. Proportion of correct responses were considered as dependent variable.

Metacognitive Judgment

After completing each set of Raven's Progressive Matrices, participants provided a metacognitive judgment of confidence regarding their performance. Confidence was measured on a 4-point Likert-type scale: 1 = I am guessing, 2 = I am slightly confident, 3 = I am moderately confident, 4 = I am very confident.

Procedure

The experiment was conducted in the university laboratory, where participants were seated and tested individually. Each participant first received a detailed instructions. They then completed the Raven's Progressive Matrices. This test was presented using Microsoft PowerPoint. After completing each set of the Raven's test, participants in the feedback group were provided with feedback indicating the number of correct responses, whereas participants in the no-feedback group received no information about their performance. After each set of the Raven's Progressive Matrices, participants completed a metacognitive judgment question. Following this, participants were given a five-minute break before proceeding to the next level.

Data Analysis

Data was analyzed in a 2× 3×2 three-way mixed ANOVA, taking feedback (present vs absent) as between subject-factor, and task difficulty (high vs medium vs low) and metacognitive judgment (high vs low) as within-subject factor. SPSSv26 for windows were used for analysis. We also reported the effect size of each parameter (η2).

Results

Descriptive Statistics

Mean and standard deviation of difference group performance are presented in Table 1. All reported cognitive performance and metacognitive judgment values were approximately normally distributed. Figure 1 illustrates group differences in performance across levels of task difficulty, while metacognitive judgment showed no effect on performance regardless of feedback.

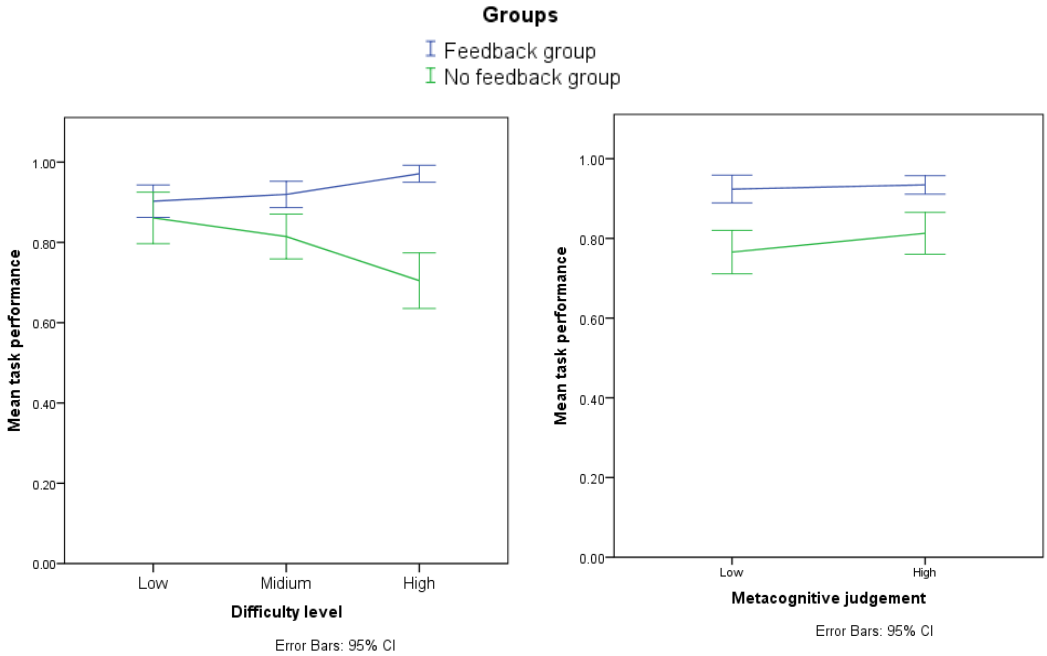
Table 1

Descriptive Statistics of the Measure

Feedback	Difficulty level	Confidence level	Mean	Std. Deviation
	Low	Low	.910	.109
		High	.902	.001
Yes	Middle	Low	.904	.958
		High	.938	.774
	High	Low	.957	.726
		High	.978	.048
	Low	Low	.675	.246
		High	.908	.113
No	Middle	Low	.851	.086
		High	.779	.191
	High	Low	.721	.157
		High	.686	.219

Figure 1

Line Charts for Cognitive Task Performance



Note. Error bar represents 95% confidence interval.

