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Self-Stigma Components and the Multidimensional Experience of Stuttering in Adults: A Cross-Sectional Study

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ABSTRACT

Purpose: This study examined associations between components of self-stigma and the multidimensional experience of stuttering in adults, and explored indirect associations involving emotional reactions, avoidance, and the sequential structure proposed by the self-stigma framework.

Methods: The final sample comprised 98 adults who stutter. Participants completed the Turkish versions of the Self-Stigma of Stuttering Scale (4S-TR) and the Wright and Ayre Stuttering Self-Rating Profile (WASSP-TR). Pearson correlations, multiple and hierarchical regressions, covariate-adjusted sensitivity analyses, PROCESS Models 6 and 4, and confirmatory factor analysis (CFA) were conducted.

Results: Stigma application showed the most consistent unique associations with emotional reactions, cognitive responses, avoidance, and perceived impact; these associations remained significant after adjustment for age, sex, educational level, and therapy history. Stigma awareness showed more selective associations, whereas stereotype agreement retained a unique association with avoidance. The serial indirect-effect analysis identified a significant indirect association from awareness to avoidance through agreement and application. A significant indirect association between stigma application and avoidance through emotional reactions was also observed. However, emotional reactions and avoidance were strongly correlated ($r = .835$), and CFA did not provide clear evidence of discriminant validity between the corresponding WASSP-TR subscales (latent $r = .962$).

Conclusion: Stigma application was the self-stigma component most consistently associated with multiple dimensions of the stuttering experience. The cross-sectional design and substantial overlap between emotional reactions and avoidance preclude causal or mechanistic interpretations.

Keywords: Stuttering; Social Stigma; Emotions; Adult

ÖZET

Amaç: Bu çalışmada, yetişkinlerde öz damgalama bileşenleri ile kekemeliğin çok boyutlu deneyimi arasındaki ilişkiler incelenmiş; ayrıca duygusal tepkiler, kaçınma ve öz damgalama çerçevesinin öngördüğü sıralı yapıyı içeren dolaylı ilişkiler araştırılmıştır.

Yöntem: Nihai örneklem kekemeliği olan 98 yetişkinden oluşmuştur. Katılımcılar, Kekemelikte Öz Damgalama Ölçeği'nin Türkçe formunu (4S-TR) ve Wright ve Ayre Kekemelik Öz-Değerlendirme Profili'nin Türkçe formunu (WASSP-TR) doldurmuştur. Pearson korelasyon analizleri, çoklu ve hiyerarşik regresyon analizleri, kovaryatlara göre düzeltilmiş duyarlılık analizleri, PROCESS Model 6 ve Model 4 analizleri ve doğrulayıcı faktör analizi (DFA) uygulanmıştır.

Bulgular: Damgalamayı kendine uygulama, duygusal tepkiler, bilişsel tepkiler, kaçınma ve algılanan etki ile en tutarlı özgün ilişkileri gösteren öz damgalama bileşeni olmuş; bu ilişkiler yaş, cinsiyet, eğitim düzeyi ve terapi öyküsü için düzeltme yapıldıktan sonra da anlamlı kalmıştır. Damgalama farkındalığı daha seçici ilişkiler gösterirken, stereotiplerle hemfikir olma kaçınma ile özgün ilişkisini korumuştur. Sıralı dolaylı etki analizinde, farkındalıktan stereotiplerle hemfikir olma ve damgalamayı kendine uygulama üzerinden kaçınmaya uzanan anlamlı bir dolaylı ilişki belirlenmiştir. Damgalamayı kendine uygulama ile kaçınma arasında duygusal tepkiler üzerinden anlamlı bir dolaylı ilişki de gözlenmiştir. Bununla birlikte, duygusal tepkiler ile kaçınma güçlü düzeyde ilişkili bulunmuş ($r = .835$) ve DFA, ilgili WASSP-TR alt ölçeklerinin ayırt edici geçerliğine ilişkin açık kanıt sağlamamıştır (örtük düzeyde $r = .962$).

Sonuç: Damgalamayı kendine uygulama, kekemelik deneyiminin birden fazla boyutuyla en tutarlı biçimde ilişkili öz damgalama bileşeni olmuştur. Kesitsel tasarım ve duygusal tepkiler ile kaçınma arasındaki yüksek düzeyde örtüşme, nedensel veya mekanistik yorumlara izin vermemektedir.

Anahtar Kelimeler: Kekemelik; Sosyal Stigma; Hissiyat; Erişkin

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Stuttering is increasingly understood not only as a disorder of speech fluency but also as a multidimensional psychosocial condition shaped by how individuals experience, interpret, and manage speaking difficulties in everyday life (1,2). For many adults, its effects extend beyond moments of disfluency to education, work, relationships, self-perception, and communication participation. Social anxiety, fear of negative evaluation, avoidance, and reduced quality of life are well documented (3–6). Some individuals organize everyday choices around anticipated speaking difficulty, which may reduce immediate distress while progressively restricting participation (6). Discrimination and other social stressors may further affect emotional well-being and identity (6,7). Accordingly, the lived experience of stuttering includes emotional, cognitive, and behavioral dimensions that are not captured by observable speech disruptions alone (5,8). Observable severity also does not necessarily correspond to psychosocial impact, which can vary considerably among individuals with similar levels of stuttering (9).

