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Symptom Severity, Distribution and Clinical Change in Young Adults at a Northern Italy University Counselling Service

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ABSTRACT

Objective: University students access counselling services with heterogeneous levels of distress and symptom presentations. This exploratory longitudinal study characterised students accessing university counselling services and examined baseline correlates of short-term symptom change, with particular attention to whether symptom distribution contributed information beyond global symptom severity.

Method: $N = 357$ students (65% female; mean age = 22.28) completed the Symptom Checklist-90-Revised (SCL-90-R) before and after a four-session counselling cycle. Short-term change was defined as post-counselling minus baseline log-transformed Global Severity Index (GSI). Multiple linear regression models examined baseline correlates of change. Because symptom distribution was strongly related to global severity, the primary distribution index was a severity-adjusted residualised distribution. Sensitivity analyses tested alternative symptom-distribution thresholds.

Results: Students showed substantial pre-post reductions in global distress. Higher baseline GSI was associated with greater symptom reduction, whereas broader-than-expected symptom distribution was associated with less favourable change after accounting for baseline severity and contextual predictors. This residualised distribution effect was modest but statistically significant and was most evident when symptom distribution was defined using mild-to-moderate raw-score thresholds. Among students starting above the clinical GSI threshold of 1, broader-than-expected symptom distribution was also associated with a lower probability of crossing below this threshold at post-counselling.

Conclusion: Findings suggest that baseline symptom intensity and symptom distribution provide partly distinct information about short-term response profiles. Greater initial intensity was associated with larger reductions, whereas more diffuse symptom distribution was associated with less favourable change, supporting multidimensional screening.

Trial Registration: This naturalistic longitudinal study was not registered as a clinical trial

1 | Introduction

Emerging adulthood in Western cultures, a distinct developmental stage typically spanning late teens through the mid-twenties,

is characterised by identity exploration, emotional and geographical instability and a sense of being 'in between' adolescence and adult roles (Arnett et al. 2014; Arnett 2000). While conceptually overlapping with young adulthood (Erikson 1968), it captures the

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Implications

Implications for Practice

- University counselling services may benefit from multidimensional screening that considers both global symptom intensity and the distribution of symptoms across domains.
- Symptom distribution should not be interpreted as a raw count alone, because it is strongly related to global severity. Instead, a broader-than-expected distribution for a given level of GSI may help identify students whose short-term symptom reduction is less favourable.
- Among students beginning above the clinical GSI threshold, broader-than-expected symptom distribution may indicate a lower likelihood of crossing below that threshold after a brief counselling cycle, supporting closer monitoring and more explicit review of treatment planning.

Implications for Policy

- Higher education institutions should support routine outcome monitoring in counselling services, including standardised baseline and post-counselling symptom assessment. Such monitoring can help services evaluate short-term change, identify students who remain above clinically relevant thresholds and refine referral procedures using both severity and symptom-distribution information.

psychosocial dynamics of delayed role assumption (Montgomery and Arnett 2015). For instance, the internal drive for identity refinement, external exploration and autonomy may clash with societal expectations to achieve stability, financial independence, higher education and professional success (Côté 2006). As such, young adulthood is increasingly recognised as a period of multi-level changes involving identity consolidation, personality development, interpersonal relationships, social roles and career-related decisions (Seiffge-Krenke and Luyckx 2014), as well as phase-specific social development conflicts and, possibly, psychopathology (Humphrey and Bliuc 2021; Nelson and Barry 2005). These developmental transitions may therefore contribute to heterogeneous forms of psychological distress rather than to a single dominant clinical presentation (Greger et al. 2026; Kessler et al. 2005).

Focusing on university students, evidence has accumulated regarding psychological distress and students' mental health (Sharp and Theiler 2018). Both clinical dimensions and specific developmental risk factors emerged, especially with respect to depressive aspects impacting adulthood transition (Sheldon et al. 2021). Increasing university-specific trends in mental health issues following the COVID-19 pandemic in the areas of anxiety, depression and somatic symptoms also emerged in relation to distress generated by disruptions to academic routines, social isolation and future uncertainty (Nails et al. 2023; Zhai and Du 2020; Van de Velde et al. 2021).

In the Italian context, similar elevations in distress have been documented among students accessing university counselling

services, often compounded by cultural factors such as stigma and family expectations, which may delay help-seeking and amplify distress during transitions to independence (Cerutti et al. 2022).

Elevated psychopathological levels have important implications for academic functioning (Rückert 2015), and the demand for psychological support from university students has increased (Holm-Hadulla and Koutsoukou-Argyraki 2015). As a result, university centres have developed counselling services to promote student well-being and reduce mental health issues. Research on university counselling services has shown that students frequently present with elevated distress, anxiety, depressive symptoms, interpersonal difficulties and academic-related concerns, and that brief counselling is often associated with pre-post symptom reductions in naturalistic service evaluations (Greco et al. 2025; Caldarelli et al. 2024; Pizzo et al. 2025; Bani et al. 2022). At the same time, outcomes are heterogeneous, and studies have highlighted the importance of baseline severity, presenting problem, engagement, dropout and service context when interpreting change. Therefore, the clinically relevant question is not only whether symptoms decrease on average, but which baseline profiles are associated with more or less favourable short-term change (Broglia et al. 2023; Speranza et al. 2023; Murray et al. 2016; McKenzie et al. 2015).

