



## The Role of Defense Mechanisms in Predicting Adolescent Personality Traits

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### ABSTRACT

The objective of this cross-sectional study was to assess defense mechanisms and evaluate the predictive role of defense mechanisms on personality traits. The sample population consisted of 891 adolescents, aged between 17 and 19 years from Coimbatore, Tamil Nadu, India, selected through systematic random sampling method, during the academic year 2023-2024. The data collected using the Eysenck Personality Inventory and a self-developed scale on defense mechanisms were analysed by SPSS 30 and Jamovi 2.6.44, 2025. The defense mechanism scale was validated through principal component analysis, resulting in 11 components with 30 items, with a factor loading threshold of 0.4. The scale demonstrated good internal consistency (Cronbach's alpha = .751), an adequate KMO (0.716), significant Bartlett's test of sphericity, and a 51.150 cumulative percentage. An r value of 0.991 in test-retest indicated excellent reliability, and CFA (SEM)-Comparative Fit Index (CFI) showed .902, TLI .900; Parsimony Comparative Fit Index (PNFI) .621, which is greater than 0.50 confirmed good fit. The findings of linear regression analysis depicted that reaction formation was a common defense mechanism among adolescents and significantly predicted introversion and neuroticism, while denial was the least used defense mechanism. Rationalization and projection were significant predictors of extroversion, whereas mature defense, like sublimation, was found to be the predictor of stable personality traits. Notably, reaction formation, a neurotic defense mechanism, was used frequently by adolescents in this study, which is a cause for concern, to realize the need for tailored interventions to promote adolescents' healthy personality, mental health and well-being.

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## 1. Introduction

Adolescence is a time of significant change, where external influences and experiences lead to shifts in personality and values. This highlights the dynamic nature of this developmental stage. Sigmund Freud's personality theory addresses the complications of adolescent development as a critical period for psychological transformation, where they navigate their identities and beliefs through the id, ego, and superego. This transition marked the incorporation of past experience and future goals, shaping character formation and interpersonal relationships (Tanjung et al., 2023). Personality traits were interconnected with socialization experiences, which shape individual personalities and influence behavioral predispositions, including the risk of developing antisocial behaviors in children and youth (Center and Kemp et al., 2002). Defense mechanisms and personality traits significantly influence adolescents' emotions and their function in society. Research examining the adaptive defenses was associated with a healthier personality style, whereas the maladaptive defenses led to an increase in psychological distress and interpersonal complications (Di Giuseppe et al, 2020; Maghami et al., 2024; Granieri et al., 2017). Defense mechanisms were psychological processes that help an individual to act in stressful and threatening situations, and were categorized into three types such as mature, immature, and neurotic defense mechanisms (Hall et al , 1997). It is necessary to acknowledge the approach to handling life changes and ongoing stress based on the circumstances. Different factors affect the mechanisms utilized by individuals, which cause individuals to be afflicted by various mental and even physical problems. Any type of change, both favorable and unfavorable, in human life requires dealing and adjustment (Mohammadlou., 2016). Different types of defense mechanisms, including immature and neurotic defenses, correlate with particular personality traits and psychosocial functioning, suggesting that their prevalence reflects underlying personality structures (Blanco et al., 2023). Research on defense mechanisms has consistently emphasized their significance in psychological adaptation and personality development (Cramer, 2006). Contemporary psychoanalytic theory conceptualizes defense mechanisms were normal aspect of relational and developmental growth that safeguards the ego and supports adaptation (Di Giuseppe et al, 2019; Maghami et al., 2024). However, from a recent past defense mechanisms have gathered the interest of researchers because of their particular significance in understanding and addressing psychological disorders from a psychotic perspective. Consequently, one of the factors that may influence the development of personality disorders by affecting personality organization is defense mechanisms (Gholami et al.,2024). Studies which focus on adolescents were comparatively less, and existing literature explored these defense mechanisms in a clinical setting or narrowly examined single defense mechanisms without exploring their broader predictive relationship with personality traits (Laczkovics et.al, 2018). It is clearly observed that a gap in the literature regarding how defense mechanisms were employed by adolescents in Indian settings and how they shaped the personality traits. Addressing this gap, the study aims to assess the use of different defense mechanisms among adolescents, identify their personality traits, and examine the predictive role of defense mechanisms in adolescent personality traits through a Cross-sectional study. Educators and mental health professionals can utilize this knowledge to foster environments that promote healthy psychological development (Matyash & Pavlova, 2023). Conversely, while defense mechanisms were essential for coping, over-reliance on maladaptive strategies hinders emotional growth and leads to personality disorders. This duality emphasizes the need for balanced approaches providing psychological support for adolescents.

