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Cognitive emotion regulation strategies and resilience-related protective factors in persons who stutter: a cross-sectional comparative and correlational study

Nurcan Alpüran Kocabıyık · Esra Erol · Ayşegül Sarı Sülüker

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Abstract

Background This study aimed to compare cognitive emotion regulation strategies and resilience-related protective factors between people who stutter (PWS) and people who do not stutter (PWNS), and to examine within-group associations between resilience-related protective factor scores and cognitive emotion regulation strategies.

Methods The cross-sectional sample comprised 140 adults (PWS, $n=69$; PWNS, $n=71$), aged 18–65 years. Group assignment was based on participants' self-identification of stuttering status, without independent clinical confirmation. Participants completed the Cognitive Emotion Regulation Questionnaire (CERQ) and the Protective Factors for Resilience Scale (PFRS). Sex distribution was compared using Pearson's chi-square test, whereas age category and education level were compared using Fisher–Freeman–Halton exact tests because of sparse expected cell counts. Group comparisons were performed using independent-samples t tests or Mann–Whitney U tests according to distributional assumptions, with effect sizes and 95% confidence intervals reported. Within-group associations were examined using Pearson or Spearman correlations, and Benjamini–Hochberg false discovery rate (FDR) correction was applied separately to the 36 subscale-level correlations within each group.

Results No statistically significant between-group differences were observed in sex distribution (PWS: 37 men, 32 women; PWNS: 29 men, 42 women; $\chi^2(1)=2.29$, $p = .130$), age (Fisher–Freeman–Halton exact $p = .709$), or education (Fisher–Freeman–Halton exact $p = .670$). No significant between-group differences were found for any of the nine CERQ subscales, and all corresponding effect sizes were small. PWS reported lower Personal, Peer, Family, and Total PFRS scores, with small-to-moderate rank-biserial effects. After Benjamini–Hochberg FDR correction across 36 subscale-level correlations per group, 12 positive associations involving positive refocusing, refocus on planning, and positive reappraisal remained significant in the PWS group, whereas no correlations remained significant in the PWNS group.

Conclusions No statistically significant between-group differences were detected across the nine CERQ subscales, while PWS reported lower resilience-related protective resource scores. The observed within-group correlations suggest that adaptive cognitive regulation may be relevant to the psychosocial experience of stuttering; however, the cross-sectional and exploratory nature of the analyses precludes causal or between-group inferences about correlation strength.

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Keywords Stuttering · Resilience-related protective factors · Cognitive emotion regulation · Protective factors · CERQ · PFRS

Background

Stuttering is a neurodevelopmental fluency disorder that begins in childhood and is characterized by core behaviors that disrupt the fluency of speech, such as repetitions of sounds, syllables, and words, prolongations, and blocks. Current approaches, however, conceptualize stuttering not merely as a speech disorder limited to observable speech behaviors, but as a multidimensional experience that also encompasses the individual's affective, behavioral, and cognitive reactions, social participation, and quality of life [1]. Indeed, the quality of life of people who stutter (PWS) has been reported to be adversely affected, particularly in the domains of vitality, social functioning, emotional role, and mental health [2]; social anxiety disorder has been found to be significantly more prevalent in these individuals than in fluent adults [3]; and their levels of mental well-being have been reported to be lower [4]. Panzarino et al. [5], in turn, showed that the level of psychological distress in adults is closely related to the affective, behavioral, and cognitive experiences of stuttering.

Alongside biomedical and neurodevelopmental accounts, contemporary stuttering scholarship increasingly draws on neurodiversity, social, and relational models of disability to explain why the lived impact of stuttering cannot be reduced to speech disfluency alone. The medical model remains important for understanding neurodevelopmental mechanisms, impairment-level concerns, and speech-related treatment options; however, a neurodiversity perspective challenges the assumption that atypical fluency is, by definition, a global deficit requiring normalization and instead emphasizes communicative variation, identity, autonomy, and person-defined goals [6]. In parallel, the social model conceptualizes disability as arising partly from a mismatch between the person and the environment, including listener responses, expectations for fluent speech, restricted opportunities for participation, and institutional or interpersonal barriers [7]. Importantly, these perspectives are not necessarily mutually exclusive. Onslow [8] explicitly argued for a flexible combination of medical and neurodiversity-affirming social perspectives across the lifespan, with their relative emphasis guided by the individual's age, needs, presenting concerns, and goals. Shenker et al. [9] similarly documented that neurodiversity and ableism generate legitimate clinical debate and cautioned against overly rigid positions. Accordingly, the present study adopts a non-deficit interpretive stance: between-group differences in psychosocial variables are treated as differences in reported experiences and resources, not as evidence that PWS are intrinsically less psychologically healthy than PWNS.

This contextual framing is supported by empirical work on stigma and social experience. In a sample of 505 adults who stutter, Gerlach et al. [10] found that stigma-identity constructs explained meaningful variability in psychological distress, with concealment of stuttering emerging as the strongest predictor among the stigma-related variables examined. Gerlach-Houck and Constantino [11] further described how ableist assumptions can enter both stuttering research and clinical practice when fluent speech or normalization is treated as the default indicator of successful functioning. At the environmental level, St. Louis et al. [12], in a retrospective analysis of 29 intervention studies, showed that public attitudes toward stuttering can be modified, indicating that stigma and listener attitudes are not merely fixed background conditions. Together, this literature supports a person-in-context interpretation in which psychosocial outcomes may reflect the interaction of individual coping processes with stigma, social expectations, communicative demands, perceived support, and opportunities for participation.

Adults who stutter, in turn, face a complex and often wearing set of emotional states brought about by living with a chronic communication disorder [13, 14]. In these individuals, negative effects such as shame, fear, low self-efficacy, and social anxiety are markedly high because of negative societal reactions and stereotypes. In particular, the fear of negative evaluation threatens individuals' psychological well-being by causing them to feel constantly under scrutiny in social settings and to experience a sense of inadequacy [14, 15]. Research shows that PWS have significantly higher levels of social anxiety and negative affective experiences than people who do not

stutter (PWNS), and that these negative emotional states can lead to social isolation and a decline in quality of life [2, 3, 14]. In addition, self-stigma processes, triggered by the frustration caused by the blocks experienced during speech and by negative self-evaluations, lead to a negative emotional cycle by considerably weakening individuals' perceptions of self-esteem and self-efficacy [13, 15]. These experiences may be associated with coping and resilience-related outcomes [16, 17], but they should not be understood solely as consequences of an individual impairment; social reactions, stigma, communication demands, and access to supportive environments may also shape psychosocial outcomes [7, 18].

