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Personality, Leadership, and Psychological Distress in First-Year Military Cadets: The Mediating Role of Resilience and the Moderator Role of Gender

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Abstract

The initial phase of military training constitutes a highly demanding and strenuous period during which individual differences may shape psychological adjustment. This study examined the associations between personality traits, leadership characteristics, and psychological distress among first-year cadets at the Hellenic Air Force Academy (*N* = 92; 67.4% male), assessed at the end of their basic military training. Participants completed the Connor-Davidson Resilience Scale (CD-RISC-25), the Big Five Inventory (BFI-44), a self-explanatory leadership questionnaire and the Depression, Anxiety and Stress Scale (DASS-21) along with sociodemographic data. Mediation analyses (5,000-resample bootstrap) tested whether resilience mediated the associations between each Big Five trait and leadership and distress outcomes. Moderation analyses examined gender as a moderator of these associations, with Benjamini–Hochberg false discovery rate correction applied throughout. Female cadets reported significantly higher total distress than male ones (Hedges' *g* = − 0.60 to − 1.10), with no differences in personality traits, resilience, or leadership. Resilience significantly predicted all mental distress outcomes (β = −0.201 to − 0.281). Significant indirect effects through resilience were observed for agreeableness predicting total distress (*ab* = − 0.066, 95% CI [− 0.224, − 0.004]) and stress (*ab* = − 0.069, CI [− 0.204, − 0.009]), and for leadership predicting total distress (*ab* = − 0.109, CI [− 0.291, − 0.007]) and stress (ab = − 0.108, CI [− 0.263, − 0.021]). Neuroticism and conscientiousness operated through direct pathways without significant resilience mediation. Gender moderated the associations of neuroticism (stronger in males; f^2 = .047–.072) and leadership (i.e., protective in males, positive trend in females; f^2 = .054–.085) with distress across multiple outcomes. Agreeableness and conscientiousness had a protective role across both genders. These findings highlight resilience as a modifiable mediating resource for specific adaptive traits, and gender as a key moderator of how personality and leadership relate to psychological distress in early military training.

1. Introduction

Military training represents a period of intense psychological and physical adaptation, particularly during the initial phases of basic training. First-year cadets are exposed to novel stressors, including high training demands, strict hierarchical structures, and increased expectations for performance and discipline. These stressors can contribute to elevated levels of stress, anxiety, and depression, which may compromise both cadets' well-being and training outcomes [1], [2]. Previous research employing the Depression, Anxiety, and Stress Scale (DASS-21) has identified increased levels of depression, anxiety and stress in Greek military personnel during the first year of the COVID-19 pandemic (Kotoulas et al., 2023), in the Ghana Armed Forces (Tsogbe et al., 2025), in Malaysian Armed Forces (Anuar et al., 2024), US Army (Winslow et al., 2022) and Australian Army (Tait et al., 2022). Understanding the factors that promote psychological adjustment during this critical period is therefore of substantial importance for military training programs.

Moreover, individual differences in personality traits have been consistently associated with variation in emotional responses and coping strategies under stress. In particular, the Five-Factor Model of

personality, encompassing extraversion, agreeableness, conscientiousness, neuroticism, and openness to new experiences, has been consistently linked to mental health outcomes in both civilian and military populations (Bobdey et al., 2021). Extraversion, conscientiousness, and agreeableness are generally considered to buffer psychological distress, thus promoting adaptive coping and social support, whereas neuroticism is associated with heightened vulnerability to negative affect and stress (Uliaszek et al., 2010). To date, previous studies have examined the association between personality traits and military performance (Bekesiene, 2023; Bobdey et al., 2021), as well as training dropout (Heitz & Annen, 2025), indicating that certain personality dimensions, particularly lower neuroticism, higher conscientiousness, and greater emotional stability, are consistently linked to superior military performance (Bobdey et al., 2021) and a reduced likelihood of dropping out of demanding training programs (den Hartigh et al., 2025), suggesting that personality assessment can serve as a valuable predictive tool for selection and retention in high-stakes military contexts. A recent study that has explored the relation between the personality, mental and physical health among Ukrainian military personnel (Kokun et al., 2024) demonstrated that higher self-efficacy, resilience, and emotional stability are strong predictors of reduced PTSD symptoms and fewer physical complaints, with elite combat troops exhibiting greater extraversion and emotional stability, whereas injured servicemen show significantly higher levels of PTSD, exhaustion, and somatic symptoms. Personality traits were also explored based on gender differences in U.S. Air Force Pilots (Callister et al., 1999) with results showing that, relative to male adult norms, male student pilots exhibited higher extraversion and lower agreeableness, whereas, relative to female adult norms, female student pilots displayed higher extraversion and openness but also lower agreeableness. Similarly, leadership qualities, reflecting initiative, confidence, and interpersonal competence, have also been proposed as factors that support adjustment and buffer against psychological distress in challenging environments. Indeed, leadership characteristics may shape the psychological experience of cadets by influencing coping, motivation, and group dynamics (Gutierrez et al., 2024; Lobato et al., 2024; Navas-Jiménez et al., 2025). Despite the evidence gleaned so far on the role of individual differences on cadets' adjustment during the initial phase of their training, more research is needed on the link between personality and psychological resilience to inform interventions that would promote mental health during this strenuous and demanding period in the Army.

Resilience, defined as the capacity to adapt positively in the face of adversity, has emerged as a critical protective factor in high-stress environments. According to the transactional model of stress and coping (Lazarus & Folkman, 1984), psychological stress results from the interaction between environmental demands and an individual's cognitive appraisal of available coping resources. Personality traits influence how stressors are perceived and which coping strategies are employed, while resilience can be conceptualized as a psychological resource that facilitates adaptive appraisal, effective coping, and recovery from stress. Within this framework, resilience may function as a mechanism through which personality traits and leadership characteristics influence psychological outcomes, particularly in demanding contexts such as the early stages of military training. Prior research indicates that resilience may mediate the effects of personality and leadership on mental health outcomes, yet empirical evidence in military populations, especially during initial training, remains limited. The Connor-Davidson

Resilience Scale (CD-RISC) was adopted in studies to investigate the resilience in military cadets in United States (US) Army (Han & Jin, 2025; McClung et al., 2023) and US Marine Corps (Feigel et al., 2025), in the Royal Air Force (Riley, 2020), in the Singapore Armed Forces (Koh, 2020) and Chinese military personnel (Tu et al., 2023). Associations between personality traits and resilience have also been examined in Canadian Armed Forces veterans (Plouffe et al., 2023). Understanding how resilience interacts with personality and leadership may help identify targets for interventions aimed at improving mental health in military trainees.

Particularly, although prior research has explored mental health and resilience in military populations, current studies that employ mediation models to investigate resilience as a mechanism linking personality traits to psychological outcomes during early training are still scarce, particularly with respect to newly enlisted cadets and their mental health and adaptive capacities. Existing studies have explored mental, emotional, and physical factors related to resilience (Dell et al., 2023; Orak et al., 2022; Sefidan et al., 2021; Zueger et al., 2023), as well as psychological training programs designed to enhance resilience (Evans et al., 2024; Forchuk et al., 2025; McInerney et al., 2024; Saul et al., 2024; Thompson & Dobbins, 2018). In general mental health and trauma were examined in the context of military culture (Bonner & Ellender, 2022; Ganz et al., 2022; Heward et al., 2024; Lyk-Jensen et al., 2016; Taylor et al., 2023). Broader investigations have addressed mental health and trauma within military culture (Moradi et al., 2021), and related psychological variables in specific military populations, such as Korean soldiers (Lee et al., 2025) and male veterans across nations (Zhu et al., 2025). Additional work has examined predictors of stress using machine learning models (Bekesiene et al., 2021) and operational stressors associated with psychological distress (Michaud et al., 2021). The buffering role of Secure Base Leadership on emotional demands and burnout has also been demonstrated among officer cadets at the Spanish Army's General Military Academy in Zaragoza (Navas-Jiménez et al., 2025).

When it comes to military training, other lines of research have evaluated biological and physiological processes during Basic Military Training (BMT), such as stress hormones, personality, and group cohesion (Bekesiene et al., 2022), inflammatory markers and well-being, and changes in mental health following basic military training in U.S. (Bonner & Ellender, 2022; Brennan et al., 2025; Crowley et al., 2015; Smith et al., 2021) with emphasis in Australian forces (Bulmer et al., 2022). Studies in conscripted training environments have similarly focused on resilience development and psychosocial adaptation in the Singapore Armed Forces (Koh, 2020). Similar studies focused also on gender based differences in stress and specifically in stress copying mechanisms (Dahiya et al., 2014), or exploring correlations between personality traits of cadets and their performance in terms of their military and academic pursuits in military training academies in India (Bobdey et al., 2021). Mediation analysis was employed for identifying the impact of personality traits to military performance of cadets assuming self-efficacy as mediator (Bekesiene, 2023). Psychological resilience, personality traits, and depression, anxiety and stress symptoms were studied via a network analysis among military college students in China (Hou et al., 2026). Based on this theoretical framework, in the present study it was hypothesized that resilience would mediate the associations between adaptive personality traits and stress-related outcomes during early military training.

While many of the aforementioned studies rely on traditional statistical analyses examining direct effects, mediation models remain underutilized in military psychology. Notable exceptions include mediation analyses of personality, coping, and health among deployed U.S. soldiers (Peng et al., 2012), and the role of personality traits in mediating relations between fear of negative evaluation and social interaction anxiety among military cadets in the Land Forces Academy of Sibiu (Macovei et al., 2023). The present study aimed to examine the associations between personality traits and leadership characteristics, and psychological outcomes, including stress, anxiety, and depression, in first-year cadets at the Hellenic Air Force Academy (HAFA). Furthermore, the study examined whether resilience mediates these relationships and investigated gender as a potential moderator. By exploring these pathways, the study seeks to identify individual and modifiable factors that may protect cadets from adverse psychological outcomes during early military training.

2. Methodology

2.1 Participants

The study involved 92 first-year students undergoing the initial month of basic training at the Hellenic Air Force Academy. The majority of the participants were 18 years old (*n* = 73), with 16 participants aged 19, 2 aged 20, and 1 aged 21. The sample was predominantly male (*n* = 62, 67.4%), with 30 female participants (32.6%). Participants were enrolled in standard military training programs and provided informed consent to participate in the study. Table 1- Table 3 show the mean, min, max and median values of the variables under examination including the standard deviation, and 95% CI for the whole population, the male and female population, respectively.

Table 1

Descriptive statistics of the population $(N = 92)$.

Variable	Mean	Std	Median	Min	Max	95% CI Lower	95% CI Upper
Total Distress*	9.239	7.403	9	0	29	7.706	10.772
Stress*	3.739	3.130	3	0	12	3.091	4.387
Anxiety*	2.696	2.571	2	0	11	2.163	3.228
Depression*	2.804	2.94	2	0	12	2.196	3.413
Openness	32.109	5.564	31	18	48	30.957	33.261
Conscientiousness	34.641	4.614	34.5	20	44	33.686	35.597
Extraversion	25.489	4.816	25	7	37	24.492	26.487
Agreeableness	35.75	4.392	35.5	25	45	34.841	36.66
Neuroticism	19.87	5.223	20	8	33	18.788	20.951
Resilience*	72.370	11.736	71	9	95	69.939	74.800
Leadership	21.054	3.491	21	13	30	20.332	21.777

** indicates Shapiro-Wilk test p-value < .05*

Table 2

Descriptive statistics of the male population $(N = 62)$.