## 2. Method

### 2.1 Population, Sample, and Data Collection Method

#### Methods

A cross-sectional study was planned to investigate the predictive capacity of defense mechanisms on personality traits of adolescents. The Coimbatore city of Tamil Nadu, India, has five zones, seven colleges from all five zones (North, East, Central, West and South zones) were selected for the study to have an equal representation of the sample. However, five colleges, one from each zone permitted to meet the adolescent students and collect the data. Initially a total of 1220 students consented and participated, and data was collected; however, 329 cases were excluded based on the lie score of the Eysenck Personality Inventory. The study consisted of 891 adolescents between 17-19 years, both male (459) and female (432), studying in government and private colleges selected using a random sampling method. Adolescents who enrolled in college and understood English were included in the study. Adolescents with special needs, as reported by their teachers based on medical history, were excluded.

### 2.2 Research Instruments

**2.2.1 Eysenck Personality Inventory:** The Eysenck Personality Inventory (EPI; Eysenck & Eysenck, 1968) was the briefest and most popular personality inventory. It measures the personality traits of extraversion, introversion, neuroticism, stability, and lie. The forms consisted of 57 items. The extroversion-introversion dimension was measured using 24 questions, whereby scores exceeding 15 indicated extroversion, scores ranging from 10-14 were considered in-between, and scores below 9 signified introversion. Similarly, the neuroticism-stability dimension was evaluated through another set of 24 questions, with a score above 14 classified as neuroticism, scores between 7-13 as in-between, and scores below 6 reflected emotional stability. The lie scale comprised 9 items; participants who scored above 5 were excluded from the analysis. The Cronbach's Alpha was .70 The psychometric details were not available during the test's development (Eysenck & Eysenck, 1968). In 1975, a third dimension known as Psychoticism (P) was added to the scale. Psychoticism measures traits such as aggressiveness, impulsivity, and a tendency toward antisocial behavior. However, rather than the Eysenck Personality Inventory (EPI), psychoticism was assessed using a separate tool called the Eysenck Personality Scale (EPQ).

**2.2.2 Defense mechanisms scale:** Based on Freud's psychoanalytic theory, defense mechanisms are unconscious processes that protect the individual from anxiety or the awareness of internal or external damage or stressors (Parekh et al., 2010). Defense mechanisms are used in every stages of life, nevertheless, the use become more noticeable during adolescents, this period is marked as a transitional stage between childhood and adulthood, characterized by profound identity formation and emotional maturation, these changes heightens emotional sensitivity, internal conflict and self-awareness which make the adolescents to employ defense mechanisms more often (Bailey and Pico 2023). When we look into the psychological theory of Erik Erikson's, Sigmund Freud and Jean Piaget, adolescence is a crucial stage of psychosocial, psychosexual and cognitive development; they experience heightened emotional sensitivity (Orenstein & Lewis, 2022; Lantz et al., 2025; Malik & Marwaha, 2023). Simultaneously, psychological changes increase the reliance on defense mechanisms as adolescents attempt to maintain emotional stability, making this stage an important period for personality organization and psychological development (Cramer, 2012). Using Freud's psychoanalytic theory as a foundation, an assessment scale was

developed to assess defense mechanism usage among adolescents. The defense mechanisms component was selected after reviewing related literature such as Compensation, Sublimation, regression, introjection, projection, denial, displacement, reaction formation, repression, rationalization and intellectuallization (Bailey and Pico 2023). Initially, 100 statements were framed and subjected to face validity for further refinement. The scale was sent to seven subject experts for face validity: two clinical psychologists, four human development experts, and one expert from psychology. Based on the corrections and suggestions given by the experts, 29 statements were taken out, and 71 statements were retained. Further, Principal Component Analysis (PCA) was conducted; as per the analysis the scale was further reduced to 30 items with 11 components. The scale was validated with a Kaiser-Meyer-Olkin Measure of Sampling (KMO) score of .716, which showed an adequate sample size. The Bartlett test of sphericity was significant ( $\chi^2 = 1871.516$ ), and the cumulative percentage was 51.150. The factor loading of 0.4 was set as the threshold in the PCA component matrix. The Cronbach's Alpha test was acceptable at .751. Also, the test-retest reliability of the scale was tested with a Pearson correlation; the coefficient score of  $r = .991$  indicated an excellent reliability. To further validate the tool, a Confirmatory Factor Analysis CFA using Structural Equation Modelling (SEM) was conducted, aimed to confirm and refine the observed variable (items) and their underlying latent constructs (components) identified through PCA. Through this confirmatory testing, as per the analysis 4 statements were removed (one from each defense mechanisms) projection, introjection, repression and rationalization, and obtained the goodness-of-fit indices, such as the Comparative Fit Index (CFI) showed .902, TLI, .900; Parsimony Comparative Fit Index (PNFI), .621, which is greater than 0.50; and RMSEA-0.034, indicated acceptable fit (Zewude & Hercz, 2021). Figure 1 illustrates the model fit of the SEM. The components were coded as continuous; finally, the scale was validated with 26 items with a 5-point rating, indicating always, frequently, sometimes, rarely, and never with 5,4,3,2,1, and vice versa for negative items, where the sum of the total score indicated the level of usage, a lower score reflected lower usage of defense mechanisms.

