



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 in personality traits. The sample population consisted of 891 adolescents, aged between 17 and 19 years from Coimbatore, Tamil Nadu, India, selected through a 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 using 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 the test-retest indicated excellent reliability, and CFA (SEM)- Comparative Fit Index (CFI) showed .902, TLI .900; and a Parsimony Comparative Fit Index (PNFI) .621, which is greater than 0.50 confirmed a 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 defenses, 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 adolescents navigate their identities and beliefs through the id, ego, and superego. This transition marks the incorporation of past experiences and future goals, shaping character formation and interpersonal relationships (Tanjung et al., 2023). Furthermore, personality traits are interconnected with socialization experiences, which shape individual personalities and influence behavioral predispositions, including the risk of developing antisocial behaviors in children and youth (Center et al., 2002). Defense mechanisms and personality traits significantly influence adolescents' emotions and their functioning in society. Research examining adaptive defenses has shown they are associated with a healthier personality style, whereas the maladaptive defenses lead to an increase in psychological distress and interpersonal complications (Di Giuseppe et al., 2020; Maghami et al., 2024; Granieri et al., 2017). Defense mechanisms are psychological processes that help an individual act in stressful and threatening situations, and are categorized into three types: 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, whether favorable and unfavorable, in human life requires dealing with it 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 as a normal aspect of relational and developmental growth that safeguards the ego and supports adaptation (Di Giuseppe et al., 2019; Maghami et al., 2024). However, in the recent past years, defense mechanisms have gathered the interest of researchers because of their particular significance in understanding and addressing psychological disorders from a psychotic perspective. Consequently, defense mechanisms are among the factors that may influence the development of personality disorders by affecting personality organization (Gholami et al., 2024). Studies which focus on adolescents are comparatively fewer, and existing literature explores these defense mechanisms in a clinical setting or narrowly examines single defense mechanisms without investigating their broader predictive relationship with personality traits (Laczkovics et al., 2018). There is a gap in the literature regarding how defense mechanisms are employed by adolescents in Indian settings and how they shape the personality traits. Addressing this gap, this 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 are essential for coping, over-reliance on maladaptive strategies hinders emotional growth and may contribute to personality disorders. This duality emphasizes the need for balanced approaches to provide psychological support for adolescents.

2. Method

2.1. Population, Sample, and Data Collection Method

A cross-sectional study was planned to investigate the predictive capacity of defense mechanisms on the personality traits of adolescents. The study was conducted in Coimbatore city of Tamil Nadu, India, which 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, were permitted to meet the adolescent students and collect the data. Initially a total of

1,220 students consented and participated, and data were 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) is a brief and most popular personality inventory. It measures the personality traits such as extraversion, introversion, neuroticism, stability, and social desirability (the lie scale). The forms consists of 57 items. The extroversion-introversion dimension was measured using 24 questions, whereby scores exceeding 15 indicated extroversion, scores ranging from 10–14 represent an average level and scores below 9 signified introversion. Similarly, the neuroticism-stability dimension was evaluated through another set of 24 questions, with a scores above 14 are classified as neuroticism, scores between 7-13 as average, and scores below 6 indicate 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 individuals from anxiety or the awareness of internal or external damage or stressors (Parekh et al., 2010). Defense mechanisms are used in every stage of life, nevertheless, their use becomes more noticeable during adolescence. This period is marked as a transitional stage between childhood and adulthood, characterized by profound identity formation and emotional maturation, these developmental changes heighten emotional sensitivity, internal conflict, and self-awareness which makes adolescents employ defense mechanisms more often (Bailey & Pico, 2023). From the perspectives of Erik Erikson, Sigmund Freud, and Jean Piaget, adolescence is a crucial stage of psychosocial, psychosexual, and cognitive development; adolescents experience heightened emotional sensitivity (Orenstein & Lewis, 2022; Kaur 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 & 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 psychologist. Based on the corrections and suggestions given by the experts, 29 statements were removed, and 71 statements were retained. Subsequently, 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's 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 variables (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 weak statistical relationships.