One process that may contribute to this variability is self-stigma. The framework described by Corrigan and Rao (10) proposes a sequence in which individuals first become aware of stigmatizing societal beliefs, then agree with those stereotypes, and ultimately apply them to themselves. This final application or internalization stage is particularly relevant because negative social beliefs become incorporated into self-perception and may be associated with reduced self-efficacy, distress, and withdrawal. In adults who stutter, self-stigma has been associated with poorer psychosocial outcomes, stress, reduced quality of life, and communication-related difficulties (8,11,12). However, much of this work has considered self-stigma more globally, leaving uncertainty about whether awareness, agreement, and application have equivalent relationships with different dimensions of the stuttering experience.

Component-level analysis may therefore provide clinically useful information that a total self-stigma score cannot. This question is also relevant cross-culturally, because relatively little component-level evidence is available from non-English-speaking populations. The present study examined these associations in Turkish-speaking adults using the Turkish Self-Stigma of Stuttering Scale (4S-TR) (13) and the Turkish Wright and Ayre Stuttering Self-Rating Profile (WASSP-TR) (14,15). We examined the unique associations of stigma awareness, stereotype agreement, and stigma application with emotional reactions, cognitive responses, avoidance, and perceived impact. We also explored statistical indirect associations involving stigma application, emotional reactions, and avoidance, and the sequential awareness–agreement–application structure proposed by the self-stigma framework.

Material and Methods

The study used a cross-sectional design to examine associations between self-stigma components and the multidimensional experience of stuttering. It was conducted in accordance with the Declaration of Helsinki and approved by the Biruni University Scientific Research Ethics Committee on October 20, 2025 (Approval No: 2024-BİAEK/14-30). All participants provided electronic informed consent before participation.

Participants and Procedure

Participants were recruited through online resources and professional networks related to speech and language therapy. Eligibility criteria were age 18 years or older, self-reported stuttering, informed consent, and sufficient Turkish proficiency to complete the questionnaires. Stuttering status was based on participant self-report and was not independently verified through clinical assessment. Because all measures were administered in Turkish, participants were expected to have sufficient language proficiency, although this was not formally assessed.

Data were collected via Google Forms between November 20, 2025 and March 17, 2026. Participation was voluntary. Identifying information collected through the online form was removed before analysis, and the analytic dataset was de-identified. Of 105 initial survey records, seven duplicate submissions were identified during data screening. For each duplicate respondent, the earliest complete submission was retained and subsequent entries were removed, yielding a final analytic sample of 98 unique participants. No missing values were present in the scale variables included in the final analyses; therefore, no imputation was required.

Measures

Self-Stigma of Stuttering Scale (4S-TR)

The 4S was developed to assess self-stigma in adults who stutter across awareness of stigmatizing attitudes, agreement with stereotypes, and application of those

beliefs to oneself (16). The validated Turkish adaptation (4S-TR) contains 28 items, uses a 5-point Likert response format, and retains the Awareness, Agreement, and Application subscales (13). Higher scores indicate greater levels of the corresponding self-stigma component.

Before scoring, Items 2, 3, 4, 5, 6, 8, 14, and 18 were reverse-scored. Mean scores were calculated for Awareness (12 items), Agreement (4 items), Application (12 items), and the total 28-item scale. In the Turkish adaptation study, Cronbach's α was .889 for the Agreement subscale, indicating high internal consistency (13). In the present sample, Cronbach's α was .792 for Awareness, .417 for Agreement, .848 for Application, and .856 for the total scale. Because Agreement showed substantially lower internal consistency in the present sample, findings involving this subscale were interpreted cautiously. During the revision process, the scoring workflow was re-examined and standardized by reapplying the validated reverse-scoring procedure directly to the item-level responses before recalculating the subscale and total scores.

Wright and Ayre Stuttering Self-Rating Profile (WASSP-TR)

The WASSP is a self-report measure of the multidimensional experience and impact of stuttering (14). Its Turkish adaptation has demonstrated validity and reliability in adults who stutter (15). The scored portion contains 24 items across five domains: Behavior, Thought, Feeling, Avoidance, and Impact. Items are rated on a 7-point scale, with higher scores indicating greater difficulty or negative impact.