In the diagram provided, lines with arrows indicate direct relationships between variables. While the values on the arrows represent the coefficients, solid lines denote the strength of these relationships. In contrast, dashed lines indicate a weak statistical relationship.

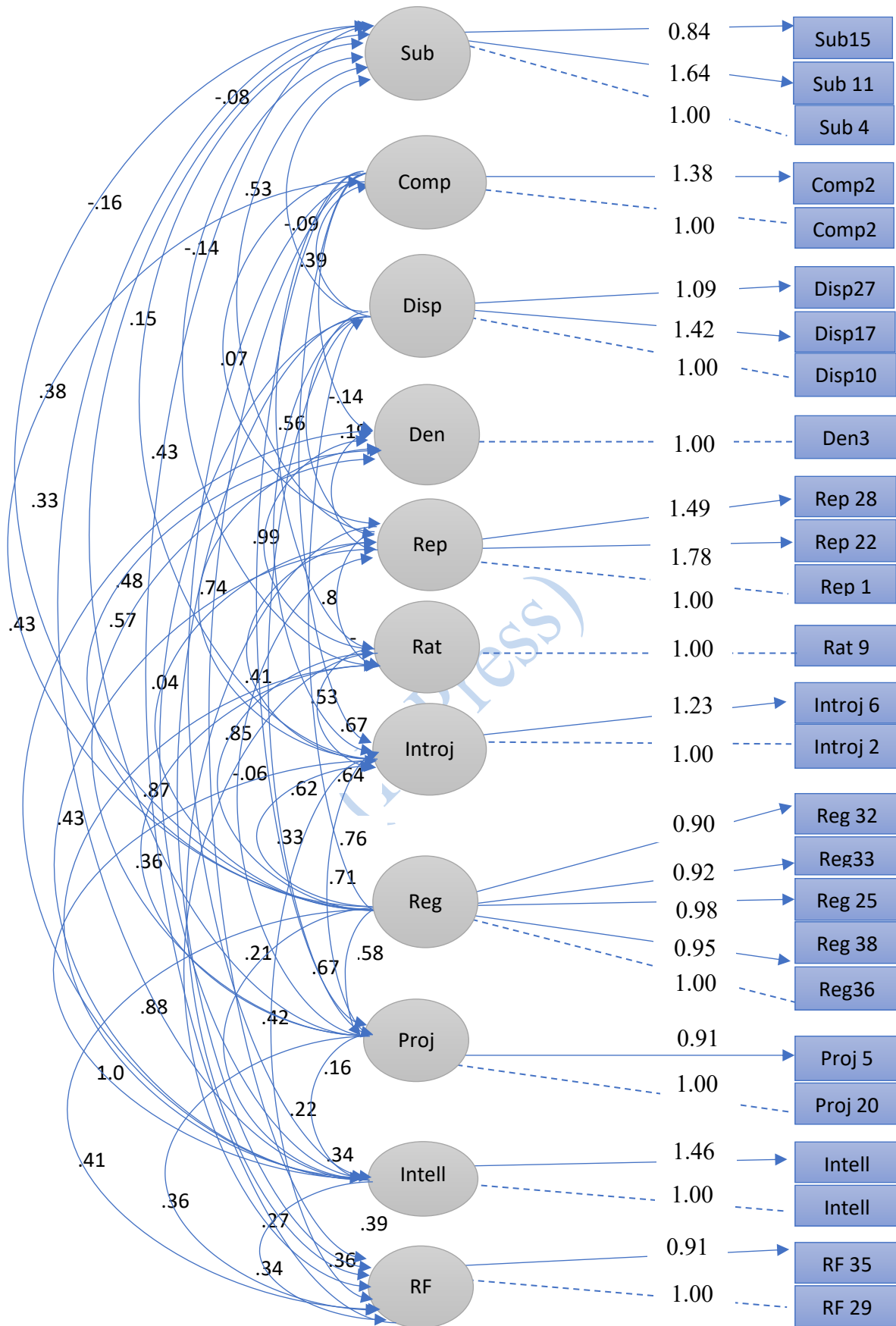


Figure 1. Model fit of SEM

### **2.3 Procedure**

The study received approval from the human ethical committee at the institute [AUW/IHEC/HD-19-20/XPD/47] on 20<sup>th</sup> January 2020. Permission was obtained from the respective college principals to meet the adolescents. Consent was obtained from the student participants, and data were collected according to the time schedule.