One of the principal mechanisms individuals draw on in coping with these emotional burdens is emotion regulation. Cognitive emotion regulation refers to the cognitive strategies used to consciously manage emotional reactions following negative life events or stressors [1, 19]. These strategies may be maladaptive, such as self-blame and catastrophizing, or adaptive, such as positive refocusing, refocus on planning, and positive reappraisal [19, 20]. In the context of stuttering, Tichenor et al. [1] demonstrated that emotional reactivity and emotion regulation skills shape the experience of stuttering and the adverse life impact of the disorder across the lifespan. Because speech can constitute a recurrent source of stress for PWS [16], the question of which cognitive strategies are used following negative communication experiences takes on particular importance in this group [1].

Another fundamental concept that supports adaptation in the face of negative experiences is psychological resilience [16, 21]. Masten [21] defines resilience as the maintenance of positive adaptation despite serious risk and adversity, and emphasizes that this capacity arises not from extraordinary qualities but from the functioning of basic adaptive systems. The protective factors that support resilience are addressed in three dimensions: personal, peer, and family resources [22, 23]. Resilience has been receiving increasing attention in the stuttering literature. Craig et al. [16] reported that resilience-related factors such as social support, self-efficacy, and life satisfaction have a protective role against the adversities created by chronic stuttering, whereas Freud and Amir [17] reported that resilience is related to the covert experience of stuttering rather than to its observed severity. Similarly, in PWS samples, self-acceptance, coping, and resilience have been shown to be associated with life satisfaction [24], and self-compassion with higher quality of life and with fewer negative reactions to stuttering [25].

Psychological adaptation should therefore be conceptualized as a person-in-context process rather than as a fixed individual trait. Using ecological momentary assessment in adults who stutter, Lei et al. [18] demonstrated that everyday negative affect, positive affect, and self-reported stuttering severity varied as a function of both person-level characteristics, particularly trait social anxiety, and situational characteristics such as social-partner reactions and social closeness. This finding is directly relevant to the present use of the PFRS because two of its three domains—Peer and Family—explicitly index relational resources, while the Personal domain captures individually perceived resources that are themselves experienced within social environments. Thus, lower PFRS scores should not be assumed to represent a stable or intrinsic deficiency in resilience; they may also reflect differences in the availability, accessibility, or perception of protective resources across everyday contexts.

At the same time, the broader emotion-regulation literature provides a rationale for examining associations between adaptive cognitive strategies and resilience-related resources. Stover et al. [26] reported a moderate positive meta-analytic association between cognitive reappraisal and personal resilience. In stuttering-specific research, Şen and Kocabıyık [27], using the Brief Resilience Scale rather than the PFRS, reported lower psychological resilience among PWS than PWNS and a group difference in the social dimension of fear of missing out. These studies are conceptually relevant. Collectively, they support examining cognitive regulation and resilience-related resources together while maintaining a clear distinction between an individual's resilience capacity and the personal, peer, and family protective resources measured by the PFRS.

In the literature, emotion regulation and psychological resilience have largely been examined independently of each other in the context of stuttering. Studies that comparatively examine the relationship between cognitive emotion regulation strategies and the protective factors supporting resilience in PWS, in relation to PWNS, are limited. Moreover, these relationships have not yet been examined in this adult sample using measurement instruments whose validity has been demonstrated for both constructs [20, 23]. Examining these associations may

instead generate hypotheses for future longitudinal and intervention research on psychosocial support beyond fluency-focused outcomes, without implying that the observed strategies are established therapeutic targets [1, 16].

Within this framework, the purpose of comparing PWS and PWNS is not to establish a hierarchy of psychological normality, but to identify whether patterns of cognitive regulation and perceived protective resources differ across groups and to characterize how these variables are associated within each group. This distinction is especially important because the same observable stuttering behavior may be experienced differently depending on identity, stigma, social support, communication context, and person-defined goals [6, 7, 10, 18].

Accordingly, the present study has two main aims: (a) to compare PWS and PWNS in terms of cognitive emotion regulation strategies and resilience-related protective factor scores, and (b) to examine the relationships between resilience-related protective factor dimensions and cognitive emotion regulation strategies in both groups. On the basis of the literature, it was predicted that the resilience-related protective factor scores of PWS would be lower than those of PWNS [16, 17], and that in both groups resilience-related protective factor scores would show a positive relationship with adaptive cognitive strategies and a negative relationship with maladaptive strategies [24, 28].

Methods

Research design

A cross-sectional, comparative research design was employed to examine differences in cognitive emotion regulation strategies and resilience-related protective factors between persons who stutter (PWS) and persons who do not stutter (PWNS), as well as to investigate the associations between resilience-related protective factors and cognitive emotion regulation strategies within each group.

Participants

The study sample comprised 140 adults aged 18–65 years, including 69 people who stutter (PWS; $n=69$) and 71 people who do not stutter (PWNS; $n=71$). Eligibility criteria required participants to self-identify as either a person who stutters or a person who does not stutter, to be between 18 and 65 years of age, and to be a native speaker of Turkish. Prior to data collection, informed voluntary consent was obtained from all participants via Google Forms. Recruitment was conducted through an online Google Form distributed via WhatsApp groups and social media platforms and non-governmental organization about stuttering. A total of 142 responses were initially received (71 PWS and 71 PWNS). Two PWS responses were excluded because the questionnaire data were incomplete; the remaining 140 complete responses constituted the analytic sample. Responses were screened for duplicates, and no duplicate submissions were identified.

