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Sex Differences in The Relationship Between Peer Support and Stress in Emerging Adulthood

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Abstract

Background

Emerging adulthood is a volatile developmental stage characterized by career transitions and elevated vulnerability to stress. While social support is generally protective, its functional subtypes may operate differently across sexes. This study examined the sex-differentiated associations between four functional types of peers and psychological stress among employed emerging adults.

Methods

Study conducted a cross-sectional secondary analysis of data from the Child and Adolescent Behaviors in Long-term Evolution project in Taiwan, included 1,367 employed young adults aged. Perceived stress was measured using the 10-item Perceived Stress Scale. Multivariable linear regression models, stratified by sex, were estimated to evaluate the independent associations of the four peer support domains and three situational stressors with psychological stress, after adjusting for sociodemographic and lifestyle covariates.

Results

Women reported significantly higher psychological stress and higher perceived peer support across all four domains than men. Sex-stratified regression models revealed distinct protective mechanisms. Among men, appraisal support was the only peer support subtype independently associated with lower stress, whereas informational support showed positive association with stress. Conversely, emotional support was the sole independent protective factor against stress in women. Across both sexes, financial stress showed association with psychological stress, particularly among men, while workplace bullying remained strongly associated with higher stress only in women.

Conclusions

The stress-buffering function of peer support among employed emerging adults varies significantly by support type and sex. Interventions aiming to alleviate early-career occupational stress should adopt a gender-sensitive lens, prioritizing competence-affirming appraisal support for men and empathy-driven emotional support for women.

Keywords: Emerging adulthood, Peer support, Stress, Sex Difference

Introduction

Emerging adulthood (ages 18–25) is a distinct developmental stage marked by instability, identity exploration, and frequent romantic or occupational transitions (Arnett, 2000). These changes create sustained uncertainty, elevating vulnerability to mental health issues. U.S. epidemiological data indicate that the 12-month prevalence of psychiatric disorders exceeds 40% among individuals aged 18–29—the highest of any age group—with mood, anxiety, and substance use disorders being particularly prominent (Arnett et al., 2014).

Sex differences in stress exposure during this period are well-documented globally. For instance, community-based studies of 4,816 Spanish adults (Matud et al., 2020) and 503 university students (Yalcin-Siedentopf et al., 2021) both reported higher perceived stress in women than in men. A central distress source is transitioning into the workforce, which introduces occupational demands and role expectations that differ qualitatively from those faced by older adults. Despite the developmental specificity of these stressors, they remain poorly recognized by existing mental health services.

Workplace adversity represents a prominent occupational stressor for this cohort. Evidence on sex differences in bullying exposure remains mixed: some studies report higher exposure among women, whereas others find comparable rates between sexes (Biswas et al., 2021). A Malaysian survey of emerging adults detected no sex differences in overall bullying exposure, identifying covert work-related bullying as the most common form (Rong & Tharbe, 2018). Crucially, bullying exposure consistently links to anxiety, depression, and burnout. Longitudinal evidence confirms that bullying precedes mental health deterioration rather than follows it (Walker, 2025). These patterns underscore the need to examine both the stressors emerging adults encounter and the coping resources available to them.

Social support is a consistently identified protective factor against stress-related psychological harm. Cohen and Wills (1985) proposed that social support buffers stress by reducing stressor appraisal as threatening and enhancing perceived coping resources. Importantly, social support is multidimensional. House et al. (1988) distinguished four functional subtypes: emotional (care and empathy), instrumental (tangible assistance), informational (advice and guidance), and appraisal support (evaluative feedback affirming self-worth). The protective effects of these subtypes may vary by stressor and developmental context, making access to diverse support forms consequential for emerging adults navigating concurrent transitions.

Among support sources, peer support—assistance and validation from individuals of similar age, social position, or life circumstances—is highly salient during emerging adulthood (Price et al., 2022). Beyond informal interactions, peer-delivered interventions involving emotional validation, experiential knowledge sharing, and collaborative problem-solving improve capacity to manage psychological stressors (Walker et al., 2024). In the present study, peer support was operationalized as perceived peer support—participants' subjective appraisal of supportive behaviors from age-peers in daily interactions.

Sex differences in coping styles and support utilization directly imply that sex moderates the peer support–stress relationship. Women more frequently adopt emotion-focused strategies, such as seeking emotional reassurance and verbal processing (Tamres et al., 2002). Conversely, men favor problem-focused approaches, preferring instrumental or informational assistance to address stressors directly (Matud, 2004; Reevy & Maslach, 2001). Additionally, women tend to maintain larger social networks, exchange support more frequently, and report higher perceived support (Kneavel, 2021; Matud et al., 2020), yet they simultaneously report greater vulnerability to chronic stress and daily hassles than men (Matud et al., 2020; Wiklund et al., 2014). These

patterns warrant a systematic examination of how sex moderates stress exposure and peer support mechanisms.

Despite the growing literature, several gaps remain. First, most studies focus on student samples, leaving employed emerging adults—who face distinct occupational demands—understudied. Second, peer support is largely treated as a unidimensional construct; few studies have differentiated its four functional subtypes or integrated global and domain-specific stress measures within a single analytic framework. Third, sex-stratified analyses examining whether peer support–stress associations differ between men and women remain scarce.