### **2.4 Method Analysis**

The collected data were consolidated and tabulated. Statistical tests, such as frequency percentage, were calculated to assess the levels of usage of different defense mechanisms. The data was categorized according to the personality traits of adolescents. Linear regression analysis was applied to identify the predictive capacity of defense mechanisms on the personality traits of adolescents. The statistical analysis was carried out using SPSS 30 and Jamovi 2.6.44, 2025 an open-source statistical software.

## **3 Results**

### **3.1 Demographic Description**

Socio-demography serves as an independent variable that influences various factors. It is the sociological and demographic profile of an individual which categorizes them with a population and determines their socio-demographic position. It is important in behavioral and social science as they significantly influence individual behavior and attitude, habits, and character, which shape social interaction and relationships. It addresses the differences among groups and helps to formulate interventions that are relevant to a particular context. In this study, socio-demographic markers such as age, gender, area of residence, type of family, type of college attended, educational qualifications of parents, parents' occupations, family income, and birth order were included.

The sample consisted of 891 adolescents, aged between 17 and 19 years, with 459 males and 432 females. Most participants (48.1%) lived in urban areas, while 15.5% resided in semi-urban areas. Additionally, 74.7% came from nuclear families, joint families, and only 2.5% were from extended families. They were enrolled in various academic programs across selected institutions such as government colleges and private colleges. Including co-education (92.3%) and girls-only (7.7%) colleges. The majority of the participants (79.9%) reported an annual family income of less than 2 lakh, followed by those earning between 2-5lakh, 5- 10 lakh, and above 10 lakh (3.3%). Regarding occupational status, the majority of fathers (52%) were employed in the private sector, this was followed by those working in business, the government sector, and the smallest group, 6.1%, were homemakers. Conversely, most mothers (72.4%) were homemakers, followed by those employed in the private sector and the government sector; the smallest percent, 4.5, were involved in business. In terms of the educational qualification of the fathers, 33.7% had completed the Secondary School Leaving Certificate (SSLC), followed by those with a Higher Secondary School Leaving Certificate (HSSLC), non-literate, graduates, post-graduate degree, and the least percent, 3.4 holding a professional course degree. Similarly, among the mothers, 36.8% had a degree of Secondary School Leaving Certificate (SSLC), followed by Higher Secondary School Leaving Certificate (HSSLC), non-literate, graduates, and post-graduate degree, but only 2.2% held a professional course degree. Concerning the birth order majority, 54.4% were firstborn children, followed by secondborn, thirdborn born and the least percent 1.7 belonged to the "other" birth order category.

### 3.2 Descriptive indicators

Table 1 showed the interpretation of the results based on the levels of different defense mechanisms of the adolescents. Tables 2 elucidate the personality traits of the adolescents. Table 3, the regression analysis consists of three models, each assessing different combinations of predictors (defense mechanisms) about the dependent variables (personality traits). The immature defense mechanism and in-between personality category were removed from the table since it does not show a significant predictor. The significance levels (Sig.) indicate the statistical importance of each predictor, while VIF (Variance Inflation Factor) and Tolerance (Tol.) assess multicollinearity.

**Table 1:** Level of usage of different defense mechanisms (n=891)

Defense mechanisms	Components	Levels of defense mechanisms	N	Percent	
Mature	Compensation	Low	565	63.4	
		High	326	36.6	
	Sublimation	Low	483	54.2	
		High	408	45.8	
Immature	Regression	Low	496	55.7	
		High	395	44.3	
	Introjection	Low	548	61.5	
		High	343	38.5	
	Projection	Low	499	56	
		High	392	44	
	Denial	Low	659	74	
		High	232	26	
	Neurotic	Displacement	Low	549	61.6
			High	342	38.4
Reaction formation		Low	473	53.1	
		High	418	46.9	
Repression		Low	566	63.5	
		High	325	36.5	
Intellectualization	Low	522	58.6		
	High	369	41.4		
Rationalization	Low	528	59.3		
	High	363	40.7		