Variable	Mean	Std	Median	Min	Max	95% CI Lower	95% CI Upper
Distress	7.484	6.808	6	0	26	5.755	9.213
Stress	3.145	3.056	2	0	11	2.369	3.921
Anxiety	1.871	1.851	1	0	8	1.401	2.341
Depression	2.468	2.996	2	0	12	1.707	3.229
Openness	31.371	4.93	31	18	47	30.119	32.623
Conscientiousness	34.661	5.044	35	20	44	33.380	35.942
Extraversion	25.548	5.007	25	7	36	24.277	26.82
Agreeableness	35.855	4.390	35.5	25	45	34.74	36.97
Neuroticism	19.613	5.532	19	8	33	18.208	21.018
Resilience	72.113	12.622	70	9	95	68.908	75.318
Leadership	21.274	3.503	22	13	30	20.385	22.164

Table 3

Descriptive statistics of the female population $(N = 30)$.

Variable	Mean	Std	Median	Min	Max	95% CI Lower	95% CI Upper
Distress	12.867	7.366	14	1	29	10.116	15.617
Stress	4.967	2.965	5	0	12	3.86	6.074
Anxiety	4.4	3.013	4	0	11	3.275	5.525
Depression	3.5	2.739	3	0	11	2.477	4.523
Openness	33.633	6.515	32	21	48	31.201	36.066
Conscientiousness	34.6	3.645	34	27	43	33.239	35.961
Extraversion	25.367	4.476	25.5	15	37	23.695	27.038
Agreeableness	35.533	4.462	35.5	25	45	33.867	37.2
Neuroticism	20.4	4.561	21	9	30	18.697	22.103
Resilience	72.9	9.831	72	49	89	69.229	76.571
Leadership	20.6	3.48	21	13	30	19.301	21.9

2.2 Measures

2.2.1 Personality traits

Personality characteristics were assessed using the Big Five Inventory-44 (BFI-44; (John & Srivastava, 1999) adapted to the Greek population. This questionnaire measures five domains: Extraversion, Conscientiousness, Agreeableness, Neuroticism, and Openness. Internal consistency reliability was assessed using Cronbach's alpha coefficients for BFI-44. The scales demonstrated acceptable to good reliability in the present sample: Extraversion (α = 0.60), Conscientiousness (α = 0.80), Agreeableness (α = 0.70), Neuroticism (α = 0.80), and Openness (α = 0.70). Although the reliability for Extraversion was modest, it falls within the acceptable range for brief personality scales in applied settings.

2.2.2. Leadership

A self-explanatory leadership questionnaire consisting of six items was developed by initio by the research team to capture leadership-related traits relevant to the military context. The leadership scale demonstrated acceptable internal consistency (α = 0.70), indicating satisfactory reliability for research purposes.

2.2.3 Resilience

Resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC-25;(Connor & Davidson, 2003)) adapted to the Greek population, a validated self-report instrument that evaluates an individual's capacity to cope with stress and adapt to adversity. Higher scores indicate greater resilience. The scale demonstrated excellent internal consistency in the present sample (Cronbach's alpha coefficient α = 0.90), supporting its reliability for assessing resilience among military cadets.

2.2.4 Psychological distress

Mental distress was operationalized as the total score on the Depression, Anxiety and Stress Scale – 21 Items (DASS-21; Lovibond & Lovibond, 2011) adapted to the Greek population, which captures symptoms across three domains: depression, anxiety, and stress. Higher scores reflect greater psychological discomfort during the initial phase of military training. Internal consistency based on Cronbach's alpha coefficient was good to excellent across scales: Total Distress (α = 0.90), Depression (α = 0.80), Anxiety (α = 0.70), and Stress (α = 0.80), indicating satisfactory reliability within the current sample.

2.3 Procedure

Participants completed all study measures at the end of basic training, with data collection occurring over a three-day timeframe and under standardized conditions. Responses were entered into a secure database for subsequent analysis. The study was conducted in accordance with institutional ethical standards and received formal approval from the Ethics Committee of the Hellenic Air Force Academy prior to participant recruitment and data collection.

2.4 Data preprocessing

There were not any missing values in the data, and all scores were standardized (z-scores) to facilitate comparison across measures. The dataset included the following columns: Resilience (CD-RISC 25), Mental Distress (DASS-21 total score) with its three scales, the five personality traits (BFI-44), and Leadership score.

2.5 Mediation analysis

To investigate whether resilience mediates the relationship between personality traits and psychological outcomes, a mediation analysis framework was applied. Mediation analysis allows examination of whether the effect of an independent variable (X) on a dependent variable (Y) is transmitted through an intermediate variable (M), known as the mediator (MacKinnon et al., 2007; Preacher, 2015).

In this study, each of the Big Five personality traits (Extraversion, Conscientiousness, Agreeableness, Neuroticism, and Openness) and leadership were treated as independent variables (X), resilience (as measured by the CD-RISC 25) served as the mediator (M), and distress (as measured by the total score of DASS-21), anxiety, stress and depression scales of DASS-21 were used as the dependent variable (Y).

The mediation model included three key pathways:

- Path a: the effect of the independent variable (personality trait) on the mediator (resilience).
- Path b: the effect of the mediator (resilience) on the dependent variable (mental outcome), controlling for the independent variable.
- Path c' (direct effect): the effect of the independent variable on distress after accounting for resilience.
- Path c (total effect): the overall effect of the independent variable on distress, equal to the sum of the direct and indirect effects ($c = c' + a \times b$).
- Indirect (mediated) effects were estimated as the product of paths a × b, and their statistical significance was tested using bootstrap resampling (1,000 samples) to obtain bias-corrected confidence intervals.

All variables were standardized prior to analysis to allow comparison of effect sizes across constructs and to improve model stability. The analysis involved the following steps, adopted from similar studies (Yotsidi et al., 2024):

- Bootstrapping: For each personality trait, 1,000 bootstrap samples were drawn to estimate the indirect effect of the trait on mental outcome via resilience. The mediator model regressed resilience on the personality trait, and the outcome model regressed distress on both the personality trait and resilience.
- Effect Estimation: The indirect effect was calculated as the product of the coefficient from each personality trait to resilience (a path) and the coefficient from resilience to distress (b path). The direct effect corresponded to the association between each trait and distress while controlling resilience (c' path), whereas the total effect represented the overall association between each trait

and distress without including the mediator (c path). Confidence intervals (95%) for all estimated effects were obtained from the bootstrap distributions.

- Visualization: Directed graphs were created to visualize the mediation pathways. Nodes represented personality traits, resilience, and distress; edges depicted direct and indirect effects, with widths proportional to effect size and color indicating the direction (green for positive effects, red for negative effects).

2.6 Moderation analysis

To examine whether gender moderates the relationship between dispositional predictors and psychological distress outcomes, a series of moderation models were estimated using multiple linear regression. For each predictor–outcome pair, the following model was specified:

$$Y_i = \beta_0 + \beta_1 X_i + \beta_2 G_i + \beta_3 (X_i \times G_i) + \epsilon_i$$

where Y_i denotes the psychological distress outcome (e.g., total distress, stress, anxiety, or depression) for individual i, X_i represents the predictor variable (personality trait or leadership score), and G_i denotes gender, coded as a binary variable (e.g., 0 = male, 1 = female). The interaction term $(X_i \times G_i)$ captures the moderating effect of gender. The error term ϵ_i is assumed to be independently and identically distributed with mean zero and constant variance.

All continuous predictors were standardized (z-scores) prior to analysis to facilitate comparability of regression coefficients and to reduce multicollinearity between main effects and interaction terms. The primary parameter of interest was the interaction coefficient β_3, which indicates whether the slope of the relationship between $X$and Ydiffers as a function of gender. A statistically significant β_3 provides evidence of moderation.

To aid interpretation, simple slope analyses were conducted by estimating the conditional effects of X on Yat each level of the moderator. Specifically, the slope for males ($G = 0$) is given by β_1, whereas the slope for females ($G = 1$) is given by $\beta_1 + \beta_3$. These conditional estimates allow for the examination of both the magnitude and direction of the predictor–outcome association within each group (Hayes & Rockwood, 2017; Qin & Wang, 2024; Wang & Preacher, 2015).

All analyses were performed in Python using the statsmodels, pandas, numpy, and pingouin libraries.

3. Results

3.1 Gender differences

Welch's independent samples *t*-tests revealed significant gender differences exclusively in distress outcomes (Table 4). Welch's correction was applied throughout to account for unequal group sizes (*n*_male = 62, *n*_female = 30). Effect sizes are reported as Hedges' *g* to correct for sample size imbalance. Figure 1 presents two side-by-side bar charts comparing mean scores between male (blue) and female

(red) cadets, with error bars representing 95% confidence intervals. The left panel displays the four distress outcome variables (total distress, stress, anxiety, and depression), showing that female cadets consistently reported higher mean scores than males across all four dimensions. Significance brackets above the bars indicate the results of Welch's independent samples *t*-tests, confirming statistically significant differences for total distress, stress, and anxiety, whilst depression did not reach significance. The right panel displays the remaining study variables: the five personality traits (extraversion, conscientiousness, agreeableness, neuroticism, and openness), resilience, and leadership. In contrast to the mental distress outcomes, male and female cadets showed nearly identical mean scores across all dispositional variables, with overlapping confidence intervals throughout. No significance brackets appear in the right panel, reflecting the absence of any statistically significant gender differences in personality, resilience, or leadership (all $p > .09$). The juxtaposition of the two panels highlights the central finding that female cadets carry substantially greater psychological distress than their male peers despite entering the post-training period with an equivalent dispositional profile.

Significant gender differences were observed exclusively in mental distress outcomes. Female cadets reported significantly higher total distress ($M = 12.87$, $SD = 7.37$) than males ($M = 7.48$, $SD = 6.81$), $t(53.6) = -3.37$, $p = .001$, Hedges' $g = -0.76$, 95% CI [− 8.59, − 2.18], a medium-to-large effect. Similarly, females reported significantly higher stress, $t(59.1) = -2.74$, $p = .008$, $g = -0.60$, and anxiety, $t(39.9) = -4.23$, $p < .001$, $g = -1.10$). Depression did not differ significantly between genders, $t(62.4) = -1.64$, $p = .105$, $g = -0.35$. Critically, no significant gender differences emerged for any Big Five personality trait, resilience at the end of basic training, or leadership (all $p > .09$, $g = 0.01–0.41$). This pattern indicates that female and male cadets arrive at post-training measurement with equivalent psychological resources, equivalent resilience, personality profiles, and leadership characteristics, yet female cadets report substantially greater acute distress.