Three-way Mixed Analysis of Variances (ANOVA)

Before final analysis, we checked whether baseline performance differed between feedback and no feedback group (t = .993, df = 58, p= .325). To see the effect of feedback, task difficulty, and metacognitive judgement on cognitive task performance, data were analyzed in a three-way mixed ANOVA. The sphericity assumption was not violated for the main effect of feedback, task difficulty, and metacognition. Therefore, no correction was applied.

Results showed that the main effect of feedback on task performance was significant, $F(1,168) = 30.994$, $p < .001$, $\eta^2 = .156$), in which participants who received feedback *(M = .93, SD = .09)* outperformed those who did not *(M = .79, SD = .18).* But the main effect of task difficulty ($F(2,168) = 0.894$, $p = .411$, $\eta^2 = .011$) and metacognition ($F(1,168) = 1.010$, $p = .316$, $\eta^2 = .006$) had no effect on cognitive task performance. We got only one interaction effect where we can see the interaction between feedback and difficulty level was significant, $F(2,168) = 5.733$, $p = .004$, $\eta^2 = .064$. However, we did not find any other significant interaction effect between the variables *($p > .05$).*

Table 2
Fixed Effects ANOVA Results

Feedback	Difficulty level	Confidence level	*Mean*	*Std. Deviation*	Effect	*F* ratio	*df*	η^2
Yes	Low	Low	.9100	.10976	F	30.994	.000	.156
		High	.9024		DL	.894	.411	.011
Yes	Middle	Low	.9038	.9577	MJ	1.010	.316	.006
		High	.9379	.7738	F x DL	5.733	.004	.064
Yes	High	Low	.9570	.7258	F x MJ	.211	.646	.001
		High	.9780	.04786	DL x MJ	1.368	.257	.016
					F x DL x MJ	2.334	.100	.027
No	Low	Low	.6750	.24566	F	30.994	.000	.156
		High	.9075	.11303	DL	.894	.411	.011
No	Middle	Low	.8500	.08577	MJ	1.010	.361	.006
		High	.7793	.19081	F x DL	5.733	.004	.064
No	High	Low	.7206	.15661	F x MJ	.211	.646	.001
		High	.6864	.21904	DL x MJ	1.368	.257	.016

Note. df = Degree of freedom, η^2 *= Partial Eta Squared*., F= Feedback, DL= Difficulty Level, MJ = Metacognitive Judgement.

Discussion

The study examined how feedback, task difficulty, and metacognitive judgment influence cognitive task performance. A three-way mixed ANOVA showed that only feedback contributes to explain task performance, in which the feedback group outperformed the no-feedback group. A significant interaction between feedback and task difficulty indicated that feedback was especially beneficial on harder tasks. However, metacognitive judgement showed no effect on task performance.

Feedback and Cognitive Task Performance

Feedback plays a significant role in cognitive task performance, participants in the feedback group outperformed those without feedback. Feedback provides learners with information about their progress, helping them identify errors, adjust strategies, and strengthen effective responses. In line with our findings, we found consistent evidence in prior studies. Such as feedback improves accuracy and enhances reasoning ability (Unsworth, 2016; Zhang et al., 2018). Different forms of feedback (i.e., knowledge of results, knowledge of correct response, or elaborated feedback) significantly enhance cognitive task accuracy compared to the no feedback group (Kuklick et al., 2023). Brummer et al. (2024) also showed in their

meta-analysis that any simple feedback (e.g., verification or knowledge of result) is more effective to improve learning performance than no feedback. These findings also support the idea that feedback is a catalyst for improvement, guiding individuals toward better performance and more accurate self-monitoring.