The results of table 1 elucidates the level of usage of certain defense mechanisms by adolescents. The defense mechanisms such as, regression an unconscious defense mechanism in which a person returns to behaviors, thoughts, or feelings from an earlier developmental stage when confronted with stress or threat, introjection the process of taking the qualities or traits of others or something from outside and making them to be a persons personality. While projection defense mechanisms, where individuals see their own negative traits or feelings in others instead of themselves, displacement defense mechanism where individuals take out their emotions such as anger or fear on someone or something less threatening than the real cause, likewise, repression a mental process which hides painful memories or unacceptable thoughts so an individual doesn't have to face them, rationalization a process when an individuals justify their behaviors, thoughts, or feelings with reason that sound logical, even if those reasons aren't the real truth and intellectualization a defense mechanism when a person deals with stressful or emotional situation by thinking about them in a logical or factual way instead of feeling the emotions (APA, 2015; Cushman, 2020). It showed that adolescents

employ specific defense mechanisms occasionally. Mature defense such as sublimation where an individual redirect an unacceptable or socially undesirable feelings, urges or impulses into constructive and socially acceptable activities (Cohen & Kim, 2020) and compensation when an individual focuses on attaining success in one area of life to divert attention from feelings of inadequacy or the anxiety of not measuring up in another area was less frequently used, which showed that the adolescent may not be predominantly engaged in the healthiest coping strategies. The immature defenses like denial where they reject external reality, chose to focus on internal justification or flawed reasoning, was the least used, which indicated that most people do not completely reject reality (Bailey and Pico 2023). Reaction formation a neurotic defense mechanisms where an individual unconsciously replaces an unwanted or threatening impulse with its opposite were commonly employed by the adolescents. Essentially, they act in a way that is opposing to their true feelings or desires to reduce anxiety or internal conflict appears, suggesting that the adolescent often dealt with stress through indirect or conflicting emotional expression (Nawi et.al.,2020).

**Table 2:** Personality traits of adolescents (Extroversion –Introversion and Neuroticisms-Stability)

Personality traits	Category	Frequency	Percent
Extroversion-introversion	Extroversion	294	33.0
	In-between	518	58.1
	Introversion	79	8.9
Neuroticism-stability	Neuroticism	477	53.5
	In-between	376	42.2
	Stability	38	4.3

The results of Table 2 illustrate the personality traits of the adolescents. Under the dimension of extroversion-introversion, adolescents (33%) were categorized as extroverts, which reflected sociability and assertiveness (Cybulski et.al., 2014) followed by 58.1% of adolescents as in-between category. Pop Jordanova & Zorcec (2010) study mentioned that adolescents with mixed traits may display both extroverted and introverted behavior, adapting their responses to the situation. While the least percentage (8.9 %) were categorized as introverts' personality traits, where they were possibly at risk due to their social withdrawal (Delendra et al, 2023). Research showed that introversion significantly impacts adolescents school adjustment, affecting their social adjustment in the environment (Mlanga & Adie, 2022).

Subsequently, under the dimension of neuroticism-stability, 53.5% of adolescents were categorized under neuroticism, indicating that they were emotionally unstable and anxious (Cybulski 2014). Peters et al. (2019) stated that Eysenck's trait of neuroticism involves mood instability and anxiety, which is linked to impulsivity and risk-taking, while anxiety denotes emotional response, and 42.2% were categorized as in-between personality traits, moderately resilient to stress, able to manage themselves well, and had a balanced outlook on life. They were identified as having a blend of neuroticism and stable personality traits. Whereas adolescents (4.3%) were categorized under stability. Qizi (2024) cited in their study that when adolescents were emotionally stable, they were able to tackle problems and stressors, which improves problem-solving skills and supports mental health enhancing the effectiveness of coping strategies in challenging situations.

### 3.3 Stepwise Regression Analysis

**Table 3:** Predictive capacity of defense mechanisms on personality traits of adolescents (n=891)

Personality trait	Defense mechanism Predictor	Unstandardized B	$\beta$	t	Sig.	Collinearity Statistics		R	R <sup>2</sup>	Adjusted R-squared	F	Sig.
						Tol.	VIF					
Extroversion	Rationalization	.16	.13	2.34	.02	.99	1.00	.14 <sup>a</sup>	.02	.01	6.02	.015 <sup>b</sup>
	Projection	.09	.11	2.02	.04	.99	1.00	.18 <sup>b</sup>	.03	.02	5.09	.007 <sup>c</sup>
Introversion	Repression	-.15	.06	-2.46	.01	1.00	1.00	.26 <sup>a</sup>	.07	.06	6.01	.016 <sup>b</sup>
	Reaction formation	.13	.06	2.12	.03	1.00	1.00	.35 <sup>b</sup>	.12	.10	5.41	.006 <sup>c</sup>
Neuroticism	Reaction formation	-.12	-.12	-2.78	.006	.98	1.01	.11 <sup>a</sup>	.01	.01	6.14	.014 <sup>b</sup>
	Rationalization	.19	.12	2.66	.008	.98	1.01	.16 <sup>b</sup>	.02	.02	6.65	.001 <sup>c</sup>
Stability	Stability	.14	.37	2.44	.01	1.00	1.00	.37 <sup>a</sup>	.14	.11	5.98	.019 <sup>b</sup>