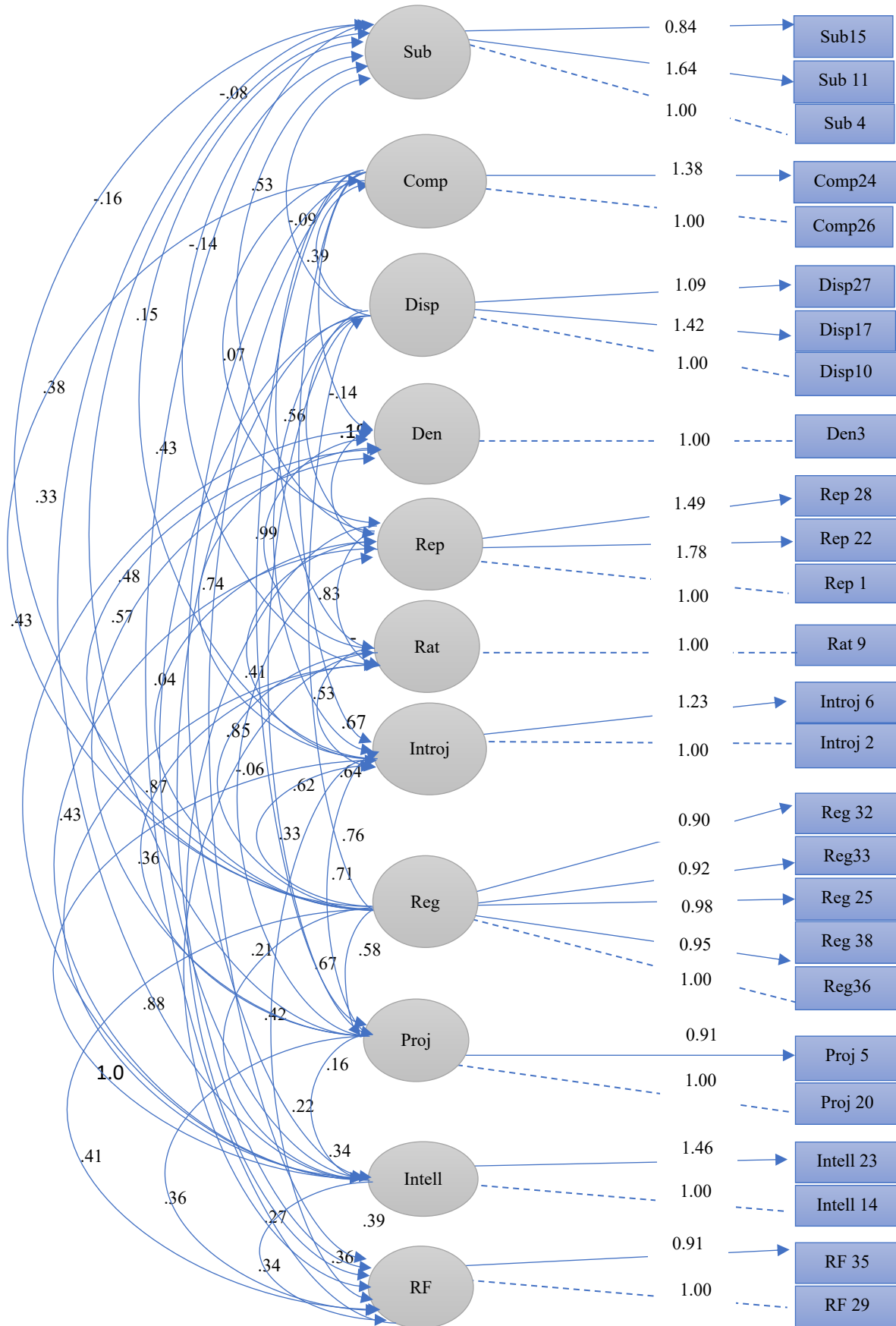


Figure 1. Model fit of SEM

2.3. Procedure

The study received approval from the Institutional Human Ethics Committee at the institute [AUW/IHEC/HD-19-20/XPD/47] on 20th January 2020. Upon obtaining Permission from the respective college principals to meet the adolescents. Consent was obtained from the student participants, and data were collected according to the scheduled timeline.

2.4. Data Analysis

The collected data were consolidated and tabulated. Descriptive statistics, such as frequencies and percentages, were calculated to assess the usage levels of different defense mechanisms. The data were categorized according to the personality traits of adolescents. Linear regression analysis was applied to identify the predictive power of defense mechanisms on the personality traits of adolescents. The statistical analysis was carried out using SPSS 30 and Jamovi 2.6.44 (2025), which is an open-source statistical software.

