

## **Relationship of Fluid Intelligence with Emotional and Home Adjustment of Teenagers**

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### **Abstract**

This study aimed to investigate the relationship between general fluid intelligence (GF), Emotional adjustment (EA), and home adjustment (HA) of teenagers and with the demographic variables (age, mother's education, and academic achievement). Second, to explore the direct and indirect effects of GF, EA, and HA on each other. A correlational study design was used in this study. Data was gathered through a stage cluster sampling technique from secondary schools in urban areas in Faisalabad. The sample was comprised of 180 students, 82 male teenagers, and 98 female teenagers' students, aged between 14 and 16 from grades 9th to 10th. Teenagers filled in the Standard Progressive Matrices and Bell adjustment inventory along with the demographic sheet and consent form. The data was collected. The data were analyzed using SPSS. All descriptive statistics were stated as percentage, frequency, mean, and standard deviation, and The Pearson product-moment correlation analysis was used. Amos analysis was executed for predictors and finding the mediator in the study. Study findings conclude that teenagers with a high level of GF would have better problem-solving strategies and deal with the novel situation effectively which helps in healthier EA and HA. Further mother who has a high level of education would deal with their children's problem effectively whether those problems are related to academic or psycho-social problems.

**Keywords:** Fluid Intelligence, Home Adjustment, Emotional Adjustment, Teenagers

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### **1. Introduction**

Fluid intelligence is an imperative component of individual cognition. Fluid intelligence also known as General Fluid intelligence (GF) is defined as the ability to learn things in new ways and problem-solving in the absence of task particular information, comprehension, and performing different activities and it is greatly predictive of consequences like educational achievements (Meyer, 2023; Fuhrmann et al. 2020). It includes the capacity to identify patterns, reasoning, and make connections to different and unfamiliar situations. GF is taken as one of the two aspects of general intelligence, the other one is crystallized intelligence, which is based on learning knowledge and skills (MSED, 2022). Undoubtedly, it is related to the procedure of evaluating novel difficulties via using logic. It encoded working memory. It greatly predicts many important outcomes of lifespan, together with educational achievement (Roth et al. 2015). Neuroanatomical, fluid intelligence is associated with frontal lobe functioning. Lesions in the frontal lobe have affected the performance on fluid intelligence tests (Bishop et al.2008). Alone with the view the functioning of the frontal lobe is associated with complex social behavior and executive functioning. Many frontal lobe lesion studies showed that damage in the frontal lobe may change the behavior and problems in social adaption (Johnson et al. 2009). Different psychometrics have been suggested to measure the GF, one of those tests was the Raven Progressive Matrices (RPM), RPM is the most commonly used test (Raven, Court, Raven, 1977). Moreover,

the architecture neurocognitive of GF exhibited that pre and early puberty age may reflect and reorganization of neurocognitive architecture (Delia et al. 2020). GF increased during the sequence of childhood and teenage (Sukel 2016).

During Teenage there are physical (Mills et al., 2016) and functional (Goddings et al., 2014) modifications in the frontal and parietal higher-order networks modifications in subcortical parts dealing with emotional stimulus, along with modifications in forms of connection among these systems thru emotion regulation (Casey et al., 2019). Teenage is a stage when there is profound change occurs at the intellectual level, and this transformation in the intellectual level may modify social relationships with adults and bring change in their emotional adjustment. It is an important period of life, during this transaction phase, there is an increased likelihood of emotional instability or lack of self-control (Prencipe et al., 2011). The transition from primary to higher secondary school, negative socioeconomic conditions, and individual characteristics may indulge risky activities that often lead to failures in school achievements are just minor modifications and accountability that have an impact upon adolescents at this period of life. Risk aspects understood as personal, family, peer, school, and public impacts might raise the probability that a teenager will maintain, experience, or aggravate both psychological and social problems (Fraser et al., 2005). Through this phase, adjustment plays a vital role in their education, emotions, and personality development. Adjustment, a procedure that describes an individual's acceptance and adaptation to his personal and environmental circumstances. Therefore, adjustment aids for self-intentional, development and growth as well as with rational, physical, emotional, and social factors (Mohinuddin, 2022).