Stuttering status was based on participants' self-identification and was not independently confirmed through a clinical speech-language assessment or speech-sample analysis. Although this approach does not substitute for clinician-confirmed diagnosis or severity assessment, self-reported identification and characterization of stuttering have been used in previous adult and large-scale population-based studies [29–31]. In addition, Horton et al. [32] reported a strong association between self-reported and clinician-rated stuttering severity, supporting the utility of self-report methods in large-scale data collection. Accordingly, self-identification was considered a feasible approach for the present survey-based study, while the absence of clinician-rated confirmation remains an important methodological limitation. Among the 69 participants in the PWS group, 12 (17.4%) reported having previously received stuttering therapy from a speech-language therapist, whereas 57 (82.6%) reported no prior stuttering therapy experience.

Information on stuttering duration and self-perceived or clinician-rated stuttering severity was not collected in the present study.

Measures

Cognitive Emotion Regulation Questionnaire (CERQ) is a 36-item self-report questionnaire designed to assess the cognitive emotion regulation strategies individuals employ following negative life events or stressful situations. The scale was originally developed by Garnefski et al. [19] and subsequently adapted into Turkish by Tuna and Bozo [20]. It comprises nine subscales self-blame, acceptance, rumination, positive refocusing, refocus on planning, positive reappraisal, putting into perspective, catastrophizing, and blaming others each consisting of four items. Items are rated on a 5-point Likert-type scale ranging from 1 (almost never) to 5 (almost always). Subscale scores are calculated by summing the four corresponding items, yielding a possible range of 4 to 20 per subscale; higher scores indicate greater frequency of use of the respective strategy. No items are reverse-scored. In the Turkish validation sample, internal consistency coefficients (Cronbach's alpha) for the subscales ranged from 0.72 to 0.83, indicating good reliability [20]. In the present sample, Cronbach's alpha coefficients for the nine CERQ subscales ranged from 0.661 to 0.816. The revised analyses were conducted at the level of the nine validated CERQ subscales; no global CERQ total score was analyzed.

Protective Factors for Resilience Scale (PFRS) is a 15-item self-report scale developed to assess protective factors associated with psychological resilience [22]. The Turkish adaptation was carried out by Tanko et al. [23]. The scale consists of three subscales Personal (5 items), Peer (5 items), and Family (5 items). Items are rated on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). No items are reverse-scored. Higher scores reflect stronger perception of protective factors that support psychological resilience. Internal consistency coefficients for the Turkish version were alpha = 0.93 for the total score, alpha = 0.76 for the Personal subscale, alpha = 0.87 for the Peer subscale, and alpha = 0.92 for the Family subscale, indicating good to excellent reliability [23]. In the present sample, Cronbach's alpha was 0.865 for Personal, 0.902 for Peer, 0.942 for Family, and 0.937 for the total PFRS score.

Statistical analysis

Categorical demographic variables were summarized as frequencies and percentages. Sex distribution between PWS and PWNS was compared using Pearson's chi-square test. Because several expected cell counts were below 5, age category and education level were compared using Fisher–Freeman–Halton exact tests. Normality of continuous scale scores was assessed using the Shapiro–Wilk test separately within each group. Group comparisons were conducted using an independent-samples t test when both groups met the normality assumption and Mann–Whitney U tests when at least one group showed a non-normal distribution. Hedges' g was reported for the t-test comparison, and rank-biserial correlation (r_rb) was reported for Mann–Whitney U comparisons; 95% confidence intervals for r_rb were obtained using stratified percentile bootstrap with 5,000 resamples. Associations between PFRS scores and the nine CERQ subscales were examined using Pearson correlation when both variables were normally distributed and Spearman rank correlation when at least one variable was non-normally distributed. Pearson 95% confidence intervals were estimated using Fisher's transformation and Spearman 95% confidence intervals using the Bonett–Wright method. The nine CERQ and four PFRS between-group comparisons were treated as separate exploratory outcome families, and their reported p values were not adjusted for multiple testing. Accordingly, the unadjusted p values for these between-group comparisons should be interpreted cautiously as exploratory findings, rather than as confirmatory evidence, given the increased risk of Type I error associated with multiple testing. To address multiplicity in the exploratory within-group analyses, the Benjamini–Hochberg false discovery rate procedure was applied separately within each group across 36 correlations (4 PFRS scores × 9 CERQ subscales), with $q < 0.05$ considered statistically significant after FDR correction. All tests were two-tailed. Analyses were performed using IBM SPSS Statistics version 29.

Results

The results are presented in four sequential steps. First, demographic characteristics were summarized and sex, age category, and education level were compared between groups. Second, group differences in the nine CERQ subscales were examined. Third, group differences in resilience-related protective factor scores were evaluated across the Personal, Peer, Family, and Total PFRS scores, with effect sizes and 95% confidence intervals reported. Finally, within each group, associations between PFRS scores and the nine CERQ subscales were examined using Pearson or Spearman correlations as appropriate, with 95% confidence intervals and Benjamini–Hochberg FDR-adjusted q values.

There were no statistically significant differences between the PWS and PWNS groups in sex (PWS: 37 men and 32 women; PWNS: 29 men and 42 women; Pearson $\chi^2(1)=2.29$, $p = .130$), age (Fisher–Freeman–Halton exact $p = .709$), or education (Fisher–Freeman–Halton exact $p = .670$) (Table 1).

No statistically significant between-group differences were observed for any of the CERQ subscales (all $p > .05$). Effect sizes were uniformly small. For the Mann–Whitney U comparisons, rank-biserial correlations ranged from r_rb = −0.150 to 0.033, and all corresponding 95% confidence intervals included zero. For catastrophizing, which was compared using an independent-samples t test, the standardized effect was also negligible (Hedges' g = −0.039, 95% CI [−0.368, 0.291], $p = .819$). Taken together, these estimates indicate little evidence of meaningful between-group differences in the individual cognitive emotion regulation strategies assessed (Table 2).