To address these gaps, this study examined employed emerging adults aged 24–29 years in Taiwan with three aims: (1) to assess associations between four domains of peer support (emotional, instrumental, informational, and appraisal) and global perceived stress; (2) to examine associations between domain-specific situational stressors (work performance, financial, and relationship stress) and overall perceived stress; and (3) to conduct sex-stratified analyses to determine whether these associations differ between men and women. These findings will extend the evidence base and provide sex-sensitive insights for targeted interventions.

Methods

Study Design and data source

We conducted a secondary analysis of data from the Child and Adolescent Behaviors in Long-term Evolution (CABLE) project, administered by the Research Center for Humanities and Social Sciences (RCHSS), Academia Sinica (Chang, 2023). This study utilized data from the 2019 follow-up survey, which employed a mixed-mode design combining a telephone survey with a subsequent online questionnaire to track an existing cohort of participants.

Data Collection Procedures

The data collection followed a two-stage procedure. In the first stage, a telephone survey was conducted between 10 December 2019 and 8 January 2020 using the computer-assisted telephone interviewing (CATI) system operated by Academia Sinica's Survey Research Center. Of the original cohort of 4,085 participants, 2,771 successfully completed the telephone interview.

In the second stage, an online survey was administered from 17 January to 13 February 2020. Invitation emails were sent on 17 January 2020 to 2,652 respondents who had completed the telephone survey and provided valid email addresses. After excluding 25 undeliverable emails (e.g., non-existent accounts or full mailboxes), 604 non-responses, and 28 partially completed questionnaires, a total of 1,995 respondents completed the online questionnaire.

Study sample

From the 2019 CABLE project database, an initial sample of 2,771 records was retrieved. Respondents who did not complete both the first-stage telephone interview and the second-stage online questionnaire were excluded (n=776), followed by exclusion of those who were students or unemployed at the time of the survey (n=375). Respondents with "do not know" or "refused" responses on any primary study variable—including psychological stress, specific situational life stress, or peer support—were further excluded (n=131), as were those with inconsistent sociodemographic information (n=122). The final sample comprised 1,367 participants. The full selection process was illustrated in Figure 1.