Emotional adjustment (EA) is defined as acceptance of one's self. An emotionally adjusted individual has a high sense of self, confident, compliant, self-actualized, and fully functioning. They have artistic ability and openness to experience. Such individuals perceive things much like they are and feel worthy under all circumstances (TutorialsPoint, 2022). EA also explained the individual self and psychological adjustment. And it is the emotional stability between personal and environmental stressors (internal and external). In addition to that, cognitive factors help in accepting or adapting to the situation (Richard & Sumathi 2015). EA contains the individual acceptance of situations, which contain acclimatizing or adapting individual one's emotions and attitudes respectively (APA Dictionary of Psychology, 2023). EA provides a strong structure for a balanced personality; and higher intellectual capacity and it also affects our physical abilities. It involves thinking patterns, and understanding of emotions and feelings (Kirtania, 2021). Further Engels et al., (2019) found that both emotional and rational engagement during the shift from primary to higher secondary school display distinctive personal and environmental correlates despite their interdependence. In another study it was to empirically identify homogeneous clusters of adolescent students with distinct emotional, behavioral, and prosocial activities, and to analyze the association between the latent profiles found and social and emotional adjustment e.g., emotional health, prose and cones affect, suicidal behavior, enhance risk for developing psychotic symptoms, cyberbullying, and affect academic performance (Eduardo et al., 2020).

Home adjustment is also an important aspect during teenage. Seldomly, Teenagers face different challenges for adjustment at their home. Home adjustment (HA) is defined as an individual adjustment toward a home environment such as his or her attitude toward the relationship with parents and siblings and the family socioeconomic status of the adolescent (Muthukumar & Kumar 2015). Family plays an important role in the HA of individuals. Family internal relationship problems have an impact on individual psychosocial aspects (Rakhi, 2018).

Mursaleen and Munaf (2020) have suggested that intellectual capacity has an impact on students' academic grades and emotional intelligence. Another Emerging conclusion reported that decision-making proficiency might not only involve fluid or crystalized intelligence, but also involve emotional regulation, motivation, and individual experience (Bruin, et al., 2020). Intelligence and HA are two basic constructs of psychology which is interrelated with each other and that are important for a stable and successful life (Kaur & Gupta, 2021). In one study it was highlighted that during developmental stages of adolescence, personal and situational factors influence intellectual functioning. The network analysis has shown that home environment and family play an important role in the early year development of verbal ability, however, GF was not significantly correlated (Conte et al., 2020). Further, A theoretical work suggested that the family environment identified as a mediator between the development of emotion regulation of adolescence and the socioeconomic status of the family (Herd et al., 2020). The Meta-analysis study of the impact on socioeconomic status, age, task, and the relation of GF and academic achievement related to reading and mathematics abilities. This study comprised students having better educational achievement when their families have high socioeconomic status (Peng et al., 2019). Further the home environment, socioeconomic

status, and household chores were important in self-control and risk-taking behavior (Holmes et al., 2019).

Higher GF may indirectly contribute to better EA and HA by enabling individuals to find effective to family-related challenges, emotional understanding, and making better decisions in life. A positive home environment and better EA can be promoted by having better cognitive abilities, which can also help with communication and understanding between family members.

### **Objectives of the study:**

The main aim of the present investigation is to find out the relationship between GF, EA, and HA of teenagers and with the demographic variables i.e., age, mother's education, and academic achievement. Second, to explore the direct and indirect effects of GF, EA, and HA on each other.

## **2. Methodology**

This study was a correlational study that focused on the relationship between GF, EA, and HA in teenagers. The data was gathered in secondary schools in urban areas in Faisalabad. The sample was comprised of 180 students, 82 male teenagers, and 98 female teenagers, aged between 14 and 16 from grades 9th to 10th. Teenagers filled out the SPM and Bell adjustment inventory along with the demographic sheet and consent form. The data was collected through two two-stage cluster sampling technique. The sample size was calculated through  $G^*$  power. Post hoc: Compute achieved power analysis performed with Input parameters Two tail, Effect size =0.3,  $\alpha$  err prob = 0.05, and Total sample size =180. The Output result in Noncentrality parameter  $\delta=4.22$  with Critical  $t = 1.973$ ,  $df = 178$ , and Power ( $1-\beta$  err prob) =0.99.