Mean domain scores were calculated from eight Behavior, three Thought, five Feeling, four Avoidance, and four Impact items; the two open-ended "Other" fields were not included in scoring. During the revision process, the WASSP-TR domain scores were likewise reconstructed directly from the item-level responses using the validated 8/3/5/4/4 domain allocation, with the two open-ended "Other" fields excluded from scoring. Cronbach's α in the present sample was .880 for Behavior, .885 for Thought, .898 for Feeling, .775 for Avoidance, and .832 for Impact. For clarity, the narrative refers to Thought, Feeling, and Impact as cognitive responses, emotional reactions, and perceived impact, respectively.

Variables and Data Analysis

The main predictors were stigma awareness, stereotype agreement, and stigma application. Avoidance was the primary outcome; emotional reactions, cognitive responses, and perceived impact were also examined.

A sensitivity analysis in G*Power 3.1.9.4 estimated the minimum detectable incremental effect size for the final sample (17). With N = 98, α = .05, 80% power, three tested self-stigma predictors, and seven total predictors including four covariates, the minimum detectable effect was approximately $f^2 = .12$.

Descriptive statistics, Pearson correlations, and regression analyses were conducted in IBM SPSS Statistics 27. Multiple regressions examined the unique associations of the three self-stigma components with emotional reactions, cognitive responses, avoidance, and perceived impact, with all predictors entered simultaneously. For avoidance, hierarchical regression entered Awareness at Step 1, Agreement at Step 2, and Application at Step 3. Covariate-adjusted analyses included age, sex, educational level, and therapy history; full results are presented in Table 4.

Indirect effects were examined using PROCESS for SPSS 5.0 with 5,000 bootstrap samples (18). The theory-aligned serial analysis (PROCESS Model 6) was treated as the primary indirect-effect analysis and examined the sequence from awareness through agreement and application to avoidance. PROCESS Model 4 was retained as a secondary descriptive analysis of the indirect association between stigma application and avoidance through emotional reactions. Indirect effects were evaluated using 95% percentile bootstrap confidence intervals and, given the cross-sectional design, were interpreted as statistical indirect associations rather than evidence of temporal or causal mediation.

To evaluate the empirical distinction between emotional reactions and avoidance, confirmatory factor analysis (CFA) of the nine corresponding WASSP-TR items was conducted in SEMLj for jamovi using WLSMV estimation (19). A correlated two-factor model was compared with a one-factor model using χ^2, RMSEA, and SRMR, and the latent correlation was examined. Regression assumptions were evaluated using residual plots, VIF values, standardized residuals, and Cook's distance; case-deletion sensitivity analyses were conducted for standardized residuals exceeding ±3. Given the number of related regression and indirect-effect analyses, these analyses were considered exploratory and no formal adjustment for multiple comparisons was applied. Two-tailed statistical significance was set at $p < .05$.

Results

The final analytic sample comprised 98 adults who stutter (Table 1), aged 18–66 years (M = 30.69, SD = 11.02). Seventy-four participants (75.5%) were male and 24 (24.5%) were female. Almost half had a university degree (49.0%); the remaining educational characteristics are reported in Table 1.

Normality and Regression Assumptions

Descriptive statistics and distributional indices are shown in Table 2. Skewness ranged from −0.231 to 0.576 and kurtosis from −0.963 to 0.034, indicating no substantial univariate departures from normality. Residual histograms, normal P–P plots, and residual-versus-predicted plots indicated no substantial violations of residual normality or homoscedasticity across the regression models, and VIF values did not indicate multicollinearity. One standardized residual exceeded ±3 in the Thought model and one in the Impact model; Cook's distances were below .18, and excluding these observations did not alter statistical significance or the substantive conclusions.

Table 1. Demographic Characteristics of Participants

Variable	n	%
Sex		
Male	74	75.5
Female	24	24.5
Education		
Primary education	12	12.2
Secondary education	30	30.6
University degree	48	49.0
Master's degree	6	6.1
Doctoral degree	2	2.0
Previous/current speech therapy		
Yes	65	66.3
No	33	33.7

Note. *N = 98. Age: M = 30.69, SD = 11.02, range = 18–66 years.*

Table 2. Descriptive Statistics, Distributional Indices, and Pearson Correlations Among Study Variables

Panel A. Descriptive Statistics and Distributional Indices

Variable	M	SD	Skewness	Kurtosis
1. Total self-stigma	2.66	0.64	.071	.034
2. Awareness	3.02	0.79	−.231	−.610
3. Agreement	2.89	0.82	.128	−.259
4. Application	2.23	0.87	.576	−.319
5. Behavior	3.49	1.36	.216	−.963
6. Thought	3.19	1.73	.422	−.936
7. Feeling	3.02	1.84	.564	−.932
8. Avoidance	2.79	1.46	.543	−.537
9. Impact	3.13	1.53	.510	−.337