Table 4
Welch's t-Tests (*N* = 92) for Gender Differences Across All Study Variables

Variable	*t*	Hedges' *g*	95% CI
Total Distress**	-3.37	−0.76	[− 8.65, − 2.11]
Stress**	-2.74	−0.60	[− 3.18, − 0.46]
Anxiety***	-4.23	−1.10	[− 3.75, − 1.31]
Depression	-1.64	−0.35	[− 2.32, 0.25]
Resilience	-0.33	−0.07	[− 5.71, 4.14]
Extraversion	0.18	0.04	[− 1.94, 2.30]
Conscientiousness	0.07	0.01	[− 1.83, 1.95]
Agreeableness	0.33	0.07	[− 1.70, 2.34]
Neuroticism	-0.72	−0.15	[− 3.02, 1.44]
Openness	-1.68	−0.41	[− 5.01, 0.49]
Leadership	0.87	0.19	[− 0.91, 2.26]

*Note. Welch's t-test used for unequal group sizes (n_male = 62, n_female = 30). Hedges' g corrects for sample size imbalance. 95% CI = confidence interval for the mean difference (Male − Female). ** p < .01, *** p < .001, n.s. = not significant.*

3.2 Mediation analyses: Resilience as mediator

Mediation analyses examined whether resilience mediated the associations between each personality trait and leadership (predictors) and each DASS-21 scale (outcomes), using 5,000 bootstrap resamples with Benjamini-Hochberg FDR correction. The full set of path coefficients, standard errors, and bootstrap confidence intervals for each predictor-outcome pair is reported in Table 5-Table 7 and illustrated in Fig. 2-Figure 5 for total mental distress, stress, anxiety and depression, respectively. Each Table presents, for every predictor: path a (standardized regression coefficient from predictor to resilience), the total effect (c), the direct effect controlling for resilience (c'), and the indirect effect (ab = path a × path b) with its 95% bias-corrected bootstrap confidence interval. A significant indirect effect is indicated when the confidence interval excludes zero.

Figure 6 presents forest plots displaying the standardized indirect effects (a × b) of each personality trait and leadership on four psychological distress outcomes (i.e., total distress, stress, anxiety, and depression), transmitted through resilience as the mediator. Each horizontal panel corresponds to one predictor (i.e., Leadership, Openness, Neuroticism, Agreeableness, Conscientiousness, and Extraversion, ordered from top to bottom), and each panel within the four sub-figures represents a different distress outcome. The horizontal bars represent 95% bias-corrected bootstrap confidence intervals derived from 5,000 resamples. The central point on each bar indicates the magnitude of the indirect effect: values to

the left of the zero-reference line (dashed) indicates a negative indirect effect, meaning that the predictor is associated with lower distress through higher resilience; values to the right indicate a positive indirect effect. Diamond-shaped markers (◆) indicate that the confidence interval excludes zero, signifying a statistically significant indirect effect; circular markers (●) indicate that the confidence interval includes zero and the indirect effect is not statistically significant. Benjamini-Hochberg False Discovery Rate correction (q = .05) was applied across all indirect effect tests.

Resilience was a significant direct predictor of all four distress outcomes: total mental distress (β = −0.281, p = .007), stress (β = −0.275, p = .009), depression (β = −0.238, p = .024), and anxiety marginally (β = −0.201, p = .057), confirming resilience as a consistent protective factor. Agreeableness demonstrated significant indirect effects through resilience on total distress (*ab* = − 0.066, 95% CI [− 0.224, − 0.004]) and stress (*ab* = − 0.069, CI [− 0.204, − 0.009]). Leadership showed significant indirect effects on total distress (*ab* = − 0.109, CI [− 0.291, − 0.007]) and stress (*ab* = − 0.108, CI [− 0.263, − 0.021]). These findings indicate partial mediation: agreeableness and leadership are partially protective against distress and stress through their association with higher resilience. Conscientiousness and agreeableness showed strong direct effects on total distress (β = −0.393 and − 0.298, both $p \leq .004$) and depression (β = −0.407, $p < .001$ for conscientiousness), but their indirect effects through resilience were not significant for anxiety or depression.

Neuroticism was the strongest predictor across all outcomes (total mental distress β = 0.463, depression β = 0.451, stress β = 0.449, anxiety β = 0.270, all $p < .001$) but showed no significant mediation through resilience for any outcome (all p_ind > .14), indicating it operates through a direct dispositional pathway. Openness showed no significant associations with any distress outcome.

Table 5
Mediation results: Total mental distress (DASS-21 Total)

Predictor	Path a	Total	Direct	Indirect	95% CI
Extraversion	0.181	-0.053	-0.002	**-0.051**	**[-0.161, -0.004]**
Conscientiousness	0.261*	-0.393	-0.343*	**-0.050**	**[-0.180, 0.000]**
Agreeableness	0.317*	-0.298*	-0.233*	**-0.066**	**[-0.224, -0.004]**
Neuroticism	-0.433*	0.463*	0.420*	0.043	[-0.017, 0.203]
Openness	0.183	0.096	0.152	-0.056	[-0.211, 0.003]
Leadership	0.445*	-0.188	-0.079	**-0.109**	**[-0.291, -0.007]**

*Note. All variables z-standardized. Mediator = Resilience at T1. Path a = predictor → resilience. Indirect = a × b, estimated via 5,000 bootstrap resamples. 95% CI = bias-corrected bootstrap CI. Significant indirect effects (CI excludes zero) are bolded. * indicates p < .05.*

Table 6
Mediation results: Stress

Predictor	Path a	Total	Direct	Indirect	95% CI
Extraversion	0.181	-0.037	0.014	**-0.050**	**[-0.146, -0.006]**
Conscientiousness	0.261*	-0.326*	-0.273*	**-0.053**	**[-0.170, -0.003]**
Agreeableness	0.317*	-0.250*	-0.181*	**-0.069**	**[-0.204, -0.009]**
Neuroticism	-0.433*	0.449*	0.406*	0.043	[-0.019, 0.174]
Openness	0.183	0.045	0.099	-0.054	[-0.180, 0.003]
Leadership	0.445*	-0.179	-0.070	**-0.108**	**[-0.263, -0.021]**

*Note. All variables z-standardized. Mediator = Resilience at T1. Path a = predictor → resilience. Indirect = a × b, estimated via 5,000 bootstrap resamples. 95% CI = bias-corrected bootstrap CI. Significant indirect effects (CI excludes zero) are bolded. * indicates p < .05.*

Table 7
Mediation results: Anxiety

Predictor	Path a	Total	Direct	Indirect	95% CI
Extraversion	0.181	-0.128	-0.095	-0.033	[-0.120, 0.002]
Conscientiousness	0.261*	-0.270*	-0.233*	-0.037	[-0.166, 0.008]
Agreeableness	0.317*	-0.338*	-0.305*	-0.033	[-0.161, 0.013]
Neuroticism	-0.433*	0.270*	0.225	0.045	[-0.024, 0.251]
Openness	0.183	0.098	0.140	-0.041	[-0.171, 0.002]
Leadership	0.445*	-0.184	-0.118	-0.066	[-0.239, 0.028]

*Note. All variables z-standardized. Mediator = Resilience at T1. Path a = predictor → resilience. Indirect = a × b, estimated via 5,000 bootstrap resamples. 95% CI = bias-corrected bootstrap CI. Significant indirect effects (CI excludes zero) are bolded. * indicates p < .05.*

Table 8
Mediation results: Depression

Predictor	Path a	Total	Direct	Indirect	95% CI
Extraversion	0.181	0.017	0.062	**-0.045**	**[-0.154, -0.001]**
Conscientiousness	0.261*	-0.407*	-0.370*	-0.037	[-0.168, 0.007]
Agreeableness	0.317*	-0.189	-0.127	-0.063	[-0.236, 0.002]
Neuroticism	-0.433*	0.451*	0.429*	0.023	[-0.036, 0.174]
Openness	0.183	0.107	0.156	-0.049	[-0.194, 0.002]
Leadership	0.445*	-0.122	-0.020	-0.102	[-0.293, 0.003]

*Note. All variables z-standardized. Mediator = Resilience at T1. Path a = predictor → resilience. Indirect = a × b, estimated via 5,000 bootstrap resamples. 95% CI = bias-corrected bootstrap CI. Significant indirect effects (CI excludes zero) are bolded. * indicates p < .05.*

3.3 Moderation analyses: Gender as moderator

Based on gender differences found in section 3.1, to further clarify whether the relationships between personality traits including leadership and, resilience or psychological outcomes varied as a function of gender, moderation analyses were conducted with gender specified as moderator, using the model $Y = \beta_0 + \beta_1 X + \beta_2 G + \beta_3 (X \times G) + \varepsilon$, with simple slopes extracted for males (β_1) and females ($\beta_1 + \beta_3$). The full moderation results for each distress outcome are presented in Table 8-Table 11, and the significant gender and predictor interactions are visualized in Fig. 7-Figure 10 for neuroticism and leadership, respectively.

Table 8-Table 11 present the moderation results for total distress, stress, anxiety, and depression, respectively. Each Table contains one row per predictor (i.e., extraversion, conscientiousness, agreeableness, neuroticism, openness, and leadership) and the following columns: b_X, the main effect of the predictor on the distress outcome; b_G, the main effect of gender; b_XxG, the interaction coefficient indicating whether the slope of the predictor–outcome relationship differs between males and females; SE, the standard error of the interaction term; *t*, the corresponding test statistic; *p*, the significance of the interaction; Slope M, the simple slope for male cadets; Slope F, the simple slope for female cadets; and f^2, the incremental effect size for the interaction. Bold *p*-values indicate statistically significant interactions. Comparison across Table 8-Table 11 allows to assess whether significant gender and predictor interactions are consistent across distress dimensions or specific to particular outcomes.

Figure 7 displays simple slope plots for the three significant interactions between neuroticism and gender (panels a–c: total distress, stress, and depression) while Fig. 9 the four significant Leadership and Gender interactions (panels d–g: total distress, stress, anxiety, and depression). Each panel shows the predicted distress outcome (z-standardized, y-axis) at three levels of the predictor: Low (− 1 SD), Mean (0), and High (+ 1 SD), plotted separately for male cadets (blue line, circle markers) and female cadets

(red line, square markers). Diverging lines between the male and female trajectories indicate a moderation effect: when lines cross or spread apart as the predictor increases, this indicates that the predictor–distress relationship operates differently across gender. The slope (β) and significance of the simple slope test for each gender group are shown in the legend below the x-axis. The interaction coefficient (b_int), its p-value, and Cohen's f² are displayed in a box to the right of each panel outside the plot area.

Figure 8 presents simple slope bar charts for neuroticism across three outcomes (panels a–c: total distress, stress, and depression) while Fig. 10 for leadership across all four distress outcomes (panels a–d: total distress, stress, anxiety, and depression). For each outcome, two bars are displayed, one for male cadets (blue) and one for female cadets (red), where bar height represents the standardized regression slope (β) quantifying the strength and direction of the Neuroticism–distress association within each gender group. Error bars represent 95% confidence intervals around each simple slope estimate. Significant simple slopes are labelled with their β value and the corresponding significance stars (*, **, ***) directly above or below each bar. A horizontal reference line at zero indicates the absence of a Neuroticism effect. The interaction statistics (*b*_int, *p*, f^2) are displayed in a box to the right of each panel.