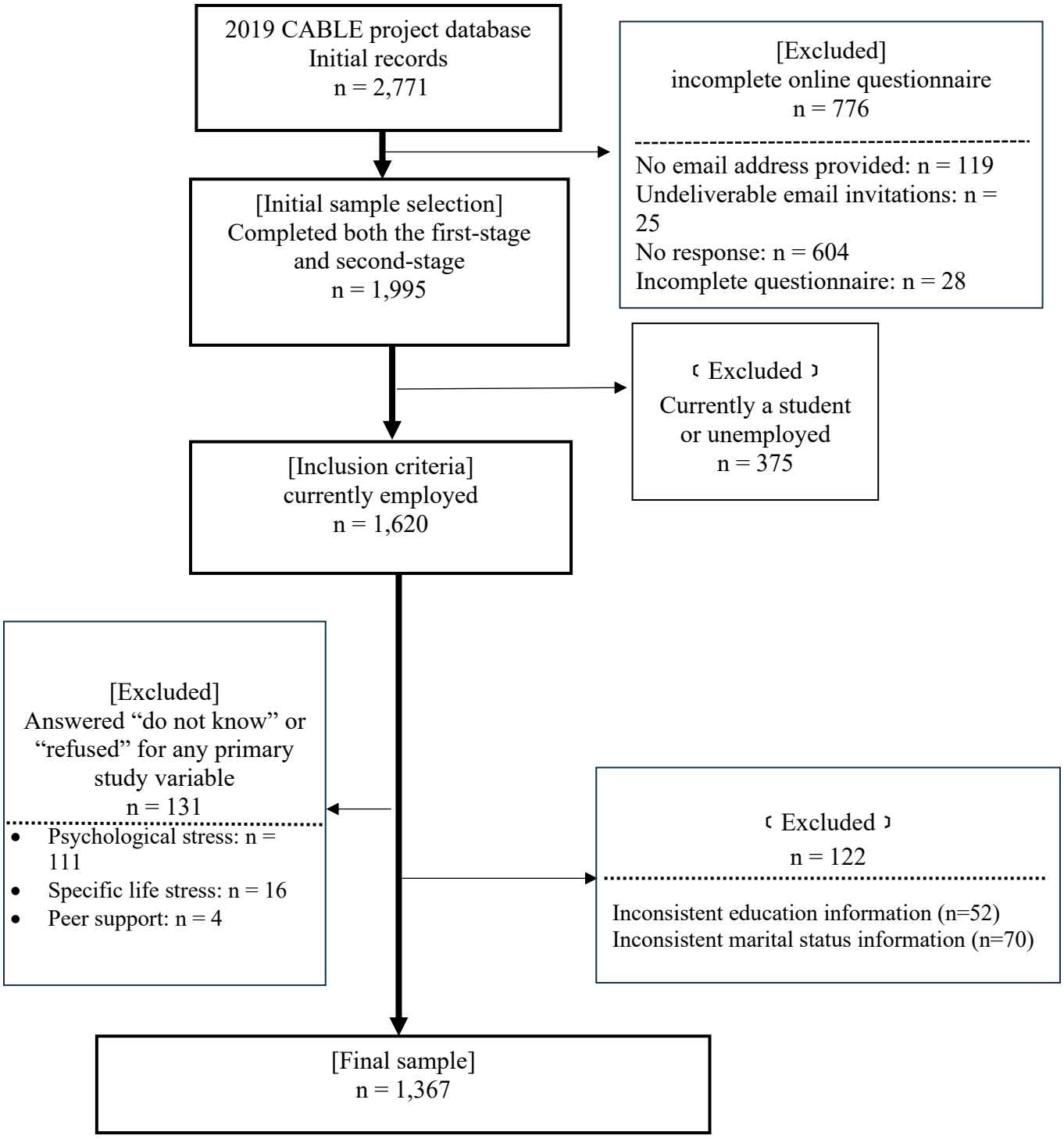


Figure 1. Flowchart of sample selection

Variables and measures

Independent variables

Peer support

Peer support was assessed across four dimensions: emotional, instrumental, informational, and appraisal, using a 5-point Likert scale (1=never/none, 5=always). Each dimension comprised three items, yielding domain scores ranging from 3 to 15, with higher scores indicating greater perceived support. Emotional support reflects empathy, understanding, and emotional comfort; instrumental support refers to tangible assistance or resources; informational support refers to advice or information that facilitates decision-making; and appraisal support refers to feedback that affirms self-worth and competence (House, 1988).

Covariate variables

Sociodemographic and behavioral variables

Sociodemographic variables included sex (male/female), age group (24–26 vs. 27–29 years), education (high school/vocational school or below, university, master's degree or above), and marital status (single, cohabiting unmarried, married). Health-related variables included body mass index (BMI) and history of cardiometabolic conditions (ever diagnosed with hypertension, diabetes, or hyperlipidemia). Socioeconomic variables included occupational category (legislators, senior officials and managers; professionals, technicians and associate professionals, clerical support workers, service and sales workers, and other) and personal/household income (categorized by average monthly income in the past year). Lifestyle and religiosity variables included smoking status (non-smoker, smoker but not daily, daily smoker), alcohol use in the past month (yes/no), exercise habit (≥10 minutes per session, yes/no), and religious affiliation (yes/no).

Workplace bullying was assessed as exposure to persistent negative acts at work in the past six months (yes/no).

Specific situational life stress

Participants rated their level of stress experienced over the past two weeks across three domains—work performance, relationships, and financial concerns—using a scale from 0 (no stress) to 5 (very high stress). Higher scores indicate greater stress within each domain.

Dependent variables

Psychological stress was assessed using the 10-item Perceived Stress Scale (PSS-10), originally derived from the Perceived Stress Scale developed by Cohen and colleagues in 1983 to capture individuals' subjective appraisal of stress in everyday life. The PSS framework emphasizes perceived (subjective) stress, reflecting the extent to which respondents evaluate life situations as unpredictable, uncontrollable, and overwhelming, rather than quantifying objective stressful events or their intensity (Lee, 2012).

Items were rated on a 5-point Likert scale ranging from 0 ("never") to 4 ("very often"). Four items were reverse-coded, and item scores were summed to yield a total score ranging from 0 to 40, with higher scores indicating greater perceived stress. The PSS-10 covers key dimensions of stress appraisal, including perceived control, coping capacity, and emotional distress, and has demonstrated satisfactory reliability and validity across age groups, sexes, and cultural contexts (Lee, 2012).

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics version 29.0. Data management, including cleaning, coding, and consistency checks, was conducted in Microsoft Excel 365.

Sample characteristics were summarized using descriptive statistics, with categorical variables presented as frequencies and percentages and continuous variables as means with standard deviations. Sex differences in participant characteristics were examined using independent-samples t tests for continuous variables and chi-square tests for categorical variables. Bivariate associations between peer support domains, situational stressors, and psychological stress were assessed using Pearson correlation coefficients; group differences across dichotomous variables were examined using independent-samples t tests, and one-way ANOVA was used for variables with more than two categories.

Sex-stratified multiple linear regression models were estimated separately for men and women to evaluate associations between peer support, situational stressors, and psychological stress. Covariates were selected based on two criteria: (1) sociodemographic and behavioral variables that showed statistically significant associations with psychological stress in sex-specific univariable analyses were included as potential confounders; and (2) all four peer support domains (emotional, instrumental, informational, and appraisal) were retained in all models regardless of univariable significance to ensure conceptual completeness. All tests were two-tailed, and statistical significance was set at $p < 0.05$.

Results

Descriptive characteristics are presented in Table 1. The sample included 595 men (43.5%) and 772 women (56.5%). Most participants were aged 27–29 years (54.4%), university-educated

(78.3%), single (83.5%), and employed in managerial/professional roles (36.0%). Personal monthly income was most commonly NT$20,000–39,999 (57.8%). Non-smoking was reported by 78.9%, alcohol use in the past month by 58.2%, and regular exercise by 62.5%. Workplace bullying was reported by 7.7%. Mean peer support scores ranged from 11.16 ± 2.28 (appraisal) to 12.56 ± 2.24 (emotional; range 3–15). Among situational stressors, work performance stress was highest (2.27 ± 1.11), followed by financial stress (2.13 ± 1.17) and relationship stress (1.33 ± 1.17; range 0–5). The mean PSS-10 score was 16.84 ± 5.91 (range 0–40).