Panel B. Pearson Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8	9
1. Total self-stigma	—								
2. Awareness	.766**	—							
3. Agreement	.654**	.390**	—						
4. Application	.819**	.290**	.456**	—					
5. Behavior	.350**	.195	.253*	.344**	—				
6. Thought	.643**	.463**	.352**	.574**	.647**	—			
7. Feeling	.589**	.324**	.415**	.588**	.684**	.770**	—		
8. Avoidance	.564**	.301**	.465**	.550**	.705**	.715**	.835**	—	
9. Impact	.484**	.346**	.299**	.425**	.605**	.573**	.742**	.695**	—

Note. *N = 98. M = mean; SD = standard deviation. Variables 1–4 represent 4S-TR scores; Variables 5–9 represent WASSP-TR domains. Correlations of Total self-stigma with Awareness, Agreement, and Application are part–whole associations. *p < .05, **p < .01.*

Correlation Results

Table 2 presents Pearson correlations. Stigma application showed the strongest and most consistent positive bivariate associations with the WASSP-TR domains (r = .344–.588), including emotional reactions (r = .588), cognitive responses (r = .574), avoidance (r = .550), perceived impact (r = .425), and behavioral responses (r = .344; all p ≤ .001). Awareness was associated with cognitive responses (r = .463), emotional reactions (r = .324), avoidance (r = .301), and perceived impact (r = .346), but not behavioral responses (r = .195, p = .054). Agreement was positively associated with all WASSP-TR domains (r = .253–.465). Several WASSP-TR domains were also strongly related; notably, emotional reactions and avoidance correlated at r = .835 (p < .001).

Regression Analyses

All four multiple regression models were significant (Table 3), explaining 38.6% of variance in emotional reactions, 42.5% in cognitive responses, 36.6% in avoidance, and 23.7% in perceived impact. Stigma application showed significant unique associations with every outcome: emotional reactions (β = .485, p < .001), cognitive responses (β = .476, p < .001), avoidance (β = .414, p < .001), and perceived impact (β = .332, p = .002). Awareness was additionally associated with cognitive responses (β = .322, p < .001) and perceived impact (β = .227, p = .024). Agreement showed a unique association with avoidance (β = .243, p = .014) but not with the other outcomes.

The hierarchical regression for avoidance showed incremental contributions across the proposed components. Awareness explained 9.0% of variance at Step 1 (p = .003), Agreement added 14.3% at Step 2 (p < .001), and Application added a further 13.3% at Step 3 (p < .001), resulting in a final R^2 of .366.

Indirect Association Through Emotional Reactions

PROCESS Model 4 showed that stigma application was associated with emotional reactions (B = 1.24, SE = 0.17, p < .001). When application and emotional reactions were entered together to predict avoidance, emotional reactions remained significant (B = 0.62, SE = 0.05, p < .001), whereas the direct effect of application was not significant (B = 0.15, SE = 0.12, p = .196). The total effect of application on avoidance was significant (B = 0.92, SE = 0.14, p < .001), as was the indirect effect through emotional reactions (Effect = 0.77, BootSE = 0.12, 95% CI [0.53, 1.02]).

Table 3. Multiple Regression Analyses Predicting Dimensions of the Stuttering Experience

Panel A. Regression Coefficients				
Predictor	**Feeling**	**Thought**	**Avoidance**	**Impact**
Awareness	0.30 (0.21), β=.127	0.71 (0.19), β=.322***	0.16 (0.17), β=.086	0.44 (0.19), β=.227*
Agreement	0.33 (0.22), β=.144	0.02 (0.20), β=.009	0.43 (0.17), β=.243*	0.11 (0.20), β=.059
Application	1.02 (0.19), β=.485***	0.94 (0.18), β=.476***	0.69 (0.16), β=.414***	0.58 (0.18), β=.332**
Panel B. Model Fit				
Outcome	**R^2**	**Adjusted R^2**	**F(3, 94)**	
Feeling	.386	.366	19.69***	
Thought	.425	.407	23.20***	
Avoidance	.366	.346	18.11***	
Impact	.237	.213	9.75***	

Note. *N = 98. Values in Panel A are unstandardized regression coefficients (B), with standard errors in parentheses, followed by standardized coefficients (β). All models included stigma awareness, stereotype agreement, and stigma application simultaneously. * p < .05, ** p < .01, *** p < .001.*

Discriminant Validity Analysis

The CFA did not provide clear evidence that Feeling and Avoidance were empirically distinct. The correlated two-factor model yielded scaled $\chi^2(26) = 59.0$, SRMR = .043, and scaled RMSEA = .114; the one-factor model yielded scaled $\chi^2(27) = 62.0$, SRMR = .042, and scaled RMSEA = .116. The models therefore showed similar fit, and the latent correlation between Feeling and Avoidance was very high (r = .962, p < .001).

Sensitivity Analyses

Covariate-adjusted analyses yielded a largely unchanged pattern (Table 4). Application remained significantly associated with emotional reactions, cognitive responses, avoidance, and perceived impact; awareness remained associated with cognitive responses; and agreement remained associated with avoidance. The primary association between awareness and perceived impact was attenuated and was no longer significant after adjustment ($p = .160$). Adding the three self-stigma components after age, sex, educational level, and therapy history explained significant additional variance across all outcomes ($\Delta R^2 = .153–.318$, all $p < .001$).