Significant interactions were observed for two predictors consistently across multiple outcomes: interactions between neuroticism and gender and leadership and gender. The interaction between neuroticism and gender was significant for total distress (b_int = − 0.428, $p = .041$, $f^2 = .051$), stress (b_int = − 0.427, p = .049, $f^2 = .047$), and depression (b_int = − 0.534, $p = .016$, $f^2 = .072$). Neuroticism was a strong predictor of distress in males (β = 0.536–0.572, all $p < .001$) but substantially weaker in females (β = 0.038–0.118, all $p > .51$). The Leadership and Gender interaction was significant across all four outcomes: total distress ($f^2 = .085$), stress ($f^2 = .063$), anxiety ($f^2 = .054$), and depression ($f^2 = .061$). Leadership was consistently protective in males (β = −0.270 to − 0.337, all $p \leq .036$) but showed a positive trend in females (β = 0.146–0.237, all $p > .20$). Agreeableness and conscientiousness showed consistent protective effects across both genders without significant interactions (all $p > .65$).

Table 9
Moderation results: Total distress

Predictor	b_X	b_G	b_XxG	SE	t	p	Slope M	Slope F	f²
Extraversion	0.012	0.722	-0.215	0.228	-0.946	.347	0.012	-0.203	.011
Conscientiousness	-0.407	0.722	0.081	0.233	0.347	.729	-0.407	-0.326	.001
Agreeableness	-0.317	0.708	0.091	0.207	0.438	.662	-0.317	-0.226	.002
Neuroticism	0.545	0.688	-0.428	0.206	-2.076	**.041**	0.545	0.118	.051
Openness	0.096	0.727	-0.142	0.209	-0.682	.497	0.096	-0.047	.006
Leadership	-0.337	0.735	0.559	0.209	2.677	**.009**	-0.337	0.222	.085

Note. All predictors z-standardized. G = gender (0 = male, 1 = female). b_XxG = interaction coefficient. Slope M = simple slope for males; Slope F = for females. f² = incremental Cohen's f² for the interaction. Bold = p < .05.

Table 10
Moderation results: Stress

Predictor	b_X	b_G	b_XxG	SE	t	p	Slope M	Slope F	f²
Extraversion	-0.003	0.579	-0.105	0.234	-0.447	.656	-0.003	-0.108	.002
Conscientiousness	-0.335	0.578	0.054	0.247	0.220	.826	-0.335	-0.281	.001
Agreeableness	-0.266	0.566	0.075	0.216	0.348	.729	-0.266	-0.191	.001
Neuroticism	0.536	0.544	-0.427	0.214	-1.997	**.049**	0.536	0.109	.047
Openness	0.093	0.605	-0.222	0.213	-1.042	.300	0.093	-0.129	.013
Leadership	-0.314	0.586	0.496	0.216	2.297	**.024**	-0.314	0.183	.063

Note. All predictors z-standardized. G = gender (0 = male, 1 = female). b_XxG = interaction coefficient. Slope M = simple slope for males; Slope F = for females. f² = incremental Cohen's f² for the interaction. Bold = p < .05.

Table 11
Moderation results: Anxiety

Predictor	b_X	b_G	b_XxG	SE	t	p	Slope M	Slope F	f²
Extraversion	-0.079	0.977	-0.148	0.214	-0.692	.491	-0.079	-0.227	.006
Conscientiousness	-0.275	0.980	0.041	0.231	0.178	.859	-0.275	-0.234	.000
Agreeableness	-0.342	0.962	0.059	0.191	0.311	.757	-0.342	-0.282	.001
Neuroticism	0.263	0.954	-0.101	0.217	-0.466	.643	0.263	0.162	.003
Openness	-0.053	0.967	0.138	0.197	0.699	.487	-0.053	0.085	.006
Leadership	-0.279	0.985	0.425	0.200	2.126	**.036**	-0.279	0.146	.054

Note. All predictors z-standardized. G = gender (0 = male, 1 = female). b_XxG = interaction coefficient. Slope M = simple slope for males; Slope F = for females. f² = incremental Cohen's f² for the interaction. Bold = p < .05.

Table 12
Moderation results: Depression

Predictor	b_X	b_G	b_XxG	SE	t	p	Slope M	Slope F	f²
Extraversion	0.103	0.347	-0.302	0.238	-1.266	.209	0.103	-0.199	.019
Conscientiousness	-0.428	0.346	0.110	0.245	0.449	.654	-0.428	-0.318	.002
Agreeableness	-0.216	0.340	0.097	0.225	0.431	.668	-0.216	-0.119	.002
Neuroticism	0.572	0.319	-0.534	0.217	-2.464	**.016**	0.572	0.038	.072
Openness	0.188	0.341	-0.243	0.218	-1.114	.268	0.188	-0.055	.015
Leadership	-0.270	0.365	0.506	0.223	2.266	**.026**	-0.270	0.237	.061

Note. All predictors z-standardised. G = gender (0 = male, 1 = female). b_XxG = interaction coefficient. Slope M = simple slope for males; Slope F = for females. f² = incremental Cohen's f² for the interaction. Bold = p < .05.

4. Discussion

4.1 Overview

This study examined personality traits and leadership as predictors of psychological distress in first-year HAFA cadets following basic military training, with resilience as a mediator and gender as a moderator. The combined mediation–moderation framework yielded a coherent picture: certain adaptive traits protect against distress partly through resilience resources, while the relationship between individual

differences and mental distress is conditioned by gender in ways that implicate institutional and contextual mechanisms rather than dispositional differences alone.

4.2 Resilience as partial mediator: Trait-specific pathways

The mediation analyses confirmed that resilience was a significant direct predictor of all distress outcomes (β = −0.201 to − 0.281; Table 5-Table 8), supporting its conceptualization as a core protective psychological resource in military training contexts (Connor & Davidson, 2003; Sefidan et al., 2021). The trait-to-resilience-to-distress pathway was, however, trait-specific: agreeableness and leadership were the only predictors for which significant indirect effects through resilience were observed, and these effects were limited to total mental distress (Table 5; Fig. 2; Fig. 6a) and stress (Table 6; Fig. 3; Fig. 6b).

The agreeableness findings are consistent with research demonstrating that prosocial, cooperative, and conflict-avoidant tendencies facilitate the development of social cohesion and unit bonding during military training, processes that directly build resilience resources (Bobdey et al., 2021; Niederhauser et al., 2023; Sefidan et al., 2021; Zueger et al., 2023). The leadership mediation is theoretically meaningful in a military academy context where institutional training is explicitly designed to develop leadership capacity: cadets with higher leadership motivation and interpersonal competence may engage more deeply with the training structure, accruing resilience through mastery experiences and perceived institutional effectiveness (Gutierrez et al., 2024).

The absence of resilience mediation for neuroticism and conscientiousness distinguishes two different protective mechanisms. Conscientiousness exerted strong direct effects on depression (β = −0.407, $p < .001$) and total distress (β = −0.393, $p < .001$) without significant mediation, suggesting a direct behavioral coping mechanism, structured goal-directed behavior, self-regulation, and systematic planning, that reduces distress without requiring resilience as an intermediate resource (Bekesiene, 2023; Bogg & Roberts, 2004; Kotov et al., 2010). This aligns with finding that conscientiousness predicted military cadet performance through self-efficacy pathways that are independent of affective buffering mechanisms (Bekesiene, 2023).

Neuroticism demonstrated the largest and most consistent direct associations with all distress outcomes (β = 0.449–0.463, all $p < .001$) with no significant resilience mediation. This direct-pathway pattern is consistent with transdiagnostic model, proposed in (Lahey, 2009), of neuroticism as a dispositional affective sensitivity factor that amplifies stress responses independently of available coping resources, and with (Ormel et al., 2013) conceptualization of neuroticism as a general liability factor whose effects bypass specific psychological resources. In practical terms, this means that resilience-building programmes are unlikely to reduce the psychological distress of highly neurotic cadets, whose vulnerability operates through a fundamentally different channel.

The differential mediation pattern across mental distress outcomes, with significant indirect effects primarily for total distress (Table 5; Fig. 2; Fig. 6a) and stress (Table 6; Fig. 3; Fig. 6b) but not for anxiety (Table 7; Fig. 4; Fig. 6c) or depression (Table 8; Fig. 5; Fig. 6d), is theoretically informative. Stress and

total distress represent more environmentally reactive outcomes amenable to resilience buffering, while anxiety and depression may be more strongly rooted in stable dispositional or cognitive vulnerabilities that resilience resources cannot readily override at a single measurement point (Kotov et al., 2010; Sefidan et al., 2021). This is consistent with findings from longitudinal military training studies showing that resilience interventions produce larger effects on stress-related outcomes than on internalizing symptom dimensions (Niederhauser et al., 2023; Zueger et al., 2023).

4.3 Gender differences: Equal resources, unequal distress

Female cadets (Table 3; Table 4) reported substantially higher total distress (Hedges' g = − 0.76), stress (g = − 0.60), and anxiety (g = − 1.10) than males (Table 2; Table 4) in the complete absence of any significant gender difference in personality traits, resilience, or leadership. This dissociation between mental distress and dispositions is a central finding of the moderation study. It indicates that the female cadets' mental distress may reflect differential contextual responsivity rather than dispositional vulnerability.

This pattern is consistent with current literature where longitudinal findings in a large military sample that sex differences in mental health were not explained by differences in protective factors including resilience (Dell et al., 2025), and the demonstration that female military personnel show greater physiological and psychological stress reactivity under operationally equivalent training conditions (Conkright et al., 2021). The most plausible contextual mechanism involves the experience of gender minority status in a predominantly male institutional environment, heightened social evaluation concerns, and the additional cognitive load of identity navigation, processes that generate differential distress without requiring personality-level vulnerability (Boldry et al., 2001; Matud et al., 2020).

4.4 Neuroticism moderation: A context-dependent vulnerability factor

The interaction between neuroticism and gender was significant for total distress, stress, and depression but not anxiety (Table 9-Table 12). In all significant cases the pattern was consistent: neuroticism was a strong predictor of mental distress in males (β = 0.536–0.572, all $p < .001$) and a negligible predictor in females (β = 0.038–0.118, all $p > .51$). For depression, the attenuation was near-complete (Table 12; Fig. 7c). The simple slope plots in Fig. 7 illustrate this pattern clearly: the male slope rises steeply with increasing neuroticism across all three outcomes, while the female slope remains near-flat, consistent with the interaction coefficient values reported in Table 9-Table 12.

This pattern is interpretable through sensitivity amplifier model proposed in (Ormel et al., 2013): the distress-amplifying effect of neuroticism is most potent when the individual's baseline distress context is relatively low, leaving dispositional variation to differentiate who responds adversely to training demands. Male cadets, starting from a lower contextual distress baseline (Table 2), are more differentiated by their neuroticism level. Female cadets carry additional contextual distress load that is largely independent of their neuroticism, reducing the marginal contribution of dispositional emotional instability to their already-elevated distress. The non-significant interaction for anxiety is consistent with this interpretation:

anxiety showed the largest overall gender difference (g = − 1.10; Table 4), suggesting contextual factors already saturate female anxiety, leaving less dispositional variance to interact with gender.

These findings partially replicate and extend observations published in (Anand & Sg, 2016) regarding Air Force Academy cadets and align with broader evidence that neuroticism-based risk is more consistently expressed in male military personnel when contextual distress is controlled (Bobdey et al., 2021; Melkevik et al., 2025; Ormel et al., 2013). They suggest that neuroticism-based screening at entry has differential predictive utility by gender: it reliably identifies at-risk male cadets but is less informative for female cadets, whose distress requires contextual rather than dispositional assessment.