In the European context, the most widespread models include brief psychodynamic and cognitive-behavioural approaches (Rückert 2015), with evidence from controlled and naturalistic studies indicating reductions in anxiety, psychological distress and improvements in well-being following these interventions (Collins et al. 2025; Monti et al. 2014; Biasi et al. 2017). University counselling services typically offer brief, standardised interventions aimed at restoring academic functioning and alleviating distress related to university challenges. However, students access these services with diverse motivations and clinical profiles, which may require tailored responses. Variations in global symptom intensity, symptom distribution across domains, comorbidity-like presentations and functional impairment may all be relevant for understanding short-term change. Importantly, however, symptom distribution must be interpreted carefully because students with symptoms spread across many domains also tend to show higher global distress. Therefore, there is a need to better understand the factors driving clinical change, as well as to develop more precise, clinically meaningful phenotyping of groups that may exhibit different response trajectories. A number of randomised controlled trials (RCTs) showed significant pre-post changes, especially for anxiety, depression and academic functioning (Collins et al. 2025). Moreover, studies with waitlist control groups reported no significant longitudinal changes in control participants (Zuo and Zhang 2023), and other studies linked symptom reduction to academic recovery that was not observed in the control group (Biasi et al. 2017). Although several studies have examined outcomes and associated factors in university counselling, further work is needed to clarify how baseline severity and multidimensional symptom presentation jointly relate to short-term change in real-world services. Some research has pointed to dropout as a possible variable associated with worse response (Connell et al. 2008). Young people often face perceived barriers such as stigma, a preference for self-reliance, low mental health literacy and concerns about confidentiality or treatment effectiveness (Gulliver et al. 2010). Other studies have indicated that students

with higher symptom severity at baseline may show steeper decreases in intensity at follow-up (Cerutti et al. 2022). A specific challenge concerns the interpretation of symptom distribution relative to global symptom severity: students with higher intensity are expected to exceed thresholds on more domains. For this reason, raw symptom distribution may partly reflect general distress rather than a distinct clinical feature. Therefore, a more informative approach requires examining whether students have more or fewer elevated domains than expected for their level of global severity. This severity-adjusted residual component can be interpreted as broader-than-expected or narrower-than-expected symptom distribution, consistently with dimensional and transdiagnostic approaches emphasising how clinical presentations often cut across diagnostic categories and vary along both general and more specific symptom dimensions. From this perspective, symptom distribution does not imply the presence of distinct disorders, but describes how widely distress is expressed across domains, consistently with the clinical distinction between symptom severity and case complexity (Shah et al. 2020; Smith et al. 2020). This distinction is clinically relevant because symptom intensity and symptom distribution may have different associations with short-term response. Higher baseline severity may be associated with larger reductions, reflecting greater room for improvement, acute distress reduction or regression-to-the-mean processes. Conversely, broader-than-expected distribution at comparable severity may indicate a more diffuse clinical presentation that is less likely to resolve rapidly within a brief counselling cycle. Testing these two dimensions simultaneously allows the study to examine whether symptom distribution contributes information beyond baseline intensity.

The aim of this exploratory study was to examine clinical presentation and short-term symptom change in a naturalistic sample of university students accessing a counselling service in the Italian context. Guided by frameworks emphasising the multi-level person-context interplay in emerging adulthood (Halfon and Forrest 2018; Lerner and Overton 2008), we integrated demographic information, subjective motivation for referral and standardised symptom measures. Specifically, we aimed to: (1) describe baseline demographic, contextual and clinical characteristics of students accessing the service; (2) quantify pre-post change in global distress over the four-session counselling cycle; (3) examine whether baseline contextual variables and global symptom severity were associated with individual change; and (4) test whether severity-adjusted symptom distribution explained additional variation in change and in the probability of crossing below the clinical GSI threshold among students who began above it.