Table 4. Covariate-Adjusted Sensitivity Analyses

Outcome / Model fit	Predictor	B	SE	β	p
Emotional Reactions $R^2 = .489$; Adj. $R^2 = .449$; $\Delta R^2 = .301$; $\Delta F(3, 90) = 17.66$, $p < .001$	Age	−0.047	0.014	−.279	.001
	Sex	0.579	0.333	.136	.086
	Educational level	−0.187	0.213	−.088	.382
	Therapy history	0.184	0.367	.047	.617
	Awareness	0.248	0.219	.106	.260
	Agreement	0.303	0.205	.134	.143
	Application	0.947	0.183	.449	<.001
Cognitive Responses $R^2 = .537$; Adj. $R^2 = .501$; $\Delta R^2 = .318$; $\Delta F(3, 90) = 20.62$, $p < .001$	Age	−0.041	0.012	−.264	.001
	Sex	0.669	0.297	.167	.027
	Educational level	−0.207	0.190	−.103	.279
	Therapy history	0.282	0.327	.077	.392
	Awareness	0.665	0.195	.302	.001
	Agreement	−0.009	0.183	−.004	.960
	Application	0.868	0.163	.439	<.001
Avoidance $R^2 = .492$; Adj. $R^2 = .452$; $\Delta R^2 = .278$; $\Delta F(3, 90) = 16.39$, $p < .001$	Age	−0.046	0.011	−.345	<.001
	Sex	0.185	0.263	.055	.483
	Educational level	−0.133	0.169	−.079	.430
	Therapy history	0.152	0.290	.049	.601
	Awareness	0.121	0.173	.065	.486
	Agreement	0.414	0.162	.232	.012
	Application	0.622	0.145	.373	<.001
Perceived Impact $R^2 = .320$; Adj. $R^2 = .267$; $\Delta R^2 = .153$; $\Delta F(3, 90) = 6.76$, $p < .001$	Age	−0.037	0.013	−.264	.008
	Sex	0.035	0.319	.010	.912
	Educational level	0.170	0.204	.096	.407
	Therapy history	−0.017	0.351	−.005	.961
	Awareness	0.297	0.210	.152	.160
	Agreement	0.062	0.196	.033	.752
	Application	0.560	0.175	.320	.002

Note. *N = 98. Age, sex, educational level, and therapy history were entered as covariates in Block 1; Awareness, Agreement, and Application were entered in Block 2. B = unstandardized regression coefficient; SE = standard error; β = standardized regression coefficient; ΔR^2 = change in explained variance.*