4.5 Leadership as a gender-contingent protective factor

The interaction between leadership and gender was the most consistent and largest moderation effect, significant for all four distress outcomes (f^2 = .054–.085; Table 9-Table 12). Among males, leadership was a significant protective factor across every outcome (β = −0.270 to − 0.337, all $p \leq .036$). Among females, the association was directionally reversed, positive across all four outcomes, though not reaching significance individually (β = 0.146–0.237, all $p > .20$). The diverging simple slope lines in Fig. 10 visually confirm this crossover pattern: as leadership increases, predicted distress decreases for males while it increases for females across all four outcomes.

The protective effect of leadership in male cadets is consistent with role congruity theory (Eagly & Karau, 2002): in a predominantly male military institutional culture, leadership qualities are normatively aligned with the male gender role, conferring status, perceived competence, and institutional belonging that buffer against training stress. High-leadership male cadets benefit from positive feedback loops between their dispositional strengths and institutional recognition, enhancing perceived control and reducing distress (Gutierrez et al., 2024; Lobato et al., 2024).

The directional reversal for female cadets, positive associations with distress across all outcomes (Fig. 7;Figure 9), is consistent with gender role incongruence dynamics (Eagly & Karau, 2002; Kray et al., 2025; Lin et al., 2025). For female cadets in a male-dominated training environment, leadership qualities that are institutionally rewarded in males may generate heightened performance pressure, increased social scrutiny, and the additional cognitive burden of navigating stereotype incongruence. Research on the "think manager–think male" phenomenon (Schein, 2001) and leadership-related stereotype threat (Davies et al., 2005) suggests that the same leadership attributes carry different institutional and social valence for females, potentially contributing to elevated rather than reduced distress. The consistency of the reversal across all four distress outcomes, despite individual female slopes not reaching significance, strengthens confidence that this pattern reflects a genuine gender-contingent effect rather than a statistical artefact, pending replication in larger samples.

4.6 Agreeableness and conscientiousness as universal protective traits

Agreeableness and conscientiousness demonstrated consistent protective main effects across all outcomes and both genders, without significant moderation interactions (all b_int $p > .65$; Table 9-Table 12). This gender-invariant pattern distinguishes these traits from neuroticism and leadership, suggesting they operate through coping mechanisms that are broadly effective regardless of the institutional gender dynamics that modulate other trait effects. Structured goal-directed coping (conscientiousness) and prosocial behavior and conflict avoidance (agreeableness) appear to reduce distress through pathways that do not depend on institutional role congruence or group membership, consistent with their characterization as universal adaptive traits in the occupational and military psychology literature (Bobdey et al., 2021; Wilmot & Ones, 2022).

4.7 Practical implications

The combined mediation-moderation findings support four practical recommendations for military academy psychological support. First, resilience-enhancement programmes are most likely to benefit cadets with high agreeableness and leadership motivation, where resilience augments existing adaptive resources against overall mental distress and stress, as evidenced by the significant indirect effects for these two predictors reported in Table 5, Table 6 and Fig. 6. Second, highly neurotic male cadets require psychological monitoring and intervention approaches that go beyond resilience training, addressing emotion regulation, cognitive reappraisal, and help-seeking stigma. This is shown by the absence of resilience mediation alongside the large direct effects of neuroticism in Table 5-Table 8 and the steep male simple slopes in Fig. 8 and Fig. 10. Third, the large and contextually driven female anxiety difference ($g = -1.10$; Fig. 1; Table 3) warrants institutional-level responses: gender-sensitive onboarding, visible female role modelling, and destigmatisation of distress reporting during the acute training phase. Fourth, leadership development programmes should be designed and evaluated by gender, given the crossover interaction visible across Table 9-Table 12, Fig. 8 and Fig. 10, which suggests that standard leadership development may inadvertently increase burden for female cadets without attending to the institutional context in which leadership is enacted.

5. Conclusions and future work

This study demonstrates that personality traits and leadership shape psychological distress in first-year HAFA cadets through dual pathways: a resilience-mediated indirect channel, most operative for agreeableness and leadership predicting total mental distress and stress; and direct dispositional channels, most operative for neuroticism and conscientiousness across all distress dimensions. The combined mediation-moderation framework reveals that these pathways are not uniformly expressed across gender: neuroticism is a significantly stronger vulnerability factor in male cadets, while leadership operates as a resource for males but shows a reversed, potentially burdensome pattern for females, a crossover interaction consistent with role incongruence dynamics in a predominantly male institutional environment.

The female-male distress differential (Hedges' $g = -0.76$ to -1.10 across outcomes) in the complete absence of gender differences in personality, resilience, or leadership is the single most theoretically

important finding: it establishes that acute post-training distress among female military cadets reflects contextual and institutional processes rather than dispositional vulnerabilities. This has direct implications for how military academies design psychological support, shifting emphasis from individual trait-based screening in females toward institutional culture and role congruence interventions.

Together, these findings provide an empirically grounded and theoretically integrated account of how personality, resilience, and gender interact to shape psychological adjustment during early military socialization. They identify specific intervention targets, resilience-building for agreeable and leadership-motivated cadets, emotion-regulation support for highly neurotic males, and institutional gender sensitivity for female cadets, that are directly actionable within the HAFA context and transferable to other military academy settings.

Several limitations should be acknowledged. The cross-sectional measurement at the end of the basic training precludes causal inference about the temporal ordering of personality, resilience, and mental distress. The sample size (N = 92; female n = 30) limits statistical power, particularly for detecting small indirect effects and for individually significant female simple slopes. The extraversion path a (p = .087) and several borderline indirect effects should be treated as exploratory. All measures are self-reported in a military setting where stigma may introduce under-reporting, although it ensures anonymity and confidentiality of responses. The leadership scale, which was developed by initio warrants further external validation as well as investigation of its psychometric properties across genders. Finally, the moderation models did not include resilience as a covariate, leaving open the question of whether the interaction between gender and predictor are independent of resilience level for future research.Yet, these limitations do not negate the robustness of the present findings. First, although cross-sectional mediation cannot establish causal sequencing, it can still provide informative evidence about theoretically consistent indirect associations when interpreted cautiously and framed as associational rather than causal pathways (Fairchild & McDaniel, 2017; Georgeson et al., 2025). Second, the analyses incorporated several safeguards that strengthen confidence in the results: indirect effects were tested with 5,000 bootstrap resamples, an approach widely recommended because the sampling distribution of indirect effects is often non-normal, and multiple testing was controlled using the Benjamini–Hochberg false discovery rate procedure, which offers a principled balance between Type I error control and statistical power (Pesigan & Cheung, 2020; Tibbe & Montoya, 2022). Third, the main findings showed internal convergence across analytic components. Resilience was not only theoretically central, but also emerged consistently as a significant predictor of all distress outcomes; agreeableness and leadership showed significant indirect effects through resilience specifically for total distress and stress; and gender moderation was detected in conceptually meaningful domains, namely neuroticism and leadership. This pattern of convergence is important because robust results are strengthened when they are coherent across direct, indirect, and moderated pathways rather than depending on a single isolated coefficient. Finally, the observed moderation effects were small in magnitude, which is common in interaction research and one reason such effects are often difficult to detect in modest samples; accordingly, the fact that significant moderation nevertheless emerged supports the view that these effects reflect

meaningful signal rather than random noise, even if subgroup estimates should be interpreted cautiously (Selya et al., 2012; Vize et al., 2023).

Three research priorities emerge. First, longitudinal extension of the present post-training findings using T0 (academy entry) and T2 (end of academic semester) data, available within the existing dataset, would enable prospective mediation modelling in which T0 personality predicts T2 mental distress through T1 resilience, establishing temporal precedence in the observed pathways. Second, replication in larger, more gender-balanced samples (target $n \geq 100$ per gender) would provide adequate power for individually significant female simple slope tests and for growth mixture modelling of gender-stratified trajectory subgroups. Third, intervention studies testing whether resilience programmes, psychological treatment interventions, or institutional gender-sensitivity training differentially modify the identified pathways would translate the mechanistic findings into actionable practice-based evidence.

Declarations

Author Contribution

Conceptualization: C.N.; Data curation: C.N., D.F.; Formal analysis: C.N., D.F., V.Y.; Investigation: C.N., D.F.; Methodology: C.N., Project administration: C.N., Resources: C.N., Software: C.N., D.F.; Supervision: C.N.; Validation: C.N., V.Y.; Visualization: C.N., D.F.; Writing – original draft: C.N., D.F.; Writing – review & editing: C.N., V.Y.

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Data Availability

Data were collecte by questionnaires and are not publicly available due to the institutional confidentiality requirements of the Hellenic Air Force Academy; access requests may be submitted to the corresponding author for consideration by the relevant authority.

Ethics Statement

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (World Medical Association, 2013) and received formal approval from the Ethics Committee of the Hellenic Air Force Academy prior to participant recruitment and data collection. Participation was entirely voluntary; all cadets were informed that non-participation would carry no consequences for their academic standing, military evaluation, or career progression. Written informed consent was obtained from all participants prior to data collection. All responses were recorded anonymously and stored in a

secure, password-protected database accessible only to the research team. No personally identifiable information was retained in the analysis dataset.

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Figures

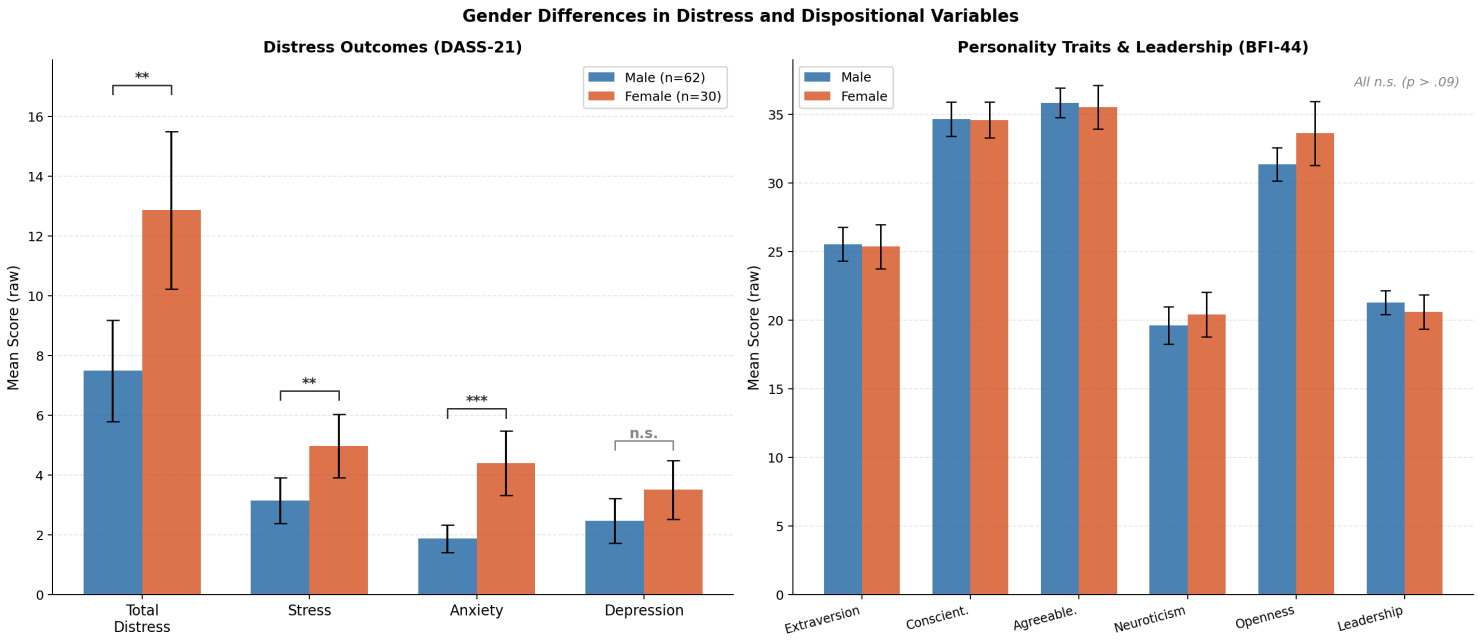


Figure 1

Mean scores ±95% CI by gender for distress outcomes (left) and personality, resilience, and leadership variables (right). All personality and resilience variables are non-significant.