Sex-stratified comparisons are presented in Table 1. Men were more likely to be aged 27–29 years (60.0% vs. 50.1%), whereas women were more evenly distributed across age groups (χ^2 = 13.198, $p < 0.001$). BMI distributions differed markedly by sex (χ^2 = 91.568, $p < 0.001$): underweight was more common among women (12.9% vs. 4.8%) and obesity more common among men (21.9% vs. 9.0%). Men were more concentrated in managerial/professional roles (42.5% vs. 31.0%) and other occupations (17.8% vs. 3.4%), while women more frequently held clerical (29.0% vs. 8.1%) or service/sales positions (16.7% vs. 11.6%; χ^2 = 165.288, $p < 0.001$). Men more commonly held postgraduate degrees (19.5% vs. 12.2%), and cardiometabolic conditions were more prevalent among men (5.9% vs. 2.2%; both $p < 0.001$). Men reported higher personal incomes (χ^2 = 29.788, $p < 0.001$), while household income did not differ by sex (p = 0.457). Men were more often single (86.2% vs. 81.5%) and women more often married (10.1% vs. 6.2%; χ^2 = 7.240, $p = 0.027$). Daily smoking was substantially higher among men (18.3% vs. 3.4%; $p < 0.001$), and exercise participation was also higher among men (69.0% vs. 57.4%; $p < 0.001$). Workplace bullying was more prevalent among women (9.2% vs. 5.7%; $p = 0.017$). Alcohol use and religious affiliation did not differ by sex. Women reported higher peer support scores across all four domains (all $p < 0.001$): emotional (13.12 ± 1.99 vs. 11.84 ± 2.32), instrumental (12.71 ±

1.98 vs. 11.88 ± 2.12), informational (12.60 ± 2.08 vs. 11.71 ± 2.24), and appraisal support (11.67 ± 2.16 vs. 10.51 ± 2.27). Situational stress scores did not differ significantly by sex across all three domains (all $p > 0.05$). Women reported higher PSS-10 scores than men (17.29 ± 5.90 vs. 16.25 ± 5.89; $p < 0.001$).

Table 1 Sex-Stratified Comparisons of Participant Characteristics (n =1367)

		Sex			
	Total	Male	Female	$\chi 2$ / t	*p*-value
	n (%) / Mean ± SD	(595, 43.5%)	(772, 56.5%)		
Variable		n (%) / Mean ± SD	n (%) / Mean ± SD		
Age group				13.198	< 0.001
aged 24-26	623 (45.6)	238 (40.0)	385 (49.9)		
aged 27-29	744 (54.4)	357 (60.0)	387 (50.1)		
BMI				91.568	< 0.001
<18.5	119 (9.3)	27 (4.8)	92 (12.9)		
18.5≦BMI<24	755 (58.9)	285 (50.4)	470 (65.7)		
24≦BMI<27	219 (17.1)	130 (23.0)	89 (12.4)		
≥27	188 (14.7)	124 (21.9)	64 (9.0)		
Occupation				165.288	< 0.001
Legislators, senior officials and managers; professionals	492 (36.0)	253 (42.5)	239 (31.0)		
Technicians and associate professionals	273 (20.0)	119 (20.0)	154 (19.9)		
Clerical support workers	272 (19.9)	48 (8.1)	224 (29.0)		

Table 1 Sex-Stratified Comparisons of Participant Characteristics (n =1367)

Variable	Total n (%) / Mean ± SD	Sex		$\chi 2$ / t	*p*-value
		Male (595, 43.5%) n (%) / Mean ± SD	Female (772, 56.5%) n (%) / Mean ± SD		
Service and sales workers	198 (14.5)	69 (11.6)	129 (16.7)		
Other occupations [a]	132 (9.7)	106 (17.8)	26 (3.4)		
Education				15.655	< 0.001
Master's degree or above	210 (15.4)	116 (19.5)	94 (12.2)		
University	1070 (78.3)	437 (73.4)	633 (82.0)		
High school/vocational school or below [b]	87 (6.4)	42 (7.1)	45 (5.8)		
History of cardiometabolic conditions [c]				12.403	< 0.001
No	1314 (96.2)	560 (94.1)	754 (97.8)		
Yes	52 (3.8)	35 (5.9)	17 (2.2)		
Personal monthly income (NT$)				29.788	< 0.001
<20,000	62 (4.5)	32 (5.4)	30 (3.9)		
20,000–39,999	790 (57.8)	297 (49.9)	493 (63.9)		
40,000–59,999	412 (30.1)	205 (34.5)	207 (26.8)		
≥60,000	103 (7.5)	61 (10.3)	42 (5.4)		

Table 1 Sex-Stratified Comparisons of Participant Characteristics (n =1367)

Variable	Total n (%) / Mean ± SD	Sex		$\chi 2$ / t	*p*-value
		Male (595, 43.5%) n (%) / Mean ± SD	Female (772, 56.5%) n (%) / Mean ± SD		
Household monthly income (NT$)				4.674	0.457
<50,000	133 (10.9)	48 (8.9)	85 (12.4)		
50,000–69,999	138 (11.3)	59 (11.0)	79 (11.5)		
70,000–99,999	205 (16.8)	89 (16.6)	116 (16.9)		
100,000–149,999	347 (28.4)	158 (29.4)	189 (27.6)		
150,000–199,999	201 (16.4)	89 (16.6)	112 (16.3)		
≥200,000	199 (16.3)	94 (17.5)	105 (15.3)		
Marital status				7.24	0.027
Single	1142 (83.5)	513 (86.2)	629 (81.5)		
Cohabiting (unmarried)	110 (8.0)	45 (7.6)	65 (8.4)		
Married	115 (8.4)	37 (6.2)	78 (10.1)		
Smoking habits (past year)				86.451	< 0.001
Non-smoker	1078 (78.9)	417 (70.1)	661 (85.6)		
Smoker, not daily	154 (11.3)	69 (11.6)	85 (11.0)		
Daily smoker	135 (9.9)	109 (18.3)	26 (3.4)		
Alcohol use (past month)				0.094	0.759
No	570 (41.8)	251 (42.3)	319 (41.4)		
Yes	794 (58.2)	343 (57.7)	451 (58.6)		