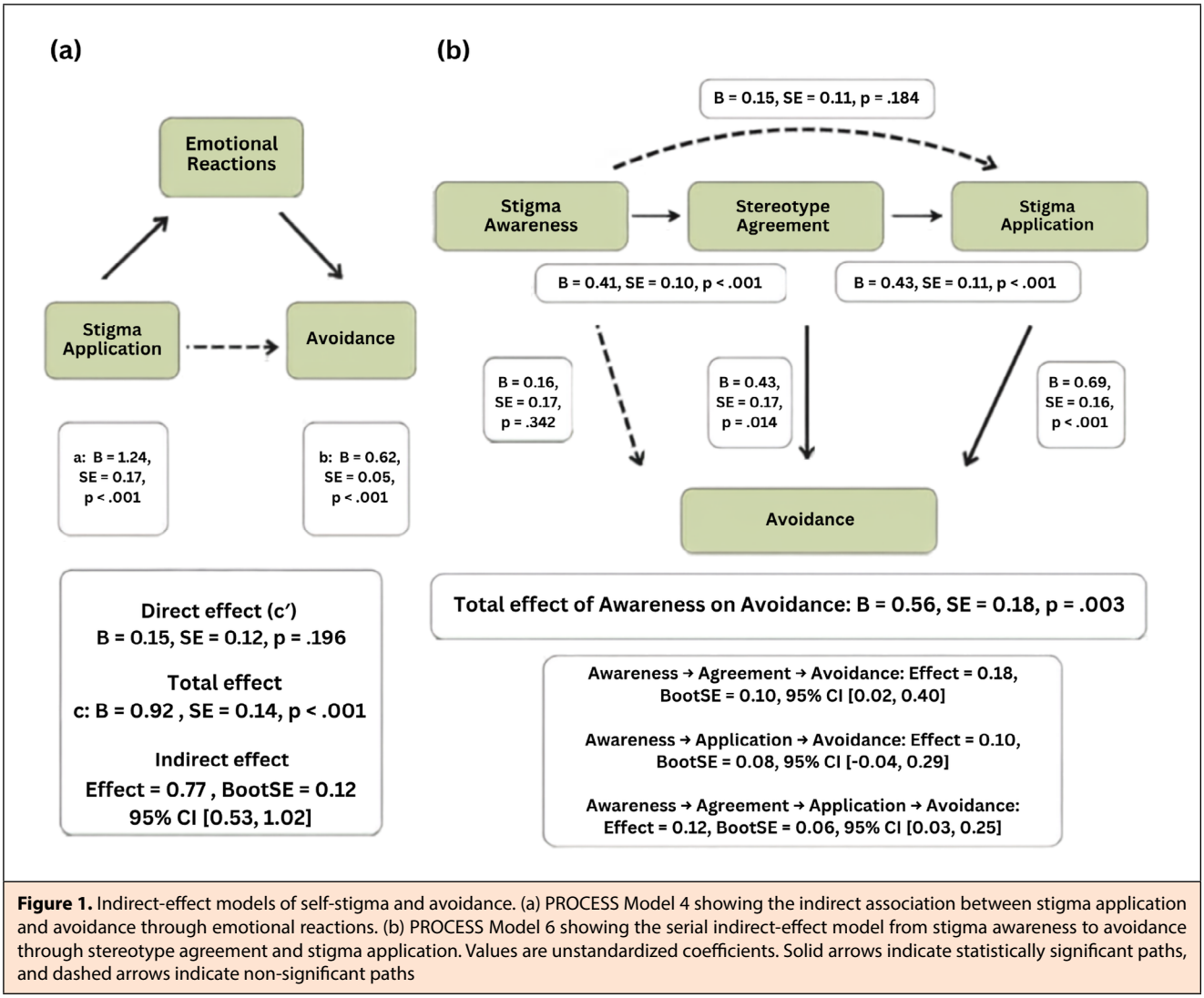

Figure 1. Indirect-effect models of self-stigma and avoidance. (a) PROCESS Model 4 showing the indirect association between stigma application and avoidance through emotional reactions. (b) PROCESS Model 6 showing the serial indirect-effect model from stigma awareness to avoidance through stereotype agreement and stigma application. Values are unstandardized coefficients. Solid arrows indicate statistically significant paths, and dashed arrows indicate non-significant paths

Serial Indirect-Effect Analysis

In PROCESS Model 6, awareness was positively associated with agreement (B = 0.41, SE = 0.10, p < .001), and agreement was positively associated with application after accounting for awareness (B = 0.43, SE = 0.11, p < .001). In the final avoidance model, agreement and application were significant while awareness was not. The total indirect effect of awareness on avoidance was significant (Effect = 0.40, BootSE = 0.14, 95% CI [0.15, 0.71]). The specific indirect effect through agreement alone was significant (Effect = 0.18, BootSE = 0.10, 95% CI [0.02, 0.40]), whereas the indirect effect through application alone was not. Importantly, the serial indirect effect through agreement and application was significant (Effect = 0.12, BootSE = 0.06, 95% CI [0.03, 0.25]). The two indirect-effect models are summarized in Fig. 1.

Discussion

The present findings indicate that the components of self-stigma are not equivalently associated with the multidimensional experience of stuttering. Stigma application showed the most consistent unique pattern: it was associated with emotional reactions, cognitive responses, avoidance, and perceived impact in the primary regressions, and all four associations remained significant after adjustment for age, sex, educational level, and therapy history. Awareness and agreement were more selective. Awareness retained an independent association with cognitive responses after adjustment, whereas agreement retained a unique association with avoidance. At the bivariate level, agreement was related to all WASSP-TR domains, but most of these associations were attenuated when awareness and application were considered simultaneously. This pattern supports

examining self-stigma at the component level rather than relying only on a total score and is broadly consistent with theoretical accounts emphasizing the particular relevance of applying stigmatizing beliefs to oneself (10,11). It also extends previous evidence linking self-stigma with poorer psychosocial outcomes and communication-related difficulties in adults who stutter (8,11,12).

The serial indirect-effect analysis offered partial statistical support for the sequence proposed by the self-stigma framework. Awareness was associated with agreement, agreement was associated with application, and the serial indirect association from awareness to avoidance through agreement and application was significant. Nevertheless, these findings cannot demonstrate that individuals progress temporally from awareness to agreement and then application. The study was cross-sectional, and the Agreement subscale showed low internal consistency (α = .417), which limits measurement precision and may attenuate or destabilize associations involving this component. The results are therefore best viewed as statistically consistent with, rather than confirmatory of, the proposed sequence (10,20). Replication with more reliable measurement of stereotype agreement and longitudinal data is needed before stronger conclusions about ordering can be drawn.