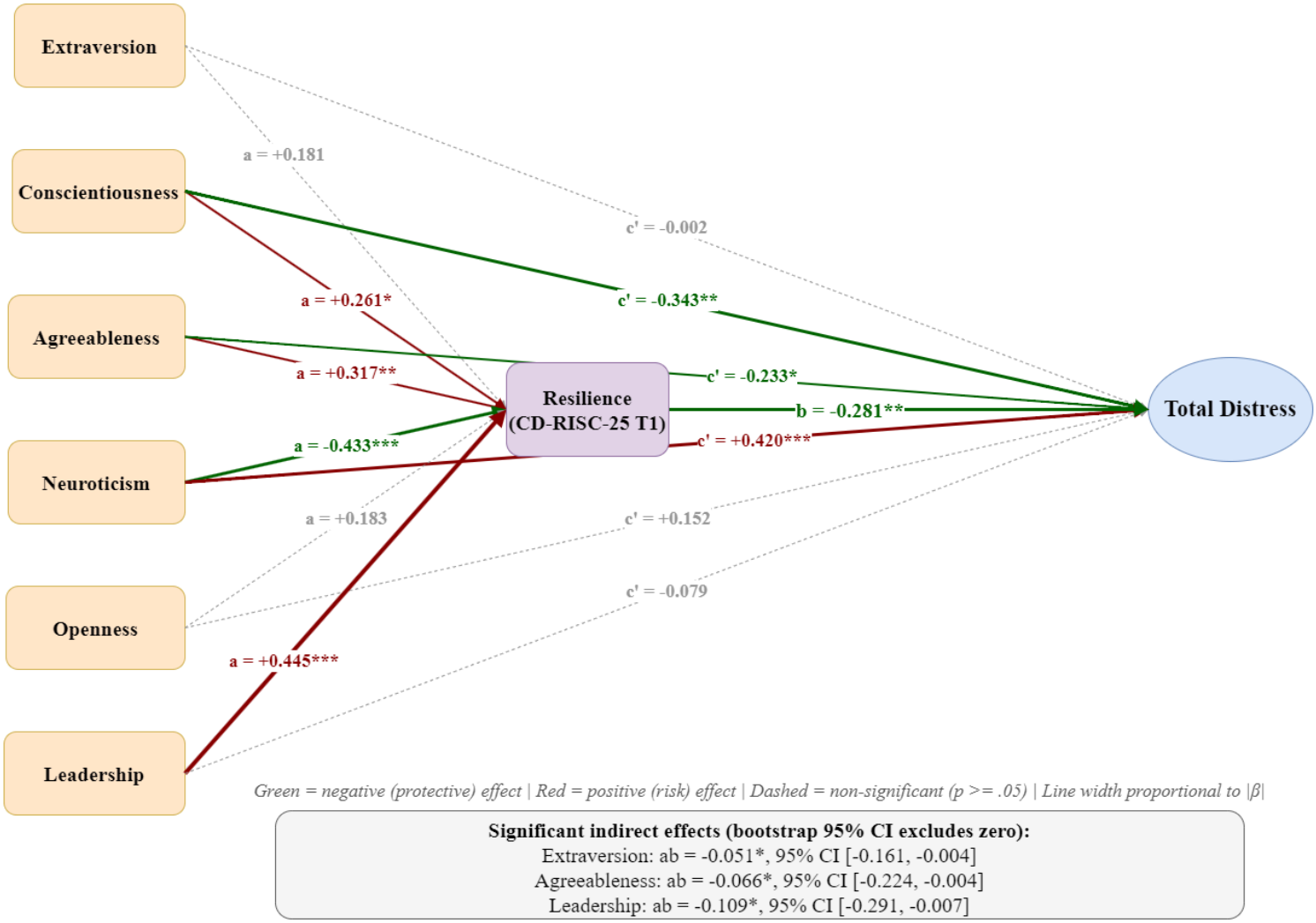


Figure 2

Mediation analysis among personality traits and leadership, resilience and distress.

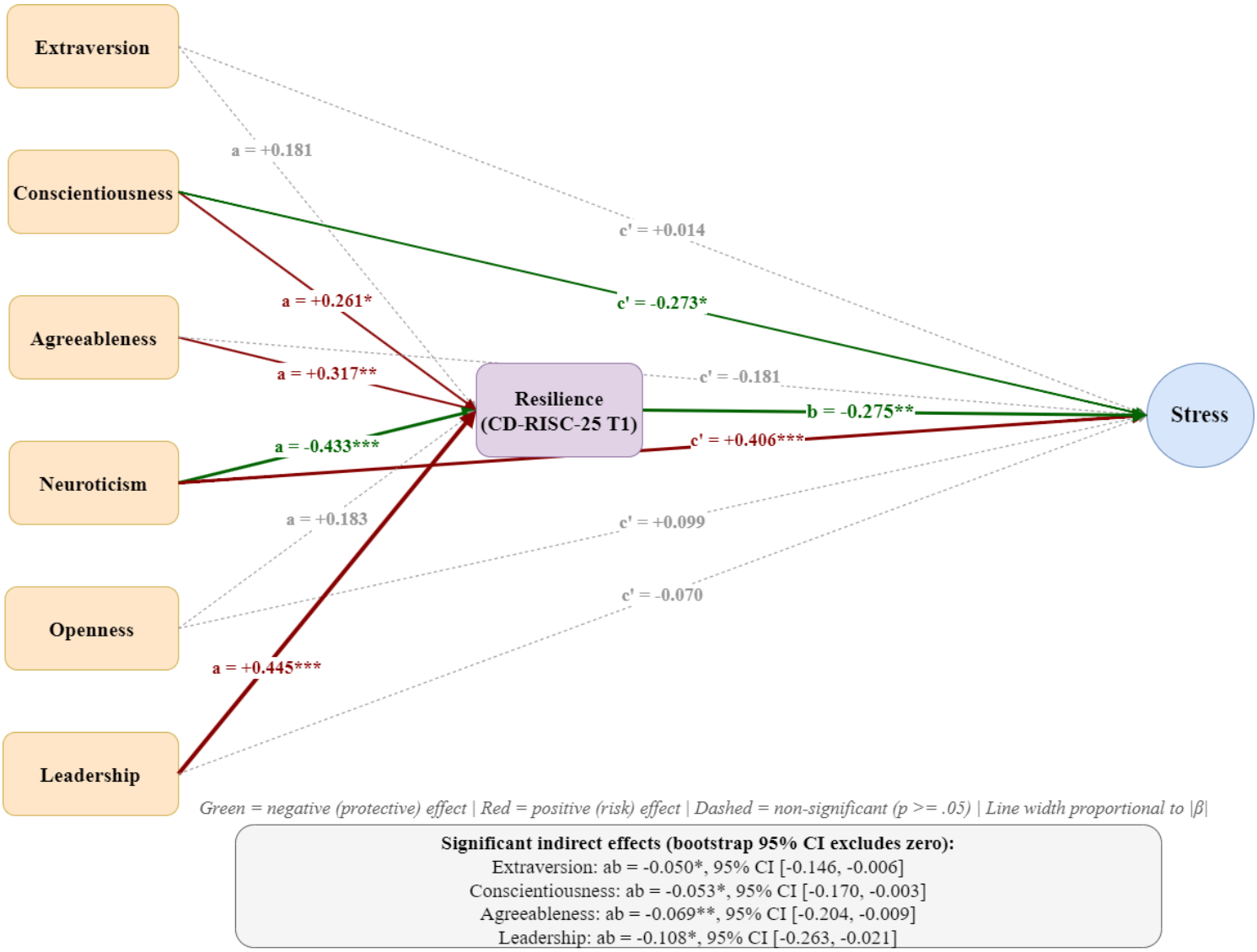


Figure 3

Mediation analysis among personality traits and leadership, resilience and stress.

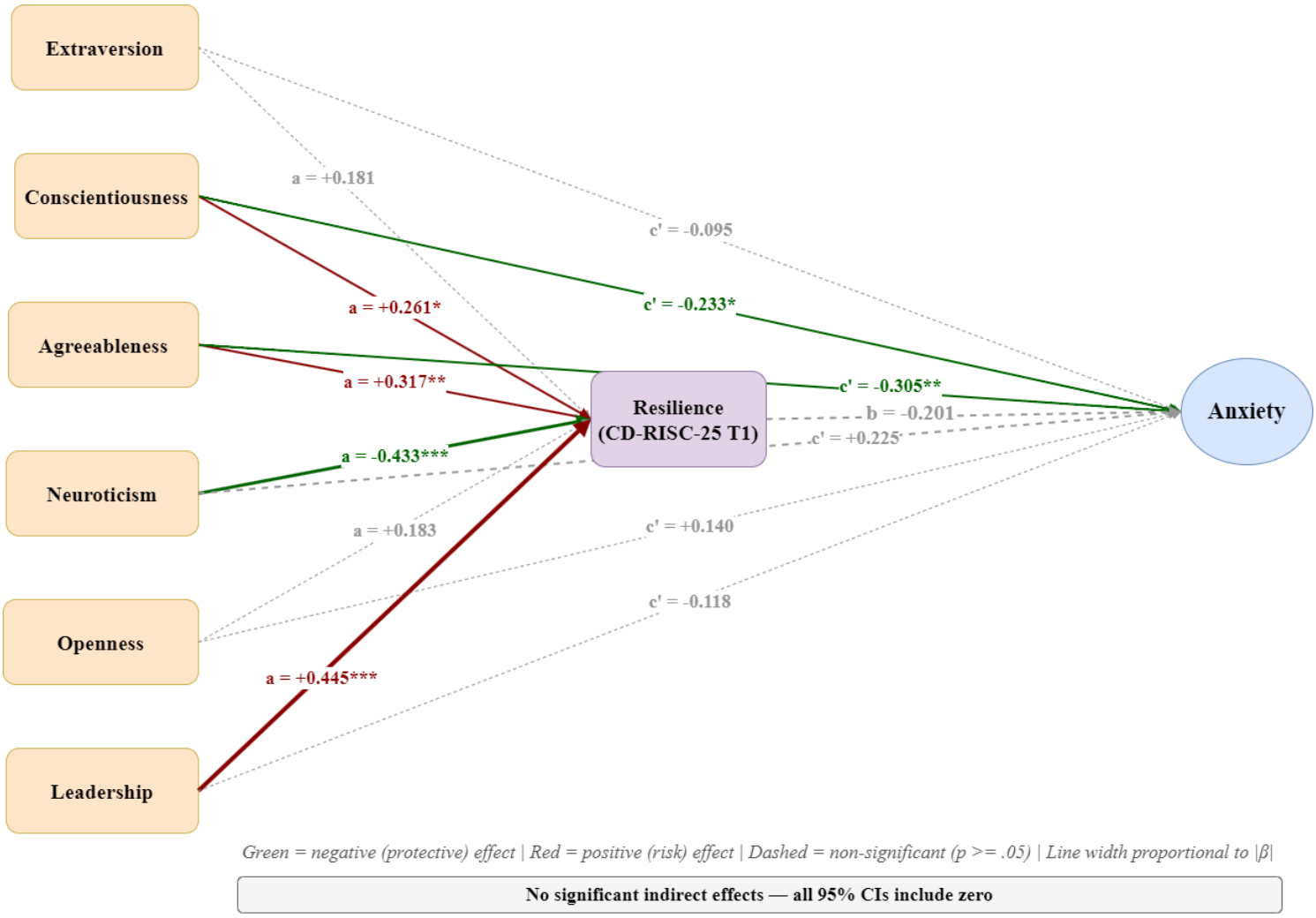


Figure 4

Mediation analysis among personality traits and leadership, resilience and anxiety.