Table 1 Sex-Stratified Comparisons of Participant Characteristics (n =1367)

Variable	Total n (%) / Mean ± SD	Sex		$\chi 2$ / t	*p*-value
		Male (595, 43.5%) n (%) / Mean ± SD	Female (772, 56.5%) n (%) / Mean ± SD		
Exercise (≥10 minutes per session) (past month)				19.399	< 0.001
No	511 (37.5)	184 (31.0)	327 (42.6)		
Yes	850 (62.5)	410 (69.0)	440 (57.4)		
Workplace bullying (past 6 months)				5.747	0.017
No	1262 (92.3)	561 (94.3)	701 (90.8)		
Yes	105 (7.7)	34 (5.7)	71 (9.2)		
Religious affiliation				2.833	0.092
No	674 (49.3)	309 (51.9)	365 (47.3)		
Yes	692 (50.7)	286 (48.1)	406 (52.7)		
Emotional support [d]	12.56±2.24	11.84±2.32	13.12±1.99	-11.013	< 0.001
Instrumental support [d]	12.35±2.08	11.88±2.12	12.71±1.98	-7.481	< 0.001
Informational support [d]	12.21±2.20	11.71±2.24	12.60±2.08	-7.583	< 0.001
Appraisal support [d]	11.16±2.28	10.51±2.27	11.67±2.16	-9.638	< 0.001
Work performance stress [e]	2.27±1.11	2.26±1.11	2.28±1.12	-0.241	0.810
Relationship stress [e]	1.33±1.17	1.31±1.23	1.35±1.12	-0.677	< 0.001
Financial stress [e]	2.13±1.17	2.13±1.21	2.14±1.14	-0.177	0.860
Perceived Stress Scale (PSS-10) [f]	16.84±5.91	16.25±5.89	17.29±5.90	-3.24	< 0.001

Table 1 Sex-Stratified Comparisons of Participant Characteristics (n =1367)

		Sex			
	Total	Male	Female	$\chi 2$ / t	*p*-value
	n (%) / Mean ± SD	(595, 43.5%)	(772, 56.5%)		
Variable		n (%) / Mean ± SD	n (%) / Mean ± SD		

[a] Other occupations include agriculture, forestry, and fishery workers; craft and related trades workers; plant and machine operators and assemblers; elementary occupations; and military personnel. [b] Included junior college (associate degree), senior high school, and vocational high school [c] Having been diagnosed by a physician with hypertension, diabetes mellitus, or hyperlipidemia (any one of the three). [d] scores ranging from 3 to 15. [e] scores ranging from 0 to 5. [f] scores ranging from 0 to 40.

Table 2 presents univariable analyses of psychological stress among male participants. Most sociodemographic variables were not significantly associated with psychological stress. Household monthly income ($p = 0.025$), alcohol use ($p = 0.042$), absence of regular exercise ($p = 0.001$), and workplace bullying ($p < 0.001$) were each associated with higher stress. All peer support domains were significantly and inversely correlated with psychological stress ($r = -0.138$ to -0.226), and all situational stressors were significantly and positively correlated ($r = 0.252$ to 0.433).

Table 2 Univariable analysis of baseline characteristics, peer support, and psychological stress in male participants

	psychological stress		
Variable	Mean ± SD	t / F / r	*p*-value
Age group		0.710	0.478
aged 24-26	16.46 ± 5.92		
aged 27-29	16.11 ± 5.87		

Table 2 Univariable analysis of baseline characteristics, peer support, and psychological stress in male participants

Variable	psychological stress		
	Mean ± SD	t / F / r	*p*-value
BMI		0.423	0.736
<18.5	16.19 ± 5.23		
18.5≦BMI<24	16.27 ± 5.76		
24≦BMI<27	15.87 ± 5.67		
≥27	16.71 ± 6.79		
Occupation		1.732	0.141
Legislators, senior officials and managers; professionals	16.30 ± 5.62		
Technicians and associate professionals	16.15 ± 6.00		
Clerical support workers	16.46 ± 6.24		
Service and sales workers	17.62 ± 6.52		
Service and sales workers	15.25 ± 5.71		
Education		0.937	0.393
Master's degree or above	16.90 ± 5.98		
University	16.13 ± 5.82		
High school/vocational school or below	15.76 ± 6.34		
History of cardiometabolic conditions		-1.249	0.220
No	16.15 ± 5.74		
Yes	17.83 ± 7.80		
Personal monthly income (NT$)		0.265	0.850
<20,000	16.31 ± 5.44		