Metacognitive Judgment and Cognitive Task Performance

Performance tends to decline when participants hold strong confidence accompanied by negative or inaccurate thoughts. This suggests that confidence enhances performance only when it is supported by positive or accurate self-assessment (Moreno et al., 2021). In contrast, the present findings indicated that metacognitive judgment did not significantly influence cognitive task performance. Similarly, Fleming and Daw (2017) reported that high but well-calibrated confidence is associated with greater metacognitive sensitivity, which facilitates effective self-monitoring and performance improvement.

The current findings, therefore, diverge from some earlier research and support the notion that the influence of metacognitive judgment on performance is not universal. One possible explanation is the presence of overconfidence, where confidence is miscalibrated relative to actual ability. Kleitman and Stankov (2007) found that self-confidence is linked to metacognitive processes and cognitive accuracy, and that miscalibration can account for performance errors across tasks. Metacognitive judgments not only reflect performance but also shape it.

Task Difficulty and Cognitive Task Performance

Task difficulty is a central factor that shapes cognitive task performance. Anderson et al. (2011) found that moderate task difficulty fosters engagement and higher learning gains, while excessive difficulty leads to disengagement and poor performance. However, results showed null effect of task difficulty on cognitive task performance. The cognitive task performance heavily depends on the ceiling or floor Effects (Smoleń & Chuderski, 2015). Participants might perform well regardless of task complexity if it is too easy. Everyone struggles equally if the task is too difficult; therefore, differences are not noticeable. In this study, task difficulty alone was not significantly related to cognitive task performance, but when considering feedback, task difficulty matters.

Feedback, Task Difficulty and Metacognitive judgment in Relation to Cognitive Task Performance

This study also revealed that feedback, task difficulty, and metacognitive judgment together did not influence cognitive task performance. This suggests that performance in the given cognitive context may be relatively stable across variations in feedback conditions, levels of task difficulty, and metacognitive judgments. Possible explanations may include the robustness of participants' cognitive strategies or limited sensitivity of the task to these manipulations. While task difficulty has often been shown to modulate

performance by influencing cognitive load and attentional resources (Sweller, 1988; Paas & van Merriënboer, 1994), the absence of a significant effect in the present study may imply that participants were able to maintain stable performance across varying levels of cognitive demand. Furthermore, although metacognitive judgment is typically associated with performance monitoring and strategy adjustment (Koriat, 1997; Dunlosky & Metcalfe, 2009), their impact may depend on the availability of accurate internal cues or the opportunity to use feedback effectively. The current findings therefore align with studies reporting weak or inconsistent links between metacognitive monitoring and task outcomes under conditions of limited feedback utility or constrained task variability (Bjork e al., 2013). Taken together, the results suggest that the influence of feedback, task difficulty, and metacognitive judgment on cognitive task performance may be context-dependent rather than universal.

Limitations

The study was limited by its sample size, which restricts the generalizability of the findings to other populations. Confidence ratings on a 4-point scale may not have fully captured the nuances of metacognitive monitoring. Moreover, only Raven's Progressive Matrices were used, limiting the applicability of the results to other cognitive domains. Finally, the study focused solely on immediate performance; long-term retention and transfer were not assessed.

Implications of the Study

The study demonstrates that feedback enhances cognitive performance, particularly on difficult tasks, whereas metacognitive judgment alone had no significant effect. These findings underscore the importance of integrating feedback with thoughtful task design to optimize performance. In clinical contexts, combining feedback with metacognitive awareness may help clinicians tailor interventions based on patients' confidence–performance gaps. For instance, Basch et al. (2017) found that real-time feedback improves quality of life and survival among cancer patients, while Barkley (2015) identified feedback as an "external executive function" aiding behavioral regulation in attention deficits hyperactivity disorder. In educational and training settings, structured feedback can enhance learning, accelerate skill acquisition, and reduce errors on complex tasks. Similarly, athletes and performers may benefit from immediate, task-specific feedback coupled with metacognitive reflection to refine strategies and improve outcomes.

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