**Demographic Information Sheet.** A self-assemble Demographic Information Questionnaire was used to collect personal information from the teenagers. The demographic questionnaire consisted of questions about age, gender, family system, mother's education, and academic grades.

**Standard Progressive Matrices (SPM):** Teenager's GF was measured through The Standard Progressive Matrices (SPM). The SPM included 60 spatial tasks of 12 trails which are divided into five blocks, from easiest to difficult. In every trial, participants were required to a series of matrices by recognizing the similar features based upon the spatial group of a range of objects and selecting one object that is similar one.

**Bell's Adjustment inventory (BI):** The current study used Bell's Adjustment inventory (BI), Urdu translated version, and two sub-scales (EA and HA) was used. This scale was translated by Shabbir and Sahar in 2014. In 1963 Bell published a test of student adjustment that is known as the adjustment inventory. Latterly it is known as the Bell Adjustment Inventory. The inventory is based on a series of 140 questions which are used to measure an individual's four domains such as home, emotional, social, and health adjustment. The items of the test are dichotomous scoring based. Low scores on tests showed healthy adjustment whereas high scores revealed maladjustment of individuals. EA was defined as emotional comprehension, emotional control, depression, and happiness. HA was defined as, relations with parents and siblings, family, and satisfaction with home environment and socioeconomic status.

The data were analyzed using SPSS. All descriptive statistics were stated as a percentage, frequency, mean, and standard deviation (SD). The Pearson product-moment correlation analysis was used to explore the association between variables. The Amos analysis was executed for predictors and finding the mediator in the study. The unstandardized regression coefficients ( $\beta$ ) and 95% confidence intervals (CIs) were used to quantify the associations between variables. The p-value of <0.05 was considered statistically significant. The Amos analysis was performed for mediating the variables.

## **3. Results**

Data was gathered from secondary schools of the urban area of Faisalabad from the sample of 180 students, 82 (45%) were male, and 98 (55%) were female. Between the ages of 14 and 16 (M 15.5, SD 0.5) from grades 9th to 10th. The academic grades of students in previous classes were, A 26%, B 55 %, and C 19 % respectively. 44% of teenagers have belonged to the joint family system and 56% belonged to the nuclear family system. Furthermore, the mother’s education was 6% postgraduate, graduate 24%, Intermediate 48%, Matric 14%, and 8 % were below Matric respectively.

**Table 1:** Pearson Product Moment Correlation among Study Variables (N=180) and descriptive statistics of collected variables

Variables		1	2	3	4	5
1	EA	-	.832**	-.740**	-.750**	-.794**
2	HA		-	-.745**	-.765**	-.807**
3	GF			-	.810**	.884**
4	Mother’s education				-	.882**
5	Academic achievement					-
	N	180	180	180		
	Mean	13.97	13.55	42.37		
	SD	5.23	4.85	6.48		
	A	.756	.753	.814		
	Range	25	21	26		
	Minimum	3	4	30		
	Maximum	28	25	56		
	Skewness	Statistic	.082	.147	-.054	
		St. error	.180	.180	.180	
	Kurtosis	Statistic	-.753	-.807	-.988	
		St. error	.360	.360	.360	

\*\*Correlation is significant at the 0.01 level (two-tailed). \*Correlation is significant at the 0.05 level (two-tailed).

Pearson product-moment correlation analysis was used to explore the relationship between study variables. Results depicted that almost all the study variables were significantly correlated with one another. Results presented that EA is highly correlated with HA. EA and HA are negatively correlated with fluid adjustment.