PWS reported lower resilience-related protective factor scores than PWNS across all PFRS domains. The Personal score was lower in PWS (M = 25.49, SD = 5.46) than in PWNS (M = 28.08, SD = 6.21), U = 1680, $p = .001$, r_rb = −0.314, 95% CI [−0.493, −0.126]. The Peer score was also lower in PWS (M = 25.12, SD = 6.74) than in PWNS (M = 28.77, SD = 5.69), U = 1612, $p < .001$, r_rb = −0.342, 95% CI [−0.513, −0.165]. Similarly, the Family score was lower in PWS (M = 29.58, SD = 6.00) than in PWNS (M = 31.08, SD = 6.20), U = 1867.5, $p = .014$, r_rb = −0.238, 95% CI [−0.421, −0.055]. The Total PFRS score likewise favored PWNS (PWS: M = 80.19, SD = 15.27; PWNS: M = 87.94, SD = 15.73), U = 1596, $p < .001$, r_rb = −0.348, 95% CI [−0.521, −0.167]. Thus, the between-group differences in resilience-related protective resources were small to moderate in magnitude, with confidence intervals that did not include zero (Table 3).

Within the PWS group, 15 of the 36 subscale-level correlations were nominally significant before multiple-testing correction. After Benjamini–Hochberg FDR correction, 12 associations remained significant ($q < 0.05$), all involving positive refocusing, refocus on planning, or positive reappraisal. For Personal protective factors, positive refocusing ($r = .495$, 95% CI [0.292, 0.655], $q < 0.001$), refocus on planning ($r = .397$, 95% CI [0.177,

Table 1 Demographic characteristics of PWS and PWNS

Characteristic	PWS ($n=69$)	PWNS ($n=71$)	Test	p
Sex			Pearson $\chi^2(1)=2.29$	0.130
Male	37 (53.6%)	29 (40.8%)		
Female	32 (46.4%)	42 (59.2%)		
Age category			Fisher–Freeman–Halton exact	0.709
18–29 years	50 (72.5%)	56 (78.9%)		
30–49 years	10 (14.5%)	10 (14.1%)		
50–60 years	5 (7.2%)	3 (4.2%)		
61–65 years	4 (5.8%)	2 (2.8%)		
Education level			Fisher–Freeman–Halton exact	0.670
Primary school	1 (1.4%)	0 (0.0%)		
Secondary school	4 (5.8%)	2 (2.8%)		
High school	13 (18.8%)	14 (19.7%)		
Associate degree	4 (5.8%)	2 (2.8%)		
Bachelor's degree	42 (60.9%)	43 (60.6%)		
Master's degree	4 (5.8%)	9 (12.7%)		
Doctorate	1 (1.4%)	1 (1.4%)		

Note. Values are n (%) unless otherwise indicated. PWS = people who stutter; PWNS = people who do not stutter. Sex was compared using Pearson's chi-square test. Age category and education level were compared using Fisher-Freeman-Halton exact tests because of sparse cells

Table 2 Comparisons of cognitive emotion regulation strategies between PWS and PWNS

CERQ variable	PWS M±SD	PWNS M±SD	Test statistic	*p*	Effect size	95% CI
Self-blame	11.12±2.81	11.07±2.89	U=2417	0.893	r_rb=−0.013	[−0.206, 0.176]
Acceptance	11.45±3.05	11.65±3.09	U=2375	0.756	r_rb=−0.030	[−0.216, 0.164]
Rumination	13.23±2.66	13.55±3.43	U=2271.5	0.456	r_rb=−0.073	[−0.265, 0.116]
Positive refocusing	12.71±3.13	12.27±3.27	U=2367.5	0.733	r_rb = 0.033	[−0.161, 0.218]
Refocus on planning	14.17±2.87	14.44±3.45	U=2212	0.320	r_rb=−0.097	[−0.288, 0.096]
Positive reappraisal	13.64±3.20	14.37±3.41	U=2083	0.125	r_rb=−0.150	[−0.331, 0.040]
Putting into perspective	13.25±2.59	13.06±3.25	U=2441.5	0.975	r_rb = 0.003	[−0.188, 0.192]
Catastrophizing	10.51±3.23	10.63±3.30	t=−0.229	0.819	g=−0.039	[−0.368, 0.291]
Blaming others	9.90±2.79	10.45±2.82	U=2144	0.200	r_rb=−0.125	[−0.316, 0.068]

Note. CERQ=Cognitive Emotion Regulation Questionnaire; PWS=people who stutter; PWNS=people who do not stutter; M=mean; SD=standard deviation; U=Mann-Whitney U; g=Hedges' g; r_rb=rank-biserial correlation. Catastrophizing was compared using an independent-samples t test; all other outcomes were compared using Mann-Whitney U tests. The 95% CI for g was calculated analytically; 95% CIs for r_rb were obtained using stratified percentile bootstrap with 5,000 resamples. Negative effect sizes indicate lower values in PWS relative to PWNS

Table 3 Comparisons of resilience-related protective factor scores between PWS and PWNS

PFRS variable	PWS M±SD	PWNS M±SD	U	*p*	r_rb	95% CI
Personal protective factors	25.49±5.46	28.08±6.21	1680	0.001	−0.314	[−0.493, −0.126]
Peer protective factors	25.12±6.74	28.77±5.69	1612	<0.001	−0.342	[−0.513, −0.165]
Family protective factors	29.58±6.00	31.08±6.20	1867.5	0.014	−0.238	[−0.421, −0.055]
Total PFRS score	80.19±15.27	87.94±15.73	1596	<0.001	−0.348	[−0.521, −0.167]

Note. PFRS=Protective Factors for Resilience Scale; PWS=people who stutter; PWNS=people who do not stutter; M=mean; SD=standard deviation; U=Mann-Whitney U; r_rb=rank-biserial correlation. The 95% CIs for r_rb were obtained using stratified percentile bootstrap with 5,000 resamples. Negative values indicate lower scores in PWS relative to PWNS

0.580], q = 0.003), and positive reappraisal (r = .403, 95% CI [0.184, 0.584], q = 0.003) remained significant. The corresponding associations also remained significant for Peer, Family, and Total PFRS scores. The largest observed association was between Total PFRS and positive refocusing (ρ=0.540, 95% CI [0.333, 0.697], q < 0.001). Several inverse associations involving self-blame and catastrophizing were nominally significant before correction, but none survived FDR adjustment (all q ≥ 0.102). In the PWNS group, five of the 36 correlations were nominally significant before correction, but none remained significant after FDR adjustment (all q ≥ 0.157). Because these analyses were conducted separately within each group, differences in statistical significance should not be interpreted as evidence that correlation coefficients differed significantly between PWS and PWNS (Table 4).