Table 3 presents the results of a stepwise regression analysis conducted to examine the extent to which defense mechanisms predict personality traits. The analysis revealed that rationalization ( $F = 6.023$ ,  $t = 2.348$ ,  $p = .015$ ,  $R^2 = .020$ ,  $\beta = .136$ ,  $VIF = 1.003$ ), a neurotic defense mechanism where individual justify their behavior through logical explanation and projection ( $F = 5.097$ ,  $t = 2.027$ ,  $p = .007$ ,  $\beta = .117$ ,  $VIF = 1.003$ ), an immature defense mechanisms involving attributing one's own maladaptive impulses to others, were significant predictors of extroversion personality trait, explaining 2.0% and 3.4% of its variance respectively, with each unit increase in rationalization and projection, there is an increase in .161 and .091 extroversion scores. Further, the analysis revealed that repression ( $F = 6.018$ ,  $t = -2.467$ ,  $p = .016$ ,  $\beta = .064$ ,  $R^2 = .072$ ,  $VIF = 1.000$ ), which involves subconsciously blocking undesirable thoughts or impulses, and reaction formation ( $F = 5.414$ ,  $t = 2.129$ ,  $p = .006$ ,  $\beta = .062$ ,  $R^2 = .125$ ,  $VIF = 1.000$ ), which replaces an initial impulse with its opposite, were significant predictors of introversion personality trait, repression explained about 7.2% of the variance, a unit change in repression defense mechanism, introversion personality traits decrease by -.157 scores and reaction formation explain 12.5% of the variance, one unit change in reaction formation, resulting in a rise of .132 in introversion scores. Therefore, the use of reaction formation defense mechanism increases the introvert personality trait.

The predictors for neurotic personality traits were found to be reaction formation ( $F = 6.141$ ,  $t = -2.785$ ,  $p = .014$ ,  $\beta = -0.127$ ,  $R^2 = .013$ ,  $VIF = 1.014$ ), and rationalization ( $F = 6.650$ ,  $t = 2.661$ ,  $p = .001$ ,  $\beta = 0.121$ ,  $R^2 = .027$ ,  $VIF = 1.014$ ), which are the neurotic defense mechanisms, with reaction formation explaining 1.3% and rationalization 2.7% of the variance, with a decreased score -0.128 when reaction formation is changed by a unit and increased by 0.198 score when a unit change in rationalisation happens, indicating that the use of rationalisation defense mechanism increases neurotic personality trait.

Lastly, a significant regression was found ( $F = 5.984$ ,  $t = 2.446$ ,  $p = .019$ ,  $\beta = 0.378$ ,  $VIF = 1.000$ ) in the sublimation defense mechanism with stability personality traits; the predictor demonstrates VIF values within an acceptable range, indicating model stability. The  $R^2$  was .143, indicating that the sublimation defense mechanism explained about 14.3% of the variance in stability personality traits. With each one-unit change in the sublimation defense mechanism, the predicted stability personality traits increased by .148 scores. Granieri et al. (2017) support the current finding that individuals who use mature defense mechanisms tend to show more stable personality traits over time. Likewise, Ghadimianfar (2015) found that mature defense mechanisms were a positive predictor of psychological well-being, implying

stability in personality traits. Furnham (2012) emphasized that individuals might also engage in mature defenses, which could mitigate the adverse effects of neuroticism on mental health.

#### **4. Discussion and Conclusion**

The present study investigated the use of defense mechanisms and the predictive capacity on personality traits. Sigmund Freud's psychodynamic theory views adolescence as a period of identity development and internal tension, characterized by a diverse and evolving pattern of defensive functioning, and our finding aligns with Freud's.

The key observation from the present study was that adolescents normally use certain defense mechanisms. A considerable proportion of adolescents (54.2%) showed limited use of mature defenses, such as sublimation, suggesting a reduced ability to redirect impulses into adolescents (63.4%) fall into the low category. Freud stated that mature defensive functioning develops with psychological growth, so the low occurrence of mature defenses in adolescents could reflect developmental challenges (Hall et al, 1997). This is consistent with Laczkovics et al. (2018) who reported that adolescents who have insecure attachment styles tend to use less mature defense mechanisms, which could lead to a greater level of immature and neurotic defenses, which in turn facilitate the effects of insecure attachment on psychological health as well as increasing the risk of psychopathology and behavior problems.