3. Results

3.1. Demographic Description

Socio-demography background is independent variable that influences various factors. It is the sociological and demographic profile of an individual which categorizes them 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 in formulating 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, and 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 percentage (4.5%) were involved in business. In terms of fathers' educational qualifications, (33.7%) had completed the Secondary School Leaving Certificate (SSLC), followed by those with a Higher Secondary School Leaving Certificate (HSSLC) non-literates, graduates, post-graduate degrees, and the smallest percentage (3.4%) held a professional course-degree. Similarly, among mothers, 36.8% had a degree of Secondary School Leaving Certificate (SSLC), followed by a Higher Secondary School Leaving Certificate (HSSLC), non-literates, graduates, and post-graduate degree holders, but only 2.2% held a professional course degree. Concerning birth order, 54.4% were first-born children, followed by second-born, third-born born and the least percent 1.7 belonged to the "other" birth order category.

3.2. Descriptive indicators

Table 1 shows the interpretation of the results based on the levels of different defense mechanisms among adolescents. Table 2 elucidates the personality traits of the adolescents. Table 3 presents the regression analysis which consists of three models, each assessing different combinations of predictors (defense mechanisms) about the dependent variables (personality traits). The immature defense mechanism and the 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 the Variance Inflation Factor (VIF) and Tolerance (Tol.) assess multicollinearity.

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

Defense mechanisms	Components	Levels of defense mechanisms	N	Percentage
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. These 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, and introjection the process of taking the qualities or traits of others or something from outside and making them to be a person's personality. While projection defense mechanisms, where individuals see their own negative traits or feelings in others instead of themselves, displacement is a 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 is 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 where a person deals with stressful or emotional situations 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 defenses such as sublimation where an individual redirects an unacceptable or socially undesirable feelings, urges or impulses into constructive and socially acceptable activities (Cohen & Kim, 2020) and compensation where 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 adolescents may not be predominantly engaged in the healthiest coping strategies. The immature defenses like denial where individuals reject external reality and choose, to focus on internal justification or flawed reasoning, were the least used, which indicates that most people do not completely reject reality (Bailey & Pico, 2023). Reaction formation a neurotic defense mechanism where an individual unconsciously replaces an unwanted or threatening impulse with its opposite was commonly employed by the adolescents. Essentially, they act in a way that is opposite to their true feelings or desires to reduce anxiety or internal conflict, suggesting that the adolescents often deals with stress through indirect or conflicting emotional expression (Nawi et al., 2020).

Table 2. Personality traits of adolescents (Extroversion –Introversion and-Neuroticism-Stability)

Personality traits	Category	Frequency	Percentage
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, 33% of adolescents were categorized as extroverts, which reflected sociability and assertiveness (Cybulski et al., 2014), followed by 58.1% of adolescents -between category. A study by Pop Jordanova and Zorcec (2010) mentioned that adolescents with mixed traits may display both extroverted and introverted behaviors, adapting their responses to the situation. While the lowest percentage (8.9 %) were categorized as introverts having introverted personality traits, individuals in this group were possibly at risk due to their social withdrawal (Delendra et al, 2023). Research shows that introversion significantly impacts adolescents’ school adjustment, affecting their social adjustment in the environment (Sunday et al., 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 are linked to impulsivity and risk-taking, while anxiety denotes an emotional response. Additionally 42.2% were categorized as in-between personality traits; they 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. Furthermore, 4.3% of adolescents were categorized under stability. Qizi (2024) stated-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	Unstan dardized B	β	t	Sig.	Collinearity Statistics		R	R ²	Adjuste d R-squared	F	Sig.
						Tol.	VIF					
Extroversion	Rationalization	.16	.13	2.34	.02	.99	1.00	.14 ^a	.02	.01	6.02	.015 ^b
	Projection	.09	.11	2.02	.04	.99	1.00	.18 ^b	.03	.02	5.09	.007 ^c
Introversion	Repression	-.15	.06	-2.46	.01	1.00	1.00	.26 ^a	.07	.06	6.01	.016 ^b
	Reaction formation	.13	.06	2.12	.03	1.00	1.00	.35 ^b	.12	.10	5.41	.006 ^c
Neuroticism	Reaction formation	-.12	-.12	-2.78	.006	.98	1.01	.11 ^a	.01	.01	6.14	.014 ^b
	Rationalization	.19	.12	2.66	.008	.98	1.01	.16 ^b	.02	.02	6.65	.001 ^c
Stability	Sublimation	.14	.37	2.44	.01	1.00	1.00	.37 ^a	.14	.11	5.98	.019 ^b