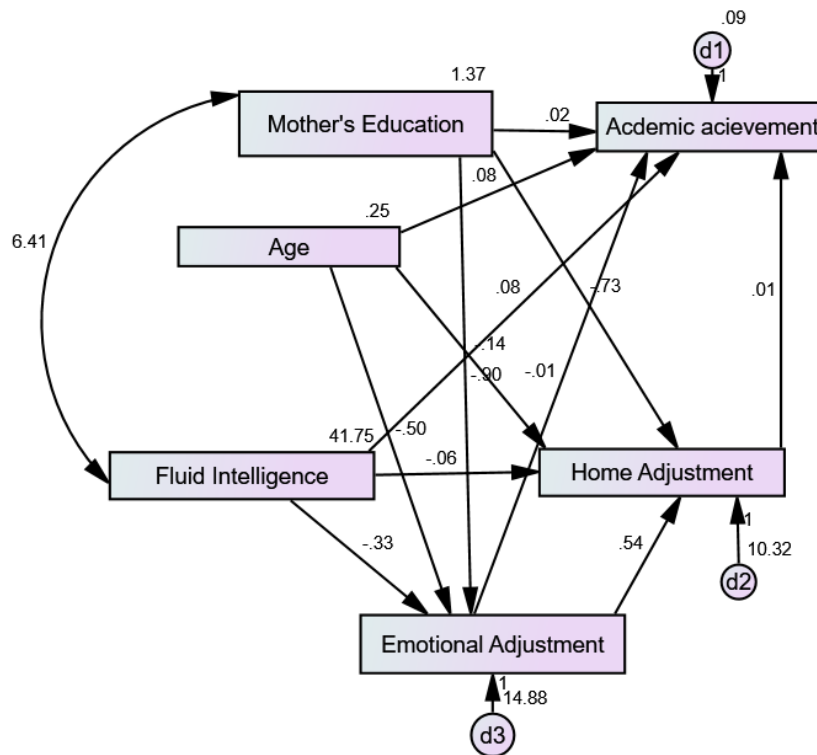
Further, the above table shows that a mother’s education is significantly negatively correlated with home and EA and positively correlated with GF and academic achievement of teenagers. The academic achievement of teenagers is positively correlated with GF and the mother’s education. And it is negatively correlated with emotional and home adjustment.

Table 1 shows the descriptive statistics of GF, EA, and HA. According to Trochim & Donnelly, 2006; George & Mallery, 2010, the skewness and kurtosis standard limit is between -2 and +2 for the normal data spread. The complete study variables have skewness and kurtosis within standard limitation ( $\pm$ ). Which shows that these variables' data are normally distributed.

Moreover, the table also embodies the mean, standard deviation, and Cronbach’s alpha (reliability) for the all-study variables. EA of the teenager has Cronbach’s alpha of .7, Mean 13.97, and standard deviation 5.23. And the HA of teenagers has Cronbach’s alpha, Mean and standard deviation of .753, 13.55, and 4.85

respectively.

**Figure I**



**Table 2:** Fit Indices for GF, HA, EA, mother’s education, age of teenagers and academic grades (N=180)

Model	$\chi^2$	df	$\chi^2/df$	CFI	NNFI	GFI	RMSEA
Model							
Fit	.159	1	.159	1	1.01	1	.000

Note: Entire changes in chi-square values are computed relative to the model,  $\chi^2 > .05$ ., GFI= Goodness of the fit index, CFI=comparative fit index, NNFI (TLI) =non-normed fit index; RMSEA=root mean square error of approximation,

Table 2 showed depicts fit indices for GF, EA, and HA mothers’ education, age, and academic grades of teenagers in the school. The chi-square test of absolute model fit is sensitive to sample size and the number of parameters, researchers frequently turn to several descriptive fit statistics to measure the total fit of a model to the data which is recommended by Hu and Bentler (1999)  $\chi^2/df$  between 1 and 3, RMSEA values .08 or lesser also Comparative Fit Index (CFI), Tucker-Lewis Index (TLI) or Non-normed fit Index (NNFI) and Goodness of fit Index (GFI) values of .9 or higher are suggested as good while  $.9 \leq .8$  is consider permitted sometimes.