A second indirect-effect analysis identified a significant statistical association between stigma application and avoidance through emotional reactions. This finding initially appears consistent with the possibility that internalized stigma and emotional responses are closely connected to communication avoidance. However, the degree of overlap between the mediator and outcome requires caution. Emotional reactions and avoidance were strongly correlated at the observed level (r = .835), and CFA did not clearly favor separation of the corresponding WASSP-TR subscales; their latent correlation was .962. Both were also assessed using the same self-report instrument at the same time point, making common method variance a plausible contributor. Consequently, the indirect effect should not be interpreted as evidence that emotional reactions constitute a distinct causal mechanism between stigma application and avoidance. Rather, it documents a statistical pattern among constructs that are conceptually distinguishable but empirically highly overlapping in this dataset.

Clinically, the consistency of stigma application across outcomes supports assessing internalized self-stigmatizing beliefs when working with adults who stutter. Cognitive-behavioral approaches may be particularly compatible with this pattern because they can directly address maladaptive beliefs using cognitive restructuring, exposure, and behavioral experiments (21,22). Acceptance-based approaches may also be clinically relevant, but they target a different process: changing the individual's relationship to difficult thoughts and emotional experiences rather than directly modifying their content (23). Qualitative work likewise emphasizes the importance of emotional and identity-related experiences in everyday life with stuttering (7). These implications should remain provisional, however, because the present observational data do not test treatment effects and cannot establish the superiority of either therapeutic approach.

Several limitations affect interpretation and generalizability. First, the cross-sectional design precludes causal or temporal conclusions and permits alternative directional relationships. Avoidance may be associated with stronger emotional reactions, and emotional distress may also be related to greater internalization of stigma. Second, stuttering status was self-reported rather than independently verified; no objective measure of stuttering severity was obtained, and duration of stuttering was not collected. Thus, these clinical characteristics could not be examined as covariates, despite the broader literature indicating that observable severity and psychosocial impact are not necessarily equivalent (9). Third, voluntary recruitment through online and professional/stuttering-related networks creates potential selection bias. The sample was predominantly male (75.5%), broadly consistent with the male predominance reported in persistent stuttering (24), but the non-probability sampling strategy still limits representativeness. Fourth, the low internal consistency of the Agreement subscale in the present sample constrains the interpretation of analyses involving this construct, including the serial indirect-effect model. Reduced reliability may attenuate observed associations and decrease the precision and stability of the corresponding estimates. Fifth, the very high latent correlation between Feeling and Avoidance (r = .962), together with the similar fit of the one- and two-factor CFA models, indicates limited empirical separation of these constructs in the present sample. Accordingly, the Model 4 indirect effect should be interpreted descriptively rather than as evidence of a distinct mediational mechanism. Sixth, social support, resilience, and co-occurring psychological difficulties were not assessed and may represent additional factors relevant to

the associations examined here. Future research should use longitudinal designs, independent verification and objective characterization of stuttering, and measures that more clearly differentiate emotional reactions from avoidance. Larger samples would also permit more stable testing of the self-stigma sequence and potential demographic or clinical moderators. Such work could clarify whether component-level self-stigma patterns predict later psychosocial outcomes and whether changes in internalized stigma correspond to meaningful changes in participation and avoidance.

Conclusion

Stigma application was the self-stigma component most consistently associated with emotional, cognitive, avoidance, and perceived-impact dimensions of stuttering. The findings were also statistically consistent with aspects of the proposed self-stigma sequence. However, the cross-sectional design, low reliability of Agreement, and substantial overlap between emotional reactions and avoidance preclude temporal, causal, or distinct mechanistic interpretations. Longitudinal studies using stronger measurement differentiation are needed to clarify these relationships.

Declarations

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Conflicts of Interest / Competing Interests

ÇK and NT were co-authors of the Turkish adaptation of the 4S-TR, and HTU was a co-author of the Turkish adaptation of the WASSP-TR. These relationships are disclosed for transparency; the authors report no financial or other competing interests related to these instruments.

Ethics Approval

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Biruni University Scientific Research Ethics Committee on October 20, 2025 (Approval No: 2024-BİAEK/14-30). All participants provided electronic informed consent prior to participation.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are available from the corresponding author on request.

Authors' Contributions

ÇK: Conceptualization, methodology, data collection, formal analysis, writing – original draft, writing – review and editing.

HTU: Methodology, supervision, writing – review and editing.

NT: Data collection, writing – review and editing.

Use of Artificial Intelligence

OpenAI's ChatGPT was used solely for language editing and editorial assistance during manuscript revision. It was not used for data collection, statistical analysis, or generation of research data.