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 individuals justify their behavior through logical explanations, and projection ($F = 5.097$, $t = 2.027$, $p = .007$, $\beta = .117$, $VIF=1.003$), an immature defense mechanism involving attributing one’s own maladaptive impulses to others, were significant predictors of the 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 of .161 and .091 in extroversion scores. Furthermore, 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 the introversion personality trait. Repression explained about 7.2% of the variance, with a unit change in the repression defense mechanism, introversion personality trait scores decreased by -.157. scores. Reaction formation explained 12.5% of the variance, with one unit change in reaction formation resulting in a rise of .132 in introversion scores. Therefore, the use of the reaction formation defense mechanism increases the introverted 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 neurotic defense mechanisms, with reaction formation explaining 1.3% and rationalization 2.7% of the variance, with a score decrease of 0.128 when reaction formation is changed by a unit and an increase of 0.198 scores when a unit change in rationalisation happens, indicating that the use of the rationalisation defense mechanism increases the neuroticism personality trait.

Lastly, a significant regression was found for the ($F=5.984$, $t = 2.446$, $p=.019$, $\beta=0.378$, $VIF=1.000$) for the sublimation defense mechanism with the stability personality trait; 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 the stability personality trait. With each one-unit change in the sublimation defense mechanism, the predicted stability personality trait scores 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 for 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 findings align 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 Laczkovicset 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 behavioral problems.

Another interesting result regarding 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 for 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 six-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 mechanisms might be less crucial for overall life satisfaction compared to mature and immature styles. A 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 indicates 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 the in-between category, a blend of both extroverted and introverted traits. Adolescents with mixed traits may exhibit behaviors of both extroversion and introversion, adapting their responses based on the situation; this reflects 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). Sunday et al. (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 neurotic, 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. This aligns with Eysenck's personality model, where neuroticism encompasses mood instability and anxiety as a distinct component and is positively associated with impulsivity and risk-taking, while anxiety primarily reflects an emotional response (Peters et al., 2019). Similarly, Xiong et al.'s (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 emphasize that when adolescents are emotionally stable, they are 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 were significantly associated with extroverted personality traits, which proved that extroverts may use rationalisation defense mechanisms, which made them justify their behaviour, thoughts, or feelings by logical explanations. While such justification may sound reasonable, it covers unacceptable thoughts and does not precisely portray a person's true feelings and motivations. By consistently rationalizing their actions, extroverts avoid confronting the reality of their actions and miss the chance for genuine self improvement (Cushman, 2020). The connection between the projection defense mechanism and extrovert personality traits can be examined through various behavioral and psychological frameworks. The projection defense mechanism, where individuals attribute their negative characteristics to others, may impact the way extraverts 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's (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 the repression defense mechanism scored lower on extraversion and openness; and it 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 this behavior is driven by emotional avoidance.

The reaction formation defense mechanisms were significantly associated with introversion personality traits. Adolescents who employed neurotic defense mechanisms often displayed withdrawal behavior, which could aggravate introverted traits, and lead to an increase in social anxiety and difficulties in socialization (Di Giuseppe et al., 2019), further reducing their well-being, social engagement and emotional regulation (Stone et al., 2025). Ryan et al. (2024) 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 indicates that reaction formation, a neurotic defense mechanism, predicts neuroticism personality traits. Various studies have highlighted a significant association between neurotic defense mechanisms and neuroticism personality traits. Likewise, a-neurotic defenses were prevalent among those with high neuroticism. Febriana et al.'s (2022) explored reaction formation as a defense strategy to hide genuine emotions, suggesting that these mechanisms may reveal underlying neuroticism.

It was also seen that rationalization a neurotic defense mechanism where an individual performs an action and then pretends the beliefs and desires that would have made it rational was is a significant predictor for the neuroticism personality traits where the person experiences 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, with rationalization being prominent 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 mechanisms positively predict 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. This 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 highlights 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 highlight these relationships, which can inform interventions aimed at promoting healthier psychological functioning and help researchers 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% of 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 generalization. Moreover, the socio-demographic conditions of the participants indeed bring in significant changes in the results when analyzed for their association. However, 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 would enhance the applicability of the findings. Additionally, the study recommends longitudinal studies as they help 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 these recommendations, 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 in accordance with ethical principles, which involved obtaining permission from the respective college principals, and taking informed consent from the participants, while 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 authors declare no conflict of interest concerning the research, authorship, or publication of this article.

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