**Table 3:** Standardized Estimates of Direct Effects

<b>Variables</b>	<b>β</b>	<b>p</b>
EA <--- GF	-.381***	.001
EA<---Mother’s Education	-.441*	.001
EA <--- Age	.012	.805
HA <--- GF	-.164*	.018
HA <--- EA	.545***	.001
HA <--- Mother’s Education	-.224**	.001
HA <--- Age	-.026	.494
Academic Grades <--- GF	.406***	.001
Academic Grades <--- EA	-.101*	.045
Academic Grades <--- HA	-.133*	.010
Academic Grades <--- Mother’s Education	.375***	.001
Academic Grades <--- Age	.003	.914

Note: \*\*p<.001. \*p<.05

According to the result of direct effect, GF has emerged as negative predictor for EA, HA and positive predictor of academic grades. HA was strongly predicted by EA. Likewise the result indicated that EA and HA were significantly negative predicted by mother’s education. Further the results showed mother’s education was a strong predictor for academic grades.

**Table 4:** Standardized Estimates of indirect Effects

<b>Variables</b>	<b>β</b>	<b>p</b>
HA <---EA <--- GF	.243***	.001

Note: \*\*p<.001. \*p<.05

The results of the indirect effect indicated, EA was a highly significant mediator between the relationship of GF and HA.

#### **4. Discussion**

The current study was based on two assumptions. The first was to investigate the relationship between GF, EA, and HA of teenagers as well as the relationship with the demographic variables. The Second was to investigate the direct and indirect impact of GF, EA, and HA. Predominantly It was presumed that there would probably be a significant relationship between GF, EA, and HA. Results have shown that GF was negatively correlated with emotional and home adjustment. These results corroborate the work of Li, Liu, and Shi (2020), who explored the correlation between emotional conflict adaptation and GF. Their results had shown that intellectual differences helped in emotional conflict adaption. Similarly, Kaur and Gupta (2021) reported that intelligence is significantly correlated with internal or external adjustment e.g., the part of EA of personal and environmental stressors with respect to the gender of adolescents. Furthermore, Initial nurturing home atmospheres, socioeconomic status, and mother's education shelter younger children against the impacts of initial hardships on teenager intelligence, with an enduring optimistic link to teenager's cognition (Trude et al., 2021).

Another part of the first aim result has shown that GF, emotional, and HA significantly correlated with demographic variables such as the mother's educational level and academic achievement. These findings are in consonance with the investigation by Cui et al., (2019) presented that mother's education improved teenager's mental health condition and decreased the occurrence of malnourished. Mother's education increased teenagers' personal control linked to academics. In one more study, the results demonstrated that the same structure of the parent-teenager relationship, as measured by psych-emotional and school maladjustment, predicted academic performance for both male and female teenagers; however, the strength of the association between acceptance of parents and results for all additional factors varied reliant on the gender of the teenager (Bully et al., 2019). Dhingra and Chauhan (2017) reported that life skills (emotional abilities, thinking abilities, and problem-solving abilities) and parental education were significantly correlated. Another systematic meta-analysis on the association between educational outcome and cognitive abilities had identified that the higher the cognitive ability the higher the chances of educational achievement. Further, they reported that investment in initial cognitive development would lead to improving economic and educational outcomes (Ozawa et al., 2022). Li and Shi (2021) claimed that the trait of emotional intelligence and GF was related to average teenage students' academic achievement. Further to our results, in 2019, Mohan concluded that the correlation of co-efficient indicates that there was a significant relationship between HA and socio-demographic variables of age, residence, and socioeconomic status. There was a significant Chi-square association between home adjustment and family environment dimensions of system maintenance dimensions.