Discussion

The present study investigated cognitive emotion regulation strategies and resilience-related protective factors in PWS and PWNS. No statistically significant differences were detected between the groups across the nine CERQ subscales, whereas PWS reported lower Personal, Peer, Family, and Total PFRS scores. After FDR correction, robust within-group associations in PWS were confined to positive refocusing, refocus on planning, and positive reappraisal; nominal inverse associations involving self-blame and catastrophizing did not survive multiplicity correction. These within-group patterns should not be interpreted as demonstrating stronger correlations in PWS than in PWNS because the coefficients were not formally compared between groups.

The comparisons of the nine CERQ subscales did not detect statistically significant differences between PWS and PWNS; however, this should not be interpreted as evidence of equivalence between groups. This finding is important because it indicates that stuttering status alone may not necessarily be associated with a global disruption in cognitive emotion regulation. The CERQ primarily assesses conscious cognitive strategies such as

Table 4 Correlations between resilience-related protective factor scores and cognitive emotion regulation strategies within groups

Group	PFRS score	CERQ strategy	*r* / ρ	95% CI	*p*	FDR q
PWS	Personal	Self-blame	ρ = −0.244	[−0.457, −0.004]	0.044	0.104
	Personal	Acceptance	*r* = −.085	[−0.315, 0.155]	0.488	0.616
	Personal	Rumination	*r* = .059	[−0.180, 0.291]	0.631	0.758
	Personal	Positive refocusing	*r* = .495	[0.292, 0.655]	<0.001	<0.001
	Personal	Refocus on planning	*r* = .397	[0.177, 0.580]	<0.001	0.003
	Personal	Positive reappraisal	*r* = .403	[0.184, 0.584]	<0.001	0.003
	Personal	Putting into perspective	ρ = 0.004	[−0.233, 0.240]	0.975	0.989
	Personal	Catastrophizing	*r* = −.248	[−0.457, −0.012]	0.040	0.104
	Personal	Blaming others	*r* = −.013	[−0.249, 0.224]	0.915	0.989
	Peer	Self-blame	ρ = −0.138	[−0.364, 0.103]	0.259	0.443
	Peer	Acceptance	ρ = −0.125	[−0.352, 0.116]	0.308	0.462
	Peer	Rumination	ρ = 0.201	[−0.040, 0.420]	0.097	0.184
	Peer	Positive refocusing	ρ = 0.408	[0.180, 0.594]	<0.001	0.003
	Peer	Refocus on planning	ρ = 0.345	[0.111, 0.543]	0.004	0.013
	Peer	Positive reappraisal	ρ = 0.332	[0.097, 0.532]	0.005	0.017
	Peer	Putting into perspective	ρ = 0.010	[−0.227, 0.246]	0.937	0.989
	Peer	Catastrophizing	ρ = −0.178	[−0.399, 0.064]	0.144	0.260
	Peer	Blaming others	ρ = 0.029	[−0.209, 0.264]	0.812	0.914
	Family	Self-blame	ρ = −0.119	[−0.347, 0.122]	0.329	0.474
	Family	Acceptance	ρ = −0.048	[−0.282, 0.191]	0.693	0.805
	Family	Rumination	ρ = 0.127	[−0.114, 0.354]	0.298	0.462
	Family	Positive refocusing	ρ = 0.461	[0.240, 0.637]	<0.001	<0.001
	Family	Refocus on planning	ρ = 0.424	[0.198, 0.607]	<0.001	0.002
	Family	Positive reappraisal	ρ = 0.293	[0.055, 0.499]	0.015	0.044
	Family	Putting into perspective	ρ = 0.220	[−0.021, 0.436]	0.069	0.156
	Family	Catastrophizing	ρ = −0.217	[−0.434, 0.024]	0.074	0.156
	Family	Blaming others	ρ = −0.089	[−0.320, 0.151]	0.465	0.616
	Total PFRS	Self-blame	ρ = −0.212	[−0.429, 0.029]	0.081	0.161
	Total PFRS	Acceptance	ρ = −0.126	[−0.353, 0.115]	0.304	0.462
	Total PFRS	Rumination	ρ = 0.104	[−0.137, 0.333]	0.395	0.547
	Total PFRS	Positive refocusing	ρ = 0.540	[0.333, 0.697]	<0.001	<0.001
	Total PFRS	Refocus on planning	ρ = 0.457	[0.236, 0.634]	<0.001	<0.001
	Total PFRS	Positive reappraisal	ρ = 0.398	[0.168, 0.586]	<0.001	0.003
	Total PFRS	Putting into perspective	ρ = 0.083	[−0.157, 0.314]	0.496	0.616
	Total PFRS	Catastrophizing	ρ = −0.252	[−0.464, −0.012]	0.037	0.102
	Total PFRS	Blaming others	ρ = 0.002	[−0.235, 0.238]	0.989	0.989
PWNS	Personal	Self-blame	ρ = −0.160	[−0.381, 0.078]	0.182	0.537
	Personal	Acceptance	ρ = −0.102	[−0.328, 0.136]	0.399	0.599
	Personal	Rumination	ρ = −0.115	[−0.340, 0.122]	0.337	0.595
	Personal	Positive refocusing	ρ = 0.219	[−0.018, 0.433]	0.066	0.399
	Personal	Refocus on planning	ρ = 0.334	[0.103, 0.531]	0.004	0.157
	Personal	Positive reappraisal	ρ = 0.260	[0.025, 0.468]	0.028	0.266
	Personal	Putting into perspective	ρ = 0.145	[−0.092, 0.367]	0.227	0.545
	Personal	Catastrophizing	ρ = −0.088	[−0.315, 0.149]	0.468	0.601
	Personal	Blaming others	ρ = −0.104	[−0.329, 0.134]	0.390	0.599
	Peer	Self-blame	ρ = −0.068	[−0.297, 0.168]	0.574	0.689
	Peer	Acceptance	ρ = 0.011	[−0.222, 0.244]	0.924	0.941
	Peer	Rumination	ρ = −0.081	[−0.309, 0.155]	0.500	0.621
	Peer	Positive refocusing	ρ = −0.051	[−0.281, 0.184]	0.670	0.779
	Peer	Refocus on planning	ρ = 0.091	[−0.146, 0.318]	0.451	0.601
	Peer	Positive reappraisal	ρ = 0.021	[−0.214, 0.253]	0.865	0.916
	Peer	Putting into perspective	ρ = −0.113	[−0.338, 0.124]	0.347	0.595
	Peer	Catastrophizing	ρ = −0.248	[−0.458, −0.012]	0.037	0.266