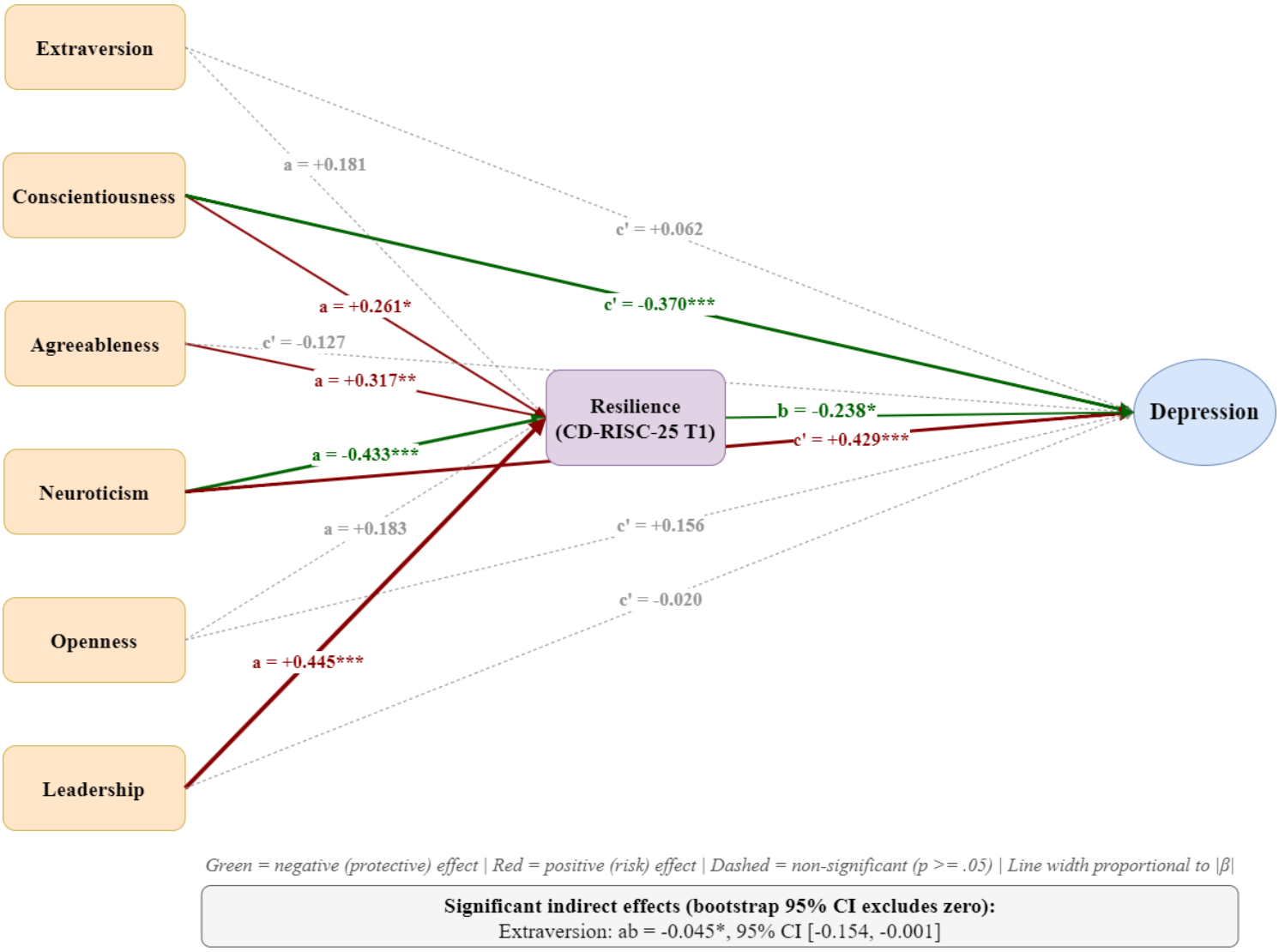


Figure 5

Mediation analysis among personality traits and leadership, resilience and depression.

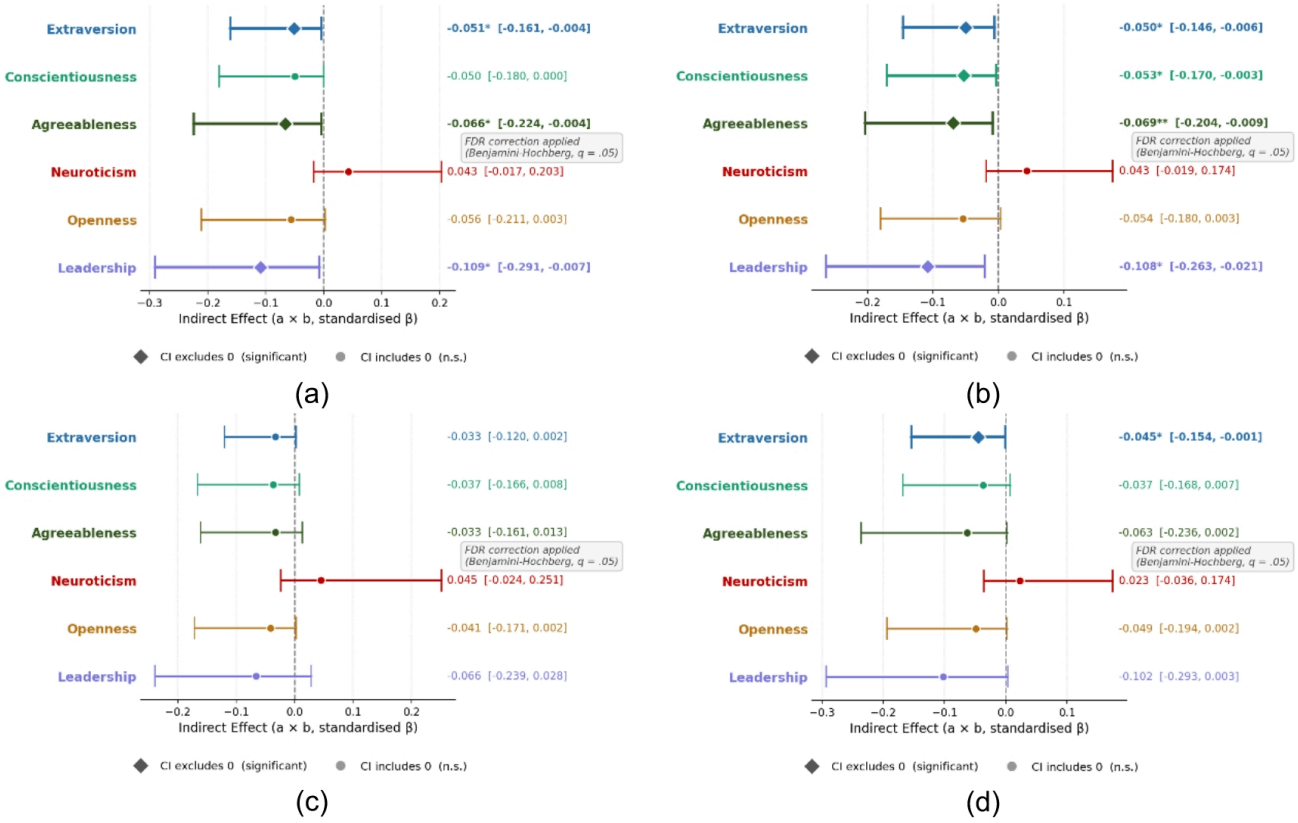


Figure 6

Indirect effects of personality traits and leadership through resilience. Outcome: (a) distress; (b) stress; (c) anxiety; (d) depression (Bootstrap 95% CI with 5,000 resamples).

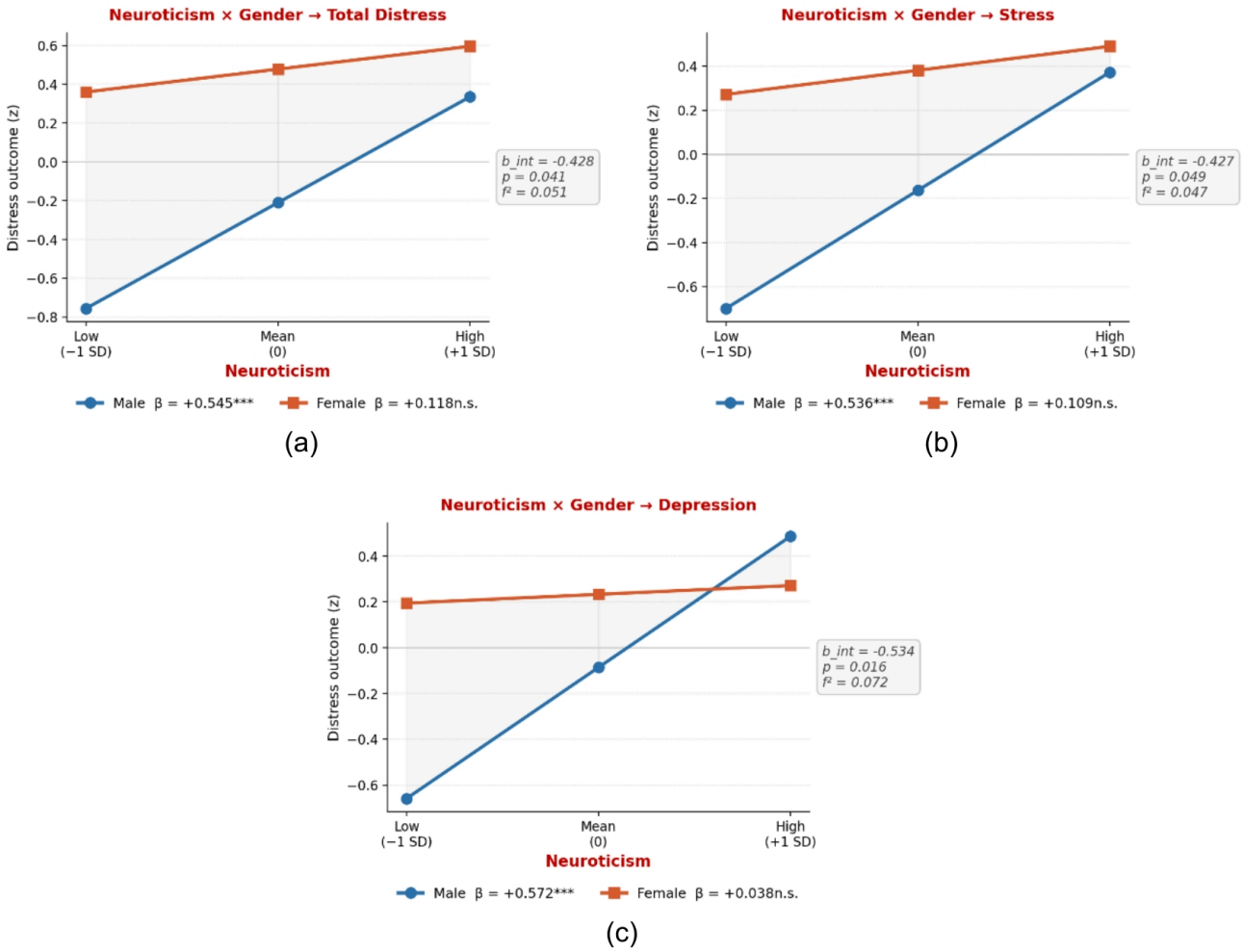


Figure 7

Neuroticism and gender interaction with respect to (a) total distress; (b) stress; and (c) depression