Table 2 Univariable analysis of baseline characteristics, peer support, and psychological stress in male participants

	psychological stress		
Variable	Mean ± SD	t / F / r	*p*-value
20,000–39,999	16.28 ± 5.74		
40,000–59,999	16.04 ± 5.95		
≥60,000	16.80 ± 6.69		
Household monthly income (NT$)		2.595	0.025
<50,000	17.33 ± 5.42		
50,000–69,999	17.51 ± 6.62		
70,000–99,999	17.15 ± 6.38		
100,000–149,999	15.25 ± 5.37		
150,000–199,999	15.55 ± 6.12		
≥200,000	15.67 ± 5.56		
Marital status		1.129	0.324
Single	16.39 ± 5.90		
Cohabiting (unmarried)	15.56 ± 5.12		
Married	15.14 ± 6.54		
Smoking habits (past year)		0.398	0.672
Non-smoker	16.16 ± 5.91		
Smoker, not daily	16.12 ± 5.81		
Daily smoker	16.71 ± 5.88		
Alcohol use (past month)		-2.042	0.042
No	15.67 ± 6.05		
Yes	16.67 ± 5.75		

Table 2 Univariable analysis of baseline characteristics, peer support, and psychological stress in male participants

Variable	psychological stress		
	Mean ± SD	t / F / r	*p*-value
Exercise (≥10 minutes per session) (past month)		3.241	0.001
No	17.40 ± 6.06		
Yes	15.72 ± 5.74		
Workplace bullying (past 6 months)		-3.804	<0.001
No	16.03 ± 5.76		
Yes	19.94 ± 6.77		
Religious affiliation		0.586	0.558
No	16.39 ± 6.01		
Yes	16.10 ± 5.77		
Emotional support		-0.171	<0.001
Instrumental support		-0.192	<0.001
Informational support		-0.138	0.001
Appraisal support		-0.226	<0.001
Work performance stress		0.365	<0.001
Relationship stress		0.252	<0.001
Financial stress		0.433	<0.001

Table 3 presents univariable analyses of psychological stress among female participants. Younger age (24–26 years) was associated with higher psychological stress compared with 27–29 years (p = 0.002). History of cardiometabolic conditions (p = 0.046), alcohol use in the past month

(p = 0.005), and workplace bullying (p < 0.001) were each associated with higher stress. Most remaining sociodemographic and behavioral variables—including BMI, occupation, education, income, marital status, smoking, exercise, and religious affiliation—were not significantly associated with psychological stress All peer support domains were significantly and inversely correlated with psychological stress (r = −0.207 to −0.254), and all situational stressors were significantly and positively correlated (r = 0.295 to 0.355).

Table 3 Univariable analysis of baseline characteristics, peer support, and psychological stress in female participants

	psychological stress		
Variable	Mean ± SD	t / F / r	*p*-value
Age group		3.165	0.002
aged 24-26	17.96 ± 5.76		
aged 27-29	16.63 ± 5.96		
BMI		0.280	0.840
<18.5	16.88 ± 5.83		
18.5≦BMI<24	17.40 ± 5.96		
24≦BMI<27	17.65 ± 5.94		
≥27	17.39 ± 5.78		
Occupation		0.803	0.523
Legislators, senior officials and managers; professionals	17.05 ± 5.69		
Technicians and associate professionals	17.68 ± 6.32		
Clerical support workers	17.48 ± 5.79		

Table 3 Univariable analysis of baseline characteristics, peer support, and psychological stress in female participants

	psychological stress		
Variable	Mean ± SD	t / F / r	*p*-value
Service and sales workers	16.74 ± 5.94		
Service and sales workers	18.35 ± 6.06		
Education		1.171	0.311
Master's degree or above	16.79 ± 5.12		
University	17.29 ± 6.01		
High school/vocational school or below	18.42 ± 5.78		
History of cardiometabolic conditions		-2.144	0.046
No	17.25 ± 5.93		
Yes	19.35 ± 3.94		
Personal monthly income (NT$)		0.516	0.672
<20,000	17.37 ± 5.88		
20,000–39,999	17.45 ± 6.01		
40,000–59,999	17.11 ± 5.79		
≥60,000	16.38 ± 5.20		
Household monthly income (NT$)		0.964	0.439
<50,000	17.41 ± 5.82		
50,000–69,999	17.85 ± 6.58		
70,000–99,999	17.82 ± 5.48		
100,000–149,999	17.06 ± 6.01		
150,000–199,999	16.34 ± 6.00		
≥200,000	17.09 ± 5.73		

Table 3 Univariable analysis of baseline characteristics, peer support, and psychological stress in female participants

	psychological stress		
Variable	Mean ± SD	t / F / r	*p*-value
Marital status		0.982	0.375
Single	17.42 ± 6.00		
Cohabiting (unmarried)	16.40 ± 5.40		
Married	17.01 ± 5.39		
Smoking habits (past year)		0.526	0.591
Non-smoker	17.23 ± 5.93		
Smoker, not daily	17.91 ± 6.11		
Daily smoker	17.04 ± 4.36		
Alcohol use (past month)		-2.809	0.005
No	16.57 ± 5.80		
Yes	17.77 ± 5.90		
Exercise (≥10 minutes per session) (past month)		1.901	0.058
No	17.77 ± 5.86		
Yes	16.95 ± 5.94		
Workplace bullying (past 6 months)		-4.492	<0.001
No	16.99 ± 5.76		
Yes	20.25 ± 6.40		
Religious affiliation		-1.047	0.295
No	17.05 ± 5.92		
Yes	17.50 ± 5.88		
Emotional support		-0.251	<0.001