Table 4 (continued)

Group	PFRS score	CERQ strategy	*r* / ρ	95% CI	*p*	FDR q
	Peer	Blaming others	ρ = −0.207	[−0.422, 0.031]	0.084	0.431
	Family	Self-blame	ρ = −0.098	[−0.324, 0.139]	0.416	0.599
	Family	Acceptance	ρ = −0.009	[−0.242, 0.225]	0.941	0.941
	Family	Rumination	ρ = −0.040	[−0.271, 0.195]	0.737	0.830
	Family	Positive refocusing	ρ = 0.170	[−0.067, 0.390]	0.156	0.510
	Family	Refocus on planning	ρ = 0.192	[−0.045, 0.409]	0.108	0.488
	Family	Positive reappraisal	ρ = 0.138	[−0.099, 0.361]	0.250	0.562
	Family	Putting into perspective	ρ = 0.250	[0.014, 0.460]	0.035	0.266
	Family	Catastrophizing	ρ = −0.119	[−0.344, 0.118]	0.322	0.595
	Family	Blaming others	ρ = −0.107	[−0.333, 0.130]	0.374	0.599
	Total PFRS	Self-blame	ρ = −0.151	[−0.372, 0.087]	0.209	0.537
	Total PFRS	Acceptance	ρ = −0.037	[−0.268, 0.198]	0.761	0.830
	Total PFRS	Rumination	ρ = −0.113	[−0.338, 0.124]	0.346	0.595
	Total PFRS	Positive refocusing	ρ = 0.121	[−0.116, 0.346]	0.314	0.595
	Total PFRS	Refocus on planning	ρ = 0.272	[0.037, 0.479]	0.022	0.266
	Total PFRS	Positive reappraisal	ρ = 0.175	[−0.062, 0.394]	0.143	0.510
	Total PFRS	Putting into perspective	ρ = 0.092	[−0.145, 0.319]	0.446	0.601
	Total PFRS	Catastrophizing	ρ = −0.182	[−0.400, 0.056]	0.130	0.510
	Total PFRS	Blaming others	ρ = −0.154	[−0.375, 0.084]	0.201	0.537

Note. CERQ = Cognitive Emotion Regulation Questionnaire; PFRS = Protective Factors for Resilience Scale; PWS = people who stutter; PWNS = people who do not stutter; r = Pearson correlation coefficient; rho = Spearman rank correlation coefficient; q = Benjamini-Hochberg false discovery rate (FDR)-adjusted p value. Pearson 95% CIs were based on Fisher's z transformation and Spearman 95% CIs on the Bonett-Wright method. FDR correction was applied separately within each group across 36 correlations

acceptance, rumination, positive reappraisal, planning, and catastrophizing, rather than broader emotional reactivity, avoidance, or physiological regulation. Therefore, these nonsignificant comparisons should not be interpreted as establishing equivalent self-reported cognitive coping patterns or as evidence that emotional processes are irrelevant to the experience of stuttering.

This result partly differs from studies suggesting that PWS may experience greater emotional and psychosocial burden than fluent speakers. For example, previous research has shown that stuttering can negatively affect social functioning, emotional well-being, vitality, and mental health-related quality of life in adulthood [2]. Similarly, PWS have been reported to show increased vulnerability to social anxiety and negative affective experiences [3, 14]. More recently, studies focusing on emotional regulation in PWS have emphasized that emotion regulation difficulties may contribute to the adverse impact of stuttering across the life span [1]. The present findings do not contradict this literature but rather refine it by suggesting that the present sample showed no statistically significant group differences in the measured cognitive emotion regulation strategies, while scores reflecting psychosocial protective resources differed between groups.

A neurodiversity-informed interpretation is particularly important when considering the absence of CERQ group differences. The absence of statistically significant CERQ subscale differences does not position PWS and PWNS on a continuum from psychologically deficient to psychologically normal and does not establish statistical equivalence in reported strategy use. This does not negate the well-documented psychosocial burden that some PWS experience. Instead, the absence of detected differences in this sample may coexist with psychosocial burden shaped by factors not captured by the CERQ, including stigma, communicative participation, listener reactions, identity, concealment, and situational demands [6, 7, 10, 18]. From this perspective, the absence of group differences in CERQ scores is compatible with a non-deficit account: PWS need not show globally disrupted cognitive regulation for stuttering to have substantial effects on daily life.

This distinction also prevents over-pathologizing statistically significant differences on other psychosocial measures. Neurodiversity scholarship emphasizes that stuttering-related variation can coexist with strengths, valued identities, autonomy, and a desire—or no desire—for speech change [6]. Onslow [8] and Shenker et al. [9] both argue, from different clinical perspectives, that neurodiversity-affirming principles should not require

clinicians or researchers to deny impairment or distress when these are important to the individual. A balanced interpretation therefore recognizes both realities: some PWS may experience meaningful speech-related or psychosocial difficulty, while the presence of group-level differences does not justify locating all difficulty within the individual or treating fluent speech as the sole normative endpoint.