Another interesting result of immature defense mechanisms showed that the majority of adolescents (74%) tend to rely less on denial, which denotes that the adolescents do not completely rely on these mechanisms to avoid the facts. A moderate reliance was observed on introjection (61.5%), projection (56%), and regression (55.7%), indicating that the adolescents used these mechanisms to cope with stress. Euler et al. (2024) noted that a moderate reliance on immature defense mechanisms was associated with a significantly smaller reduction in self-harm during the 6-month dialectical behavior therapy.

Regarding neurotic defenses, adolescents (60%) depend less on these defensive functions. The lower use observed in our sample may reflect greater psychological resilience as supported by Jennifer (2016), the study advocates that lower use of neurotic defense mechanism might be less crucial for overall life satisfaction compared to mature and immature style, lower use of defensive functioning mainly neurotic and immature defenses, may lead to a better psychological well-being (Békés et al., 2024). Subsequently, the adolescents (40%) use neurotic defense mechanisms at a high level, which explains that they tend to experience more anxiety and stress, leading to the frequent use of maladaptive coping strategies (Ishfaq & Kamal, 2024).

Surprisingly, the extroversion-introversion category of personality traits showed that the majority (58.1%) of adolescents were identified as being in-between category, a blend of both extroverted and introverted traits. Adolescents with mixed traits may exhibit behavior of both extroversion and introversion, adapting their responses based on the situation, Freud's view that personality is not fixed but influenced by internal drives and environmental demands (Pop-Jordanova & Zorcec, 2010). Thirty-three per cent of adolescents were identified to be in an extroversion category, which reflects sociability and assertiveness (Cybulski, 2014). While a smaller group of introverts (8.9%) were possibly at risk due to their social withdrawal (Delendra et al, 2023). Mlanga & Adie (2022) highlighted that introversion significantly affects adolescent school social adjustment, indicating that introverted adolescents differ from extroverted adolescents in their social interaction and adjustment within the school environment.

Under the dimension of neuroticism-stability, the majority (53.5%) of the adolescents were categorized as neuroticisms, indicating that they were emotionally unstable and anxious (Cybulski 2014). Freud's theory stated that adolescence is marked by emotional instability and

heightened anxiety due to unresolved internal conflicts. It aligns with Eysenck's personality model, neuroticism encompasses mood instability and anxiety as a distinct component and is positively associated with impulsivity and risk-taking, while anxiety primarily reflects emotional response (Peters et al., 2019), similarly Xiong et al. (2022) study indicated that smartphone addiction is linked to traits of psychoticism and neuroticism. Adolescents (42.2%) were moderately resilient to stress, able to manage themselves well, and had a balanced outlook on life. They were identified as having a blend of neuroticism and stable personality traits. The lowest percentage was said to be emotionally stable (4.3%). Studies emphasised that when adolescents were emotionally stable, they were able to tackle problems and stressors. Stability enhances problem-solving skills and contributes positively to mental health, influencing the effectiveness of various coping strategies employed in challenging situations (Qizi, 2024).

The stepwise regression analysis showed that rationalization defense mechanisms was significantly associated with extrovert personality traits, which proved that extroverts may use rationalisation defense mechanisms, which made them to justify their behaviour, thoughts, or feelings by logical explanation while such justification sound reasonable yet they cover unacceptable thoughts and do not precisely potrait a person's true feeling and motivation, by consistently rationalizaing their actions, extroverts avoid confronting the reality of their actions and miss the chance for genuine self improvement (Cushman, 2020). The connection between projection defense mechanisms and extrovert personality traits can be examined through various behavioral and psychological frameworks. The projection defense mechanisms, where individuals attribute their negative characteristics to others, may impact the way extroverts engage socially, especially in contexts that demand forming connections and building relationships. People who suppress awareness of their own undesirable traits may project these characteristics onto others, thus influencing their social perceptions and interactions (Newman et al., 1997).

It can be observed that repression defense mechanisms significantly predict introversion personality traits, Diehl and Hay, (2010) study identified that introverted individuals may use avoidant or repressive coping more often than extraverts, but the relationship was small to moderate. Byrne, D. (1961) also highlighted that repression defense mechanism scored lower on extraversion and openness and they tended to be socially controlled and less emotionally expressive. In accordance with the study conducted by Weinberger (1995) such individuals often appear calm and reserved (superficially introverted), but it was driven by emotional avoidance.

The reaction formation defense mechanism was significantly associated with introversion personality traits. Adolescents who employed neurotic defense mechanism often displayed withdrawal behavior, which could aggravate introverted traits, and led to an increase in social anxiety and difficulties in socialization (Giuseppe et al.,2019), further reducing their well-being, social engagement and emotional regulation (Stone et al.,2025). Ryan et al (2024) studies indicated that reaction formation served as a protective mechanism that leads to internal conflict and an introverted person often displays signs of a dysfunctional coping mechanism, but their use of reaction formation may not always be adaptive.