Table 3 Univariable analysis of baseline characteristics, peer support, and psychological stress in female participants

	psychological stress		
Variable	Mean ± SD	t / F / r	*p*-value
Instrumental support		-0.254	<0.001
Informational support		-0.221	<0.001
Appraisal support		-0.207	<0.001
Work performance stress		0.355	<0.001
Relationship stress		0.295	<0.001
Financial stress		0.336	<0.001

Table 4 presents multiple linear regression results for psychological stress among male participants. Regular exercise was associated with lower psychological stress (β = −1.333; p = 0.002), while alcohol use was associated with higher stress (β = 0.958; p = 0.020). Among peer support domains, appraisal support was inversely associated with psychological stress (β = −0.475; p < 0.001), and informational support was positively associated (β = 0.372; p = 0.013). All three situational stressors were significantly and positively associated with psychological stress: financial stress (β = 1.488), work performance stress (β = 1.179), and relationship stress (β = 0.538). Personal monthly income, workplace bullying, emotional support, and instrumental support were not significantly associated with psychological stress after adjustment.

Table 4 Multiple linear regression analysis for psychological stress among male participants

Variable	β (95% CI)	*p*-value
Personal monthly income (NT$)		

<20,000	ref.	
20,000–39,999	-0.373 (-2.169 ~ 1.424)	0.684
40,000–59,999	-0.666 (-2.515 ~ 1.184)	0.480
≥60,000	-0.359 (-2.470 ~ 1.752)	0.739
Alcohol use (past month)		
No	ref.	
Yes	0.958 (0.151 ~ 1.765)	0.020
Exercise (≥10 minutes per session) (past month)		
No	ref.	
Yes	-1.333 (-2.194 ~ -0.472)	0.002
Workplace bullying (past 6 months)		
No	ref.	
Yes	0.886 (-0.857 ~ 2.629)	0.319
Emotional support	-0.253 (-0.512 ~ 0.007)	0.056
Instrumental support	-0.113 (-0.426 ~ 0.200)	0.478
Informational support	0.372 (0.078 ~ 0.665)	0.013
Appraisal support	-0.475 (-0.724 ~ -0.226)	<0.001
Work performance stress	1.179 (0.790 ~ 1.567)	<0.001
Relationship stress	0.538 (0.194 ~ 0.883)	0.002
Financial stress	1.488 (1.124 ~ 1.852)	<0.001

Table 5 presents multiple linear regression results for psychological stress among female participants. Women aged 27–29 years reported lower psychological stress than those aged 24–26 years ($\beta = -1.224$; $p = 0.001$), while history of cardiometabolic conditions ($\beta = 2.683$; $p = 0.027$), and workplace bullying ($\beta = 2.115$; $p = 0.001$) were associated with higher stress. Among peer

support domains, emotional support was inversely associated with psychological stress (β = −0.382; p = 0.005). All three situational stressors were positively associated with psychological stress: work performance stress (β = 1.347), financial stress (β = 1.073), and relationship stress (β = 0.958). Alcohol use, and instrumental, informational, and appraisal support were not significant after adjustment.

Table 5 Multiple linear regression analysis for psychological stress among female participants

Variable	β (95% CI)	*p*-value
Age group		
aged 24-26	ref.	
aged 27-29	-1.224 (-1.928 ~ -0.520)	0.001
History of cardiometabolic conditions		
No	ref.	
Yes	2.683 (0.312 ~ 5.054)	0.027
Alcohol use (past month)		
No	ref.	
Yes	0.476 (-0.237 ~ 1.189)	0.191
Workplace bullying (past 6 months)		
No	ref.	
Yes	2.115 (0.903 ~ 3.327)	0.001
Emotional support	-0.382 (-0.651 ~ -0.114)	0.005
Instrumental support	-0.236 (-0.553 ~ 0.082)	0.146
Informational support	0.007 (-0.279 ~ 0.293)	0.962
Appraisal support	-0.123 (-0.363 ~ 0.117)	0.315

Work performance stress	1.347 (1.021 ~ 1.672)	<0.001
Relationship stress	0.958 (0.629 ~ 1.287)	<0.001
Financial stress	1.073 (0.750 ~ 1.396)	<0.001

Discussion

This study examined the sex-stratified associations between four functional types of peer support and psychological stress among employed emerging adults aged 24–29 years in Taiwan. The sample's mean PSS-10 score (16.84 ± 5.91) was higher than the U.S. normative mean of 13–14, aligning with evidence that younger adults experience elevated perceived stress compared to older populations (Cohen & Janicki-Deverts, 2012; Scott et al., 2013). This heightened stress reflects the psychological vulnerability of emerging adulthood, while the relatively high peer support scores (11.16–12.56 out of 15) underscore the developmental salience of peer relationships during this transitional stage (Arnett, 2000; Arnett, 2023; Szwedo et al., 2017). These findings highlight the distinct developmental profile of this population and the value of targeted, peer-based interventions.