In this context, the most prominent finding of the present study was the lower perceived resilience-related protective resources reported by PWS. Resilience is generally conceptualized as a dynamic capacity that supports adaptation in the face of adversity, stress, or negative life experiences [21]. For PWS, communication difficulties may become a chronic interpersonal stressor, particularly when accompanied by negative listener reactions, avoidance, shame, or reduced communicative participation. Therefore, lower perceived resilience-related protective resources in PWS may reflect the cumulative psychosocial burden of living with a communication disorder rather than a direct consequence of speech disfluency alone. This is consistent with previous studies emphasizing the protective role of resilience in stuttering. Craig et al. [16] suggested that resilience-related factors may protect individuals with chronic stuttering from psychological distress. Freud and Amir [17] further showed that resilience is more closely related to the subjective and covert experience of stuttering than to overt stuttering severity. This is particularly relevant for the present study because our findings also point to resilience-related protective resources as a relevant psychosocial dimension in PWS. In other words, the impact of stuttering may not be fully explained by observable speech characteristics; instead, internal coping resources, perceived support, self-efficacy, and adaptive cognitive strategies may shape how individuals experience and manage stuttering in daily life.

The PFRS findings require the same distinction. The observed effects were small to moderate and consistently favored PWNS across Personal, Peer, Family, and Total scores, but the PFRS assesses perceived protective resources associated with resilience rather than resilience as a unitary trait. Consequently, these results should not be translated into the statement that PWS are inherently 'less resilient.' The Personal subscale reflects individually perceived resources, whereas the Peer and Family subscales are explicitly relational. Lower scores can therefore arise through multiple pathways, including differences in perceived support, social safety, opportunities for participation, previous interpersonal experiences, or the interaction between personal coping and environmental responses. This interpretation is more faithful both to the construct measured by the PFRS and to contemporary resilience theory, which conceptualizes adaptation as emerging from interacting systems rather than from an isolated personal capacity [21–23].

Several empirical findings support this contextual interpretation. Gerlach et al. [10] showed that stigma-identity processes are associated with psychological distress among adults who stutter, while Lei et al. [18] demonstrated within-person variation in affect and perceived stuttering severity according to characteristics of everyday social situations. The public-attitudes literature likewise documents persistent stereotypes about stuttering and shows that at least some attitudes are modifiable through targeted interventions [12]. These findings make it plausible that perceived peer and family protective resources are influenced not only by characteristics of the person who stutters but also by the quality of social responses and the degree to which communication environments are accepting, predictable, and supportive. The present data cannot determine which pathway accounts for the lower PFRS scores, but they argue against interpreting the group difference as an exclusively intrapersonal deficit.

Medical, social, and neurodiversity-informed perspectives are therefore most useful here as complementary lenses rather than competing explanations. Biomedical and neurodevelopmental evidence remains essential for understanding the mechanisms of stuttering and for supporting speech-related goals when these are desired by the individual. Social and neurodiversity-informed models broaden the analytic frame to include identity, stigma, participation, accommodation, listener behavior, and environmental change [6–8]. Contemporary clinical discussions similarly emphasize that the appropriate balance among these perspectives may vary across people and across stages of life [8, 9]. The present study does not test any disability model directly; rather, this plural framework is used to avoid two opposite errors—reducing all psychosocial difficulty to an individual impairment, or denying speech-related difficulty when the person who stutters experiences it as important.

The lower perceived peer protective resources associated with resilience in the PWS group are also clinically meaningful. Stuttering often becomes most salient in interpersonal communication, and PWS may experience

negative social evaluation, anticipation of stuttering, avoidance of speaking situations, or fear of listener reactions. These experiences can influence social participation and perceived peer support. Adult studies have shown that PWS may experience social anxiety and reduced quality of life, particularly in domains involving social and emotional functioning [2, 3, 14]. Freud and Amir [17] also reported that resilience is associated with the covert experience of stuttering, indicating that subjective social-emotional burden may be more closely related to resilience than observable severity alone.

In the present data, the Peer domain showed a small-to-moderate between-group effect while Family resources also differed. These estimates support closer attention to relational resources but do not identify why they differed. A more cautious interpretation is that peer and family support may be experienced, accessed, or perceived differently by PWS in this sample, potentially in interaction with social anxiety, stigma, listener responses, and communicative participation. This formulation avoids treating relational-resource scores as fixed properties of the individual.

The correlation findings provide additional insight into the cognitive strategies associated with resilience-related protective resources among PWS. After FDR correction, higher Personal, Peer, Family, and Total PFRS scores were consistently associated with positive refocusing, refocus on planning, and positive reappraisal. These strategies are generally considered adaptive because they may help individuals redirect attention, generate constructive responses, and reinterpret difficult experiences in a more manageable way [19, 28]. In the present cross-sectional data, these findings indicate robust associations between selected adaptive cognitive emotion regulation strategies and perceived protective resources associated with resilience; they do not establish the direction of effect or demonstrate that these strategies increase resilience-related resources.

The associations between resilience-related protective factor scores and positive reappraisal are particularly important. Positive reappraisal may allow individuals to reinterpret communication challenges without defining themselves solely through stuttering. This aligns with previous work showing that resilience and coping are associated with self-acceptance and satisfaction with life in people who stutter [24]. Similarly, self-compassion has been identified as a protective factor related to reduced negative reactions to stuttering and better quality of life in PWS [25]. Taken together, these findings suggest that adaptive cognitive-emotional processes may help PWS maintain a more flexible and compassionate relationship with their communication experiences.

The positive-reappraisal finding has particularly strong external support. Stover et al. [26] reported a meta-analytic association between cognitive reappraisal and personal resilience across 64 independent samples, a magnitude broadly consistent with the positive associations observed in the present PWS group. Nevertheless, construct equivalence should not be assumed: Stover et al. synthesized measures of personal resilience, whereas the present study assessed personal, peer, and family protective resources using the PFRS. The convergence therefore strengthens the interpretation of positive reappraisal as a correlate of adaptive functioning, not as proof that reappraisal causes higher PFRS scores. The same caution applies to Şen and Kocabıyık [27], whose stuttering-specific study found lower resilience scores in PWS together with a difference in the social dimension of FoMO. Taken together, these findings point toward a recurring association among reappraisal, social-contextual experience, and resilience-related functioning, while leaving causal direction and construct-specific mechanisms unresolved.

Several inverse associations involving self-blame and catastrophizing were nominally significant in the PWS group before multiplicity correction; however, none remained significant after Benjamini–Hochberg FDR adjustment. These nominal findings should therefore not be interpreted as robust evidence of associations between maladaptive strategies and resilience-related protective factor scores in this sample. Their potential relevance can be examined in future confirmatory or longitudinal studies.