In line with our study purpose, the second aim was to investigate the effect of direct and indirect effects among study variables. The result has shown that GF emerged as a negative predictor for EA, and HA, and a positive predictor of academic grades. There was little past literature that had studied these variables' combinations. However, to some extent, these findings were allied with Haider and Stumm (2022) had studied the growth changes between adolescence and adulthood in the U.K. They found that intelligence was a better predictor as compared to personality traits. Intelligence was a noteworthy proportion of the link between academic achievements, socio-emotional capacities e.g., behavioral problems, helping others, aggressive behavior, and socioeconomic status of family. Likewise, Tamara and Vladimir (2016) found emotional understanding, grades, and nonverbal GF predicted students' GPA, and emotional and social functioning. In order to improve emotional understanding, an individual requires having better emotional perception, and on the basis of that an individual can develop and maintain emotion regulation abilities. It also permits us to direct our social circle or system with a good understanding of the emotion-laden behaviors of others. In particular, the regression analysis results of another study showed that the external factor was related to only age and verbal ability, whereas recognition of psycho-emotional forms required abstract reasoning ability more than age and verbal skill. Therefore, it is determined that the development of fluid intelligence has a significant role in the development of the mental component of emotional comprehension (De Stasio et al, 2014).

In addition to that the result of our study has shown that EA and HA were significantly negatively predicted by the mother's education. Further, the results showed mother's education was a strong predictor of academic grades. In 2016 Rocha claimed that students' academic achievement level was predicated by their mother's educational level. The empirical finding of He et al. (2021) has noted that intellectual capacity and girt have contributed on the educational achievement of adolescents. Further consistent with our assumption the finding had shown that HA was strongly predicated by EA. The outcome of one research analysis

represented that family socioeconomic status correlated with migrating adolescent's emotional adaptation. Likewise, according to another exploration, adolescents' positive emotions and resilience moderated linked between emotional outcome and family SES (Huang et al., 2019). Likewise, Costa and De Souza Fleith (2019) reviewed different databases and journals about the socio-emotional and cognitive variables that predict school achievement. They revealed that intellectual ability was the most important factor in school achievement; additionally, a few socio-emotional variables had also an impact such as self-efficacy and self-regulation.

Finally, this is the first study to investigate the role of EA mediator between GF and HA. The results of the indirect effect indicated that EA was a highly significant mediator in the relationship between GF and HA. In one of the reviewed studies, it has been observed that the regulation of emotion mediates the association between psychological adjustment and clarity of self-concept of adolescents. As an individual are better psychologically adjusted and have clear ideas about themselves, they can effectively channel their positive and negative emotions (Parise et al., 2019). In addition to that Łukasz Nikel et al., (2022) Also noted that self-efficacy mediated between the relationship of GF, school achievement, and shyness. Moreover, the structural equation model demonstrated that the association between the understanding of academic performance and emotion relies upon the mediator variable. Age appears to be an explanatory aspect of the variances found, the educational level of the mother is one suggestively predictor of socio-emotional competence, and fluid intelligence is a predictor of emotional understanding, academic achievement, and socio-emotional competence (Franco et al., 2017).

## 5. Conclusion:

Therefore, it is concluded that the study demonstrates that during the teenage stage, GF played an important role in emotional and home adjustment. Individuals with higher GF are better equipped to handle conflicts, show empathy, and understand the emotional needs of family members, which can lead to improved communication, decreased family stress, and increased overall satisfaction within the home. Emotional adjustment and home adjustment: Emotional adjustment plays a crucial role in maintaining healthy family dynamics and home adjustment

Moreover, teenagers with high levels of GF would have better problem-solving strategies and deal with novel situations effectively which helps in healthier emotional home adjustment. Further, a mother who has a high level of education would deal with their children's problems effectively whether those problems are related to academic or related psycho-social problems. Teenagers with high emotional adjustment can respond to conflicts and emotional situations in a constructive way, encouraging positive communication and reducing negative emotional experiences for all family members. Emotional adjustment plays a critical role in how well people handle emotional situations within the family. When a teenager is emotionally adjusted, he will be confident, self-aware, tolerate hardship, and adapt to the environment effectively which in turn helps him in problem-solving, abstract, and novel thinking, and he will accept their home environment and have a healthier relationship with their parents and siblings.

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