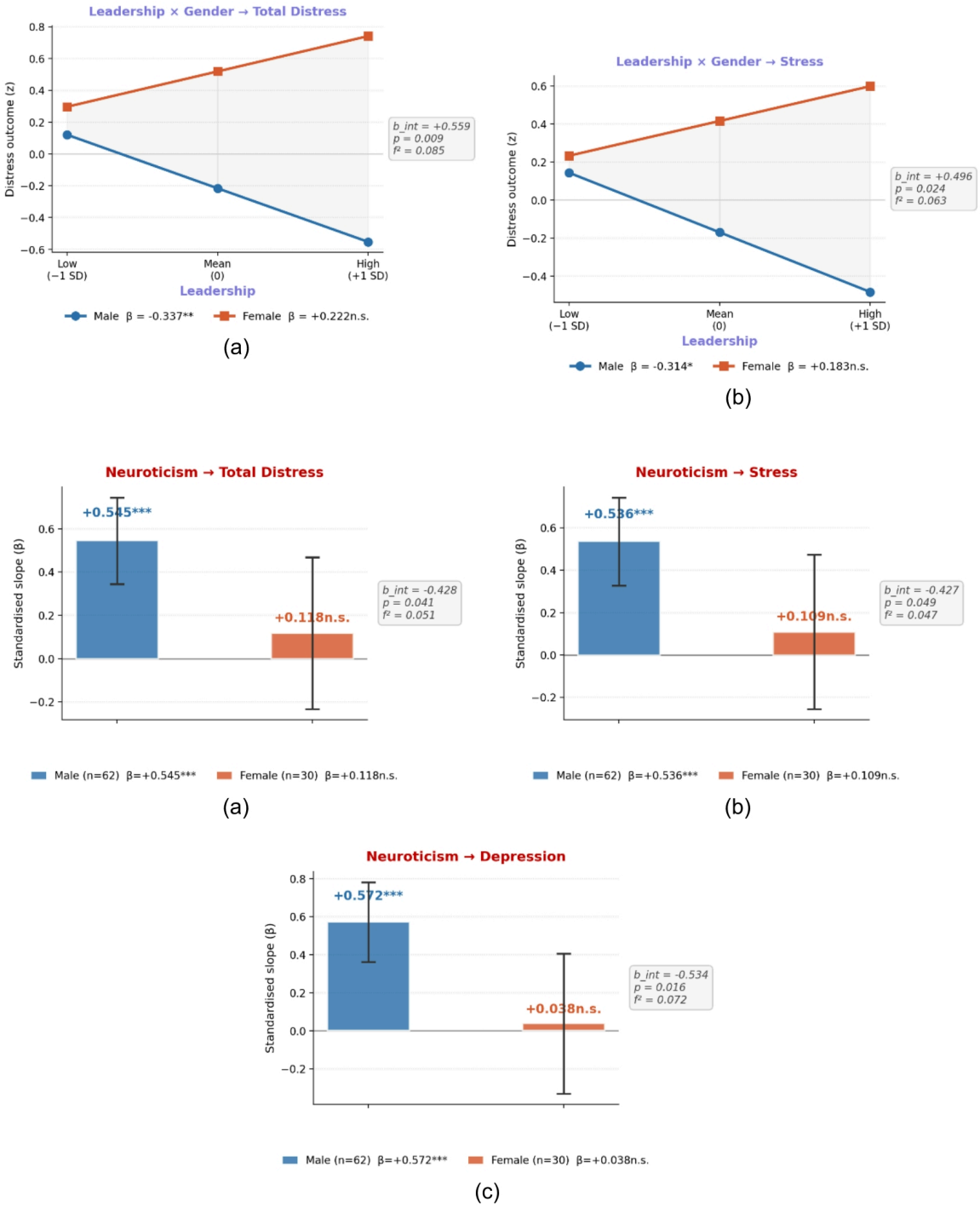


Figure 8

Simple slopes: Neuroticism to (a) total distress; (b) stress; and (c) depression

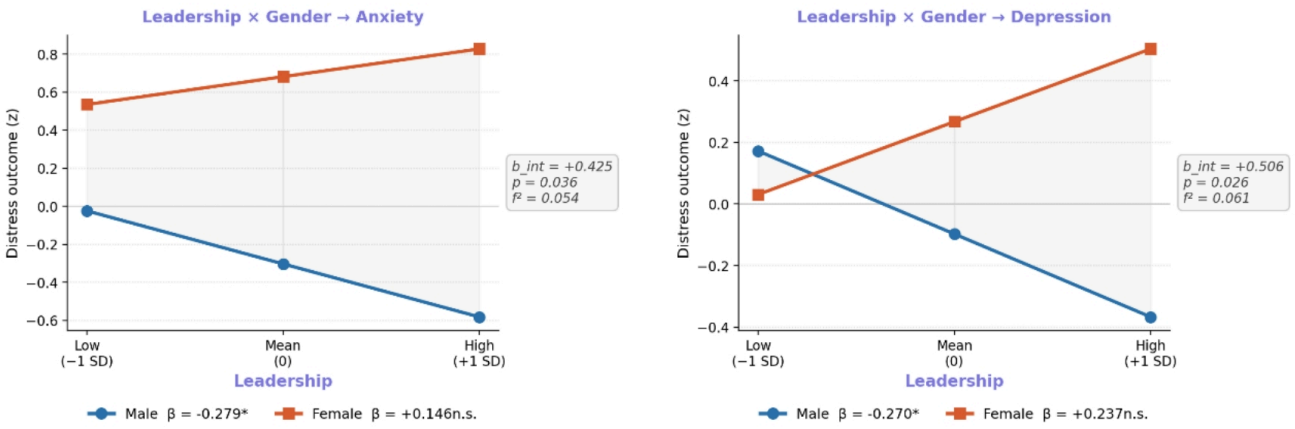


Figure 9

Leadership and gender interaction with respect to (a) total distress; (b) stress; (c) anxiety; and (d) depression

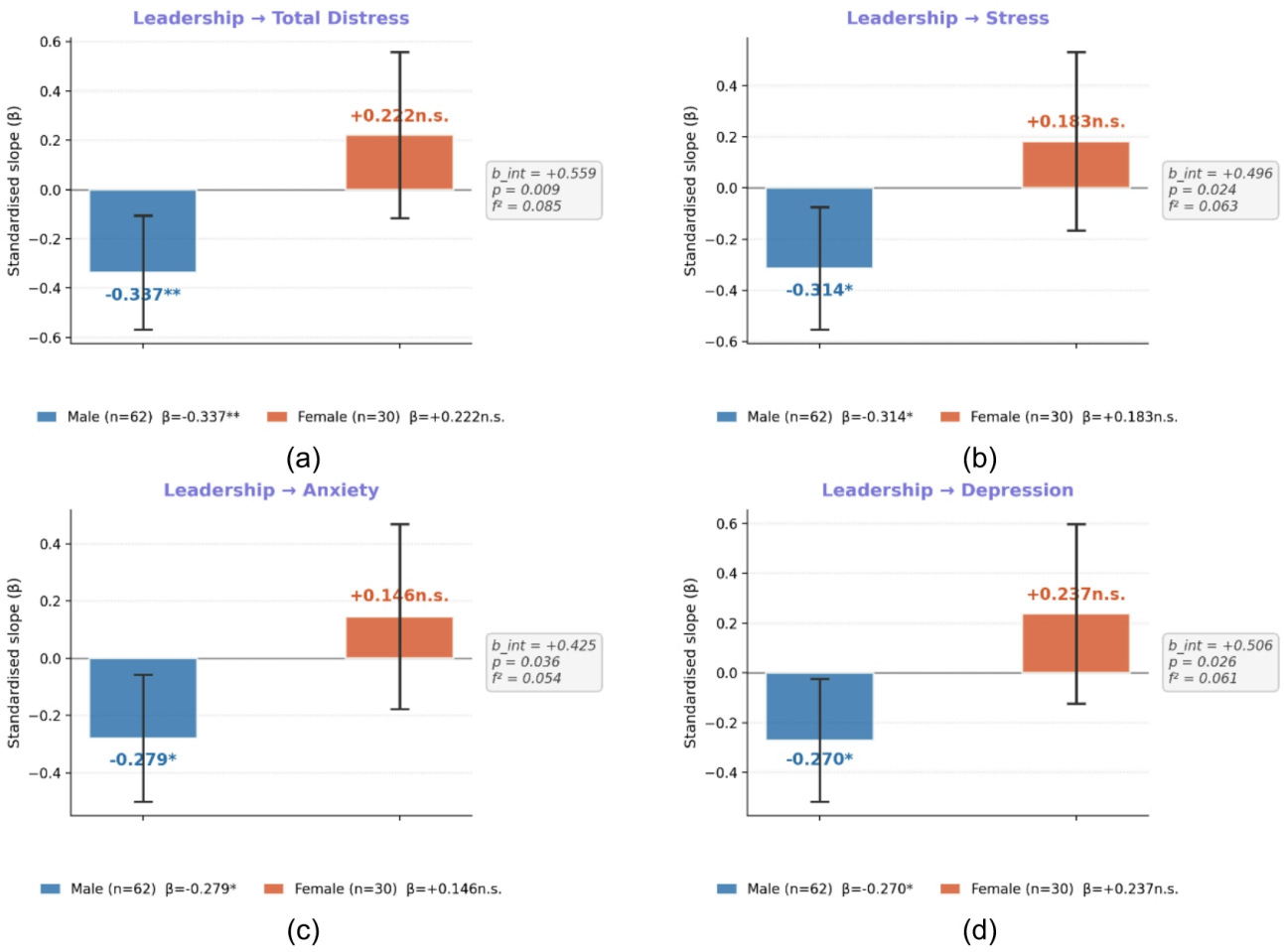


Figure 10

Simple slopes: Leadership to (a) total distress; (b) stress; (c) anxiety; and (d) depression