The present study depicts that reaction formation, a neurotic defense mechanism, predicts neuroticism personality traits. Various studies highlighted a significant association between neurotic defense mechanisms and neuroticism personality traits. Likewise, a neurotic defense was prevalent among those with high neuroticism. Febriana et al. (2022) study explores reaction formation as a defense strategy to hide genuine emotions, suggesting that these mechanisms may reveal underlying neurotic.

It was also seen that rationalization a neurotic defense mechanism where an individual performed an action and then pretends the beliefs and desires that would have made it rational was a significant predictor for the neuroticism personality traits where the person experience more frequent/intense negative emotions (anxiety, shame, anger), so they have stronger motivation to reduce those unpleasant states, because rationalization reduces distress quickly and preserves self-image, it is a commonly observed coping/defensive response in people high in neuroticism (Widiger and Oltmanns, 2017). The present results were aligned with the empirical study conducted by Morell and Andrews (1980), where they directly examined rationality/rationalising styles and found an association with neuroticism personality traits. People higher in neuroticism were more likely to rely on neurotic/less-adaptive defense styles compared with emotionally stable people. In other words, neuroticism predicts greater use of defenses whose function is to reduce anxiety and protect self-esteem rationalizing among them (Widiger & Oltmanns, 2017).

Furthermore, the mature defense mechanisms, such as sublimation, were found to be associated with stability personality traits, which were linked to better emotional regulation and adaptive personality traits. Granieri et al. (2017) support the present finding that an individual who employs mature defense tends to exhibit greater stability personality traits over time. Similarly, the study conducted by Ghadimianfar (2015) indicated that the mature defense mechanism positively predicts psychological well-being, suggesting stability in personality traits. Furnham (2012) highlighted that an individual may also utilize mature defenses, which could lessen the negative impacts of neuroticism on mental health. The finding reinforces Freud's psychodynamic theory, and it also aligns with several studies highlighting the important role that defense mechanisms play an important role in predicting personality traits and promoting mental health during adolescence. This study brings out the need to foster mature defenses to support adaptive functioning and resilience during the critical stage of growth.

#### **4.1 Conclusion**

The study gives profound insights into adolescent psychological development and methods of coping with life challenges. The present study showed that these defense mechanisms play a crucial role in predicting various aspects of personality traits and navigating the complexities of inner conflict, managing psychodynamic conflicts, particularly in the framework of mental health challenges. The findings highlighting these relationships can enlighten interventions aimed at promoting healthier psychological functioning and gain a clearer understanding of the psychological landscape of adolescents. Moreover, it was quite alarming to see the results of this study, where there were only 4.3% adolescents who exhibited stable personality traits, which points towards the need for tailored interventions for adolescents specifically to foster a healthy personality development.

#### **4.2 Limitations and recommendations for future research**

A limitation of the study was the geographical representation of the study participants. The participants were drawn from the city of Coimbatore, Tamil Nadu, India, which may limit cultural variation as well as generalisation. Moreover, the socio-demographic conditions of the participants indeed bring in significant changes in the results when analysed for their association. But the objective of this study was to analyse whether defense mechanisms predict personality development among adolescents. Hence, not considering socio-demographic markers in the study is a limitation. Future research may be conducted with the incorporation of mediating variables, such as gender, socioeconomic status, and cultural differences, as these factors can have a significant impact on the study outcomes. However,

broadening the sample to include different regions and social groups with diverse cultural and economic characteristics enhances the applicability of the findings. Additionally, the study recommends longitudinal studies as it helps to map the evolution, progress, and changes over time in this developmental stage of adolescents and also for more accurate results. In addition, examining the role of contextual factors such as educational settings, family dynamics, and peer or social networks would provide a comprehensive understanding of how these mechanisms were molded. Cross-cultural research exploring ethnic and sociocultural differences in adolescents' defensive patterns would offer valuable insights. By addressing this recommendation, future research could also enhance a tailored intervention to support mental health through the appropriate use of defense mechanisms and personality development.

## 5. Ethical Considerations

This study received ethical approval from the Human Ethics Committee at the institute (Approval No: AUW/IHEC/HD-19-20/XPD/47). The research was conducted with ethical principles, which involved permission from the respective college principals, and informed consent was taken from the participants. Ensuring the confidentiality of their information, maintaining data integrity, and allowing voluntary participation. Ethical principles were strictly maintained throughout the research process.

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## 7. Conflict of Interest

The author declared no conflict of interest concerning the research, authorship, or publication of this article.

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