Consistent with gender-role socialization theory (Matud, 2004; Tamres et al., 2002), women reported higher psychological stress and significantly greater peer support across all domains than men. However, fully adjusted multivariable analyses revealed that the specific peer support types independently linked to lower stress differed by sex: appraisal support was uniquely protective for men ($\beta = -0.475$; $p < 0.001$), whereas emotional support was uniquely effective for women ($\beta = -0.382$; $p = 0.005$). Unexpectedly, informational support was positively associated

with stress among men ($\beta = 0.372$; $p = 0.013$). Regarding situational factors, all three stressors positively predicted stress in both sexes, with financial stress being most potent among men and work performance stress among women.

These patterns indicate that the psychological benefits of peer support depend on the functional "fit" between support type and gender-specific coping orientations, reinforcing the stress-buffering model (Cohen & Wills, 1985). Social support is most effective when it matches specific stressor demands. Because women frequently employ emotion-focused coping (e.g., seeking empathy) and men favor problem-focused or self-regulatory strategies, different support types become protective independent of overall support volume (Matud, 2004; Tamres et al., 2002). Our sex-stratified approach provides vital empirical evidence for this framework in employed emerging adults—a population underrepresented relative to student or clinical cohorts.

Among men, appraisal support emerged as the strongest inverse predictor of stress. During career entry, establishing occupational identity and self-efficacy is paramount (Arnett, 2000). Peer feedback that affirms competence reduces the uncertainty and self-doubt central to psychological distress. This matches evidence that men's coping is often performance-oriented, making peer validation highly effective in mitigating stress appraisals (Matud, 2004; Reevy & Maslach, 2001). Crucially, instrumental and informational support yielded no such benefits, indicating that men value the sense of competence derived from appraisal support over concrete assistance or advice per se. Future research should clarify whether this mechanism operates primarily through enhanced self-efficacy or perceived mastery.

For women, emotional support was the sole domain independently associated with lower stress. This aligns with broader evidence that women naturally utilize emotion-focused strategies

and verbal processing to manage distress (Tamres et al., 2002). Peer expressions of empathy and care lower stress appraisals by tempering emotional distress and bolstering perceived coping capacity. Notably, although women reported higher scores across all support types, only emotional support provided buffering benefits. This reinforces the premise that access to support does not automatically confer psychological utility; rather, effectiveness is dictated by the alignment between support type and coping orientation.

The positive link between informational support and stress among men ($\beta = 0.372$) represents an intriguing finding. This could reflect reverse causality, where highly stressed men actively seek out advice as a coping mechanism. Alternatively, unsolicited guidance may backfire for men who prize autonomous problem-solving (Reevy & Maslach, 2001). In Taiwan's socio-cultural environment, this preference for autonomy is strongly reinforced by traditional gender socialization and the Confucian concept of *mianzi* (face), which mandates behavioral self-reliance and emotional stoicism (Kung, 2004; Mak & Chen, 2006). Consequently, peer guidance may be perceived by young men as an implicit sign of inadequacy, threatening their face and intensifying distress (Kim et al., 2008).

All three situational stressors—work performance, financial, and relationship concerns—positively predicted stress across both sexes. Financial stress was most severe for men ($\beta = 1.488$), reflecting the Confucian expectation of *Cheng Jia Li Ye* (establishing family and career) which pressures men to be primary providers (Lu et al., 2010). When intersected with contemporary economic pressures like stagnant wages and escalating housing costs, this cultural mandate heightens financial vulnerability as a dominant stressor. Conversely, women's distress was evenly distributed across domains, and they displayed unique vulnerability to workplace bullying ($\beta = 2.115$). This suggests that women encounter a broader constellation of concurrent stressors and

may be more susceptible to negative interpersonal dynamics at work (Biswas et al., 2021; Walker et al., 2024).

Strengths and Limitations

This study possesses several strengths. First, focusing on employed emerging adults addresses a major gap in a literature dominated by student samples. Second, the sex-stratified approach uncovers nuanced dynamics that pooled analyses would obscure. Third, delineating four peer support dimensions offers superior precision over global metrics, validating the support-stressor fit model (Cohen & Wills, 1985).

Several limitations warrant caution. First, the cross-sectional design prevents causal inferences; longitudinal studies are required to determine temporal ordering. Second, reliance on self-reports may introduce common method bias. Third, the predominantly college-educated Taiwanese sample limits generalizability to distinct occupational or Western cultural contexts. Fourth, the measure did not differentiate workplace colleagues from external peers, two sources that may exert distinct psychological effects.

Conclusion

This study demonstrates that the stress-buffering function of peer support among employed emerging adults is both sex- and domain-specific: appraisal support uniquely protects men, whereas emotional support serves this protective role for women. While women report higher overall psychological stress and greater peer support across all domains than men, situational

stressors reveal distinct gendered patterns—financial stress links most strongly to distress in men, whereas work performance stress predominates among women.

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Author Contributions

Authors C-L H, D-Y N, Y-N C, and Y-L C. designed the study and wrote the protocol. Authors C-L H, D-Y N, Y-NC, and Y-L C. conducted literature searches and provided summaries of previous research studies. Authors Y-N C and Y-L C. conducted the statistical analysis. Author C-L H, and D-Y N wrote the first draft of the manuscript, and all authors contributed to interpreting the results. All authors have read and agreed to the published version of the manuscript.

Ethical considerations

Ethics approval and consent to participate This study was approved by the Institutional Review Board of the Tri-Service General Hospital (approval no. A202505023). All research was performed in accordance with the Declaration of Helsinki. All participants signed an informed consent form prior to participation in the study.

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The authors declare no competing interests.

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