Fewer nominally significant correlations were observed in the PWNS group. However, a correlation that reaches statistical significance in one group but not in another is not, by itself, evidence that the two correlation coefficients differ. Accordingly, the present findings are interpreted as within-group association patterns rather than as a formal between-group difference in the strength of these associations. None of the five nominally significant PWNS correlations remained significant after FDR correction.

The findings are better framed as implications for assessment and future research than as evidence for specific treatment targets. First, assessment of adults who stutter may benefit from considering not only speech characteristics but also perceived personal, peer, and family resources, communicative participation, social confidence, stigma-related experiences, and the individual's own goals. This broader outcome frame is consistent with stakeholder research in which positive change for adults who stutter included social connection, autonomy, a healthier relationship with oneself, and easier or more authentic communication rather than fluency alone [33, 34]. Such domains are especially relevant to the present finding that PFRS differences extended beyond the Personal domain to Peer and Family resources.

Second, the robust associations of positive refocusing, refocus on planning, and positive reappraisal with PFRS scores identify candidate processes for longitudinal and intervention research, but the cross-sectional design does not establish that increasing these strategies will increase resilience-related resources. Future studies could test whether changes in these cognitive strategies precede changes in perceived protective resources, whether the reverse pathway is present, or whether both are influenced by common contextual variables. Interventions should therefore not be justified from the present correlations alone. Rather, they provide empirically grounded hypotheses that can be examined alongside social-contextual targets such as reducing stigma, improving communicative participation, and strengthening supportive relationships.

Third, contemporary stuttering literature increasingly emphasizes collaboration and outcomes defined with, rather than for, the person who stutters. Rodgers and Gerlach-Houck [33, 34] documented stakeholder perspectives showing that meaningful change can involve social relationships, self-concept, autonomy, and communication experience. Irani et al. [35] likewise advocated an acceptance- and collaboration-oriented view of therapy outcomes, and Phillips and Spaulding [36], in a mixed-methods study of 194 people who stutter, found that participants generally viewed approaches addressing affective, behavioral, cognitive, and social aspects of stuttering more favorably than approaches centered narrowly on fluency. These findings do not imply that speech modification is inappropriate; consistent with Onslow's combined framework [8], speech-related change may remain a valid goal when it is desired by the individual. The key implication is that clinical success should not be inferred from normalization alone and that person-defined goals, psychosocial well-being, participation, and environmental fit deserve explicit consideration.

This study has several limitations. Its cross-sectional design does not allow causal conclusions regarding the direction of associations between resilience-related protective factors and cognitive emotion regulation. The use of self-report measures may reflect participants' subjective awareness and willingness to report emotional and coping processes. Stuttering status was based on self-identification, and clinician-rated stuttering severity and detailed therapy-history variables were not available. Recruitment through online convenience sampling may have introduced self-selection bias. In addition, the correlation analyses involved multiple exploratory tests; although Benjamini–Hochberg FDR correction was applied, the coefficients were not formally compared between groups. Future longitudinal studies should examine whether adaptive cognitive emotion regulation strategies predict changes in resilience-related resources and psychosocial functioning over time. The nine CERQ and four PFRS between-group comparisons were exploratory and were not adjusted for multiple testing, increasing the possibility of false-positive findings. The online recruitment approach and lack of independent clinical confirmation of stuttering status also limit generalizability.

Conclusions

In conclusion, no statistically significant differences were detected between PWS and PWNS across the nine CERQ subscales, whereas PWS reported lower personal, peer, family, and total resilience-related protective resource scores. Within PWS, adaptive cognitive emotion regulation strategies were positively associated with several resilience-related protective factor scores. These findings support consideration of cognitive coping and

resilience-related resources as complementary psychosocial dimensions in the assessment of adults who stutter, while the cross-sectional design precludes causal interpretation.

Interpreted within a neurodiversity-informed and social-contextual framework, the findings are most consistent with differences in perceived protective resources embedded in personal and relational contexts, rather than with a generalized psychological deficit in PWS. Future longitudinal work should examine how individual cognitive strategies, stigma, social support, communication environments, and person-defined goals interact over time.

Abbreviations

CERQc	Cognitive Emotion Regulation Questionnaire
PFRS	Protective Factors for Resilience Scale
PWS	people who stutter
PWNS	people who do not stutter
SPSS	Statistical Package for the Social Sciences.

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AI Use Statement.

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Author contributions NAK contributed to conceptualization, methodology, supervision, resources, investigation, data curation, writing - original draft, and writing - review and editing. EE contributed to conceptualization, investigation, data curation, writing - original draft, and writing - review and editing. ASS contributed to conceptualization, investigation, data curation, writing - original draft, and writing - review and editing. All authors read and approved the final manuscript.

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Data availability The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate Ethical approval for this study was obtained from the Istanbul Kent University Health Sciences Research Ethics Committee. The study protocol, entitled "Cognitive Emotion Regulation Strategies and Psychological Resilience in Adults Who Stutter: A Comparative and Correlational Study," was reviewed and approved at the committee meeting held on July 9, 2026 (Meeting No. 2026-08; Document No. E-10420511-050-60552, dated July 10, 2026). Informed voluntary consent was obtained from all participants via Google Forms before data collection. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and applicable institutional requirements.

Consent for publication Not applicable.

Competing interests The authors declare no competing interests.

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Authors and Affiliations

Nurcan Alpüran Kocabıyık[1] · Esra Erol[2] · Ayşegül Sarı Sülüker[3]

✉ Nurcan Alpüran Kocabıyık
nurcanalpuran@kent.edu.tr

[1] Faculty of Health Sciences, Department of Speech and Language Therapy, Istanbul Kent University, Istanbul, Türkiye, Turkey

[2] Faculty of Health Sciences, Department of Speech and Language Therapy, Istanbul Gelisim University, Istanbul, Türkiye, Turkey

[3] Faculty of Health Sciences, Department of Speech and Language Therapy, Istanbul Kent University, Kağıthane Campus, Merkez Mahallesi, Cendere Caddesi No: 24, Türkiye 34406 Kağıthane, Istanbul, Turkey