References

1. Tichenor SE and Yaruss JS. Stuttering as defined by adults who stutter. J Speech Lang Hear Res. 2019;62:4356-69. DOI:10.1044/2019_JSLHR-19-00137
2. Yairi E, Seery CH and Singer CM. Stuttering: foundations and clinical applications. 4th ed. San Diego, CA: Plural Publishing; 2025.
3. Iverach L and Rapee RM. Social anxiety disorder and stuttering: current status and future directions. J Fluency Disord. 2014;40:69-82. DOI:10.1016/j.jfludis.2013.08.003
4. Bricker-Katz G, Lincoln M and McCabe P. A life-time of stuttering: how emotional reactions to stuttering impact activities and participation in older people. Disabil Rehabil. 2009;31:1742-52. DOI:10.1080/09638280902738672
5. Connery A, McCurtin A and Robinson K. The lived experience of stuttering: a synthesis of qualitative studies with implications for rehabilitation. Disabil Rehabil. 2020;42:2232-42. DOI:10.1080/09638288.2018.1555623
6. Boyce JO, Jackson VE, van Reyk O, et al. Self-reported impact of developmental stuttering across the lifespan. Dev Med Child Neurol. 2022;64:1297-306. DOI:10.1111/dmcn.15211
7. Anderson C, Goldstein-Schuff C and Rodgers NH. Organizing life around stuttering: a qualitative examination of stuttering through the lens of complex trauma. Am J Speech Lang Pathol. 2026;35:600-20. DOI:10.1044/2025_AJSLP-25-00273
8. Boyle MP, Cheyne MR and Rosen AL. Self-stigma of stuttering: implications for communicative participation and mental health. J Speech Lang Hear Res. 2023;66:3328-45. DOI:10.1044/2023_JSLHR-23-00098
9. Boyle MP. Relationships between psychosocial factors and quality of life for adults who stutter. Am J Speech Lang Pathol. 2015;24:1-12. DOI:10.1044/2014_AJSLP-14-0089

10. Corrigan PW and Rao D. On the self-stigma of mental illness: stages, disclosure, and strategies for change. Can J Psychiatry. 2012;57:464-9. DOI:10.1177/070674371205700804
11. Boyle MP and Fearon AN. Self-stigma and its associations with stress, physical health, and health care satisfaction in adults who stutter. J Fluency Disord. 2018;56:112-21. DOI:10.1016/j.jfludis.2017.10.002
12. Boyle MP. Identifying correlates of self-stigma in adults who stutter: further establishing the construct validity of the Self-Stigma of Stuttering Scale (4S). J Fluency Disord. 2015;43:17-27. DOI:10.1016/j.jfludis.2014.12.002
13. Tiryaki N, Özdemir RS, Karsan Ç, et al. Turkish adaptation of the self-stigma of stuttering scale (4S): study of validity and reliability (4S-TR). J Fluency Disord. 2023;78:106020. DOI:10.1016/j.jfludis.2023.106020
14. Wright L and Ayre A. WASSP: Wright and Ayre stuttering self-rating profile. Brackley, UK: Speechmark Publishing; 1999.
15. Uysal HT and Köse A. The investigation of the validity and reliability of the Turkish version of the Wright and Ayre Stuttering Self-Rating Profile (WASSP). Int J Lang Commun Disord. 2021;56:653-61. DOI:10.1111/1460-6984.12621
16. Boyle MP. Assessment of stigma associated with stuttering: development and evaluation of the Self-Stigma of Stuttering Scale (4S). J Speech Lang Hear Res. 2013;56:1517-29. DOI:10.1044/1092-4388(2013/12-0280)
17. Faul F, Erdfelder E, Buchner A, et al. Statistical power analyses using G*Power 3.1: tests for correlation and regression analyses. Behav Res Methods. 2009;41:1149-60. DOI:10.3758/BRM.41.4.1149
18. Hayes AF. Introduction to mediation, moderation, and conditional process analysis: a regression-based approach. 3rd ed. New York, NY: The Guilford Press; 2022.
19. Gallucci M and Jentschke S. SEMLj: jamovi SEM analysis. Version 1.2.8. jamovi; 2025. Available from: https://semlj.github.io/
20. Boyle MP and Blood GW. Stigma and stuttering: conceptualizations, applications, and coping. In: St. Louis KO, ed. Stuttering meets stereotype, stigma, and discrimination: an overview of attitude research. Morgantown, WV: West Virginia University Press; 2015. p. 43-70.
21. Menzies RG, O'Brian S, Onslow M, et al. An experimental clinical trial of a cognitive-behavior therapy package for chronic stuttering. J Speech Lang Hear Res. 2008;51:1451-64. DOI:10.1044/1092-4388(2008/07-0070)
22. Menzies RG, Onslow M, Packman A, et al. Cognitive behavior therapy for adults who stutter: a tutorial for speech-language pathologists. J Fluency Disord. 2009;34:187-200. DOI:10.1016/j.jfludis.2009.09.002
23. Beilby JM, Byrnes ML and Yaruss JS. Acceptance and commitment therapy for adults who stutter: psychosocial adjustment and speech fluency. J Fluency Disord. 2012;37:289-99. DOI:10.1016/j.jfludis.2012.05.003
24. Ambrose NG, Cox NJ and Yairi E. The genetic basis of persistence and recovery in stuttering. J Speech Lang Hear Res. 1997;40:567-80. DOI:10.1044/jslhr.4003.567