2 | Methods

2.1 | Sample and Procedure

Anonymous longitudinal data were drawn from a naturalistic convenience sample of 357 university students ($M = 22.28$ years, $SD = 2.40$, range = 18–30; 65% female) who accessed the psychological counselling service at the University of Trento, in northern Italy, and had complete SCL-90-R assessments at both intake and post-counselling. Sample demographics are reported

in Table 1. Students independently contacted the counselling service through the dedicated web page by completing an online form with basic information including biological sex, age, geographic origin, living with parents, subjective motivation for referral, type of university course and department. Access to the service is free and available to all students enrolled in any university programme, including bachelor's, master's, PhD and individual courses across all departments. The University Psychological Counselling Service offers a cycle of four sessions, scheduled every 2 weeks. These meetings are intended to clarify the student's primary concern, explore underlying psychological dynamics, activate personal resources and provide a meaningful framework for understanding the present moment and possible directions for change. In the final session, the clinician also discusses tailored recommendations and possible next steps. Detailed information about the psychological service offered is provided in the [Supporting Information](#). Symptom severity was assessed using the Symptom Checklist-90-Revised (SCL-90-R) (Derogatis 1992; see Measures in the [Supporting Information](#)), administered at intake and at the end of the four-session counselling cycle. Participants provided informed consent for the use of anonymised data. The research protocol was approved by the University Ethics Board (Prot. 2025-021) and was conducted in accordance with the Declaration of Helsinki (World Medical Association 2025).

2.2 | Statistical Analysis

We adopted a multi-step analytical strategy to characterise the sample, describe symptom associations and examine baseline correlates of short-term symptom change. Descriptive analyses summarised demographic, contextual and clinical variables. Group differences in categorical variables were assessed using chi-squared tests or Fisher/permutation-based tests when assumptions were not met. Continuous clinical variables were compared across groups using ANOVA or Kruskal–Wallis tests depending on distributional assumptions, with Bonferroni-corrected post hoc comparisons where appropriate. For two-group comparisons, independent-samples *t*-tests or Wilcoxon rank-sum tests were applied. To enhance clinical interpretability, we derived indices of symptom distribution across SCL-90-R domains. Raw symptom distribution was defined as the number of SCL-90-R clinical subscales exceeding a specified threshold at baseline. Because this count is expected to overlap strongly with global severity, it was not used as the primary predictor in its raw form. Instead, the primary distribution index was residualised symptom distribution: the residual from a linear model predicting the number of elevated baseline domains from baseline log-transformed GSI. Positive residuals indicate more elevated domains than expected for a student's global severity, whereas negative residuals indicate fewer elevated domains than expected. The primary threshold was a raw subscale score > 1 , with sensitivity analyses using raw thresholds > 0.6 , > 0.8 , > 1.2 , > 1.4 and the SCL-90-R reference threshold $T > 63$ (Derogatis 1992; Haraldsen and Dahl 2000; Paap et al. 2012). Given known concerns regarding the dimensional stability of SCL-90-R subscales, these domains were treated as pragmatic symptom dimensions rather than independent diagnostic categories. Accordingly, the distribution index was interpreted as a descriptive marker of how widely distress was expressed

TABLE 1 | Sample baseline variables.

N= 357	Level	Frequency	Percent
Biological sex	Female	232	65.0%
	Male	125	35.0%
Age range	18–21	145	40.6%
	22–25	174	48.7%
	> 25	38	10.6%
Geographic origin	Local region	65	18.2%
	North Italy	174	48.7%
	Centre-south Italy	78	21.8%
	Abroad	40	11.2%
Out-of-town	Yes	292	81.8%
	No	65	18.2%
Department	Law	78	21.8%
	Engineering	64	17.9%
	Sociology and International Studies	47	13.2%
	Humanities and Philosophy	38	10.6%
	Economics	37	10.4%
	Psychology and Cognitive Science	33	9.2%
	Maths/Physics	31	8.7%
	Biology	29	8.1%
	Study	103	28.9%
	Anxiety	99	27.7%
Initial motivation	Interpersonal	62	17.4%
	Eating/Sleep/Not-indicated	51	14.3%
	Depression	42	11.8%
	Depression (DEP)	113	31.7%
	Obsessive-compulsive (OC)	103	28.9%
	Interpersonal sensitivity (IS)	41	11.5%
	Anxiety (ANX)	30	8.4%
	Other (OTHER)	23	6.4%
	Paranoid ideation (PAR)	19	5.3%
	Hostility (HOS)	12	3.4%
Top Symptom	Somatisation (SOM)	8	2.2%
	Phobic anxiety (PHOB)	5	1.4%
	Psychoticism (PSY)	3	0.8%
	External referral	264	73.9%
	Yes	93	26.1%

across the instrument, not as a count of distinct disorders. Spearman correlations between baseline SCL-90-R subscales were computed with Bonferroni correction for multiple testing. Hierarchical clustering with silhouette optimisation was used descriptively to summarise the baseline structure of symptom co-occurrence. The primary outcome was short-term change in global distress, defined as post-counselling minus baseline log-transformed GSI. Negative values, therefore, indicated symptom reduction, whereas values closer to zero or positive values indicated less favourable change. To aid interpretation, equivalent results were also summarised on an improvement scale, defined as baseline minus post-counselling log-transformed GSI, where positive values indicate greater symptom reduction. Multiple linear regression models were used to examine baseline correlates of change. The modelling sequence was specified to separate contextual correlates, baseline severity and severity-adjusted symptom distribution. First, a contextual model included geographic origin and initial motivation for referral, which were retained as the compact adjustment set because they were clinically relevant and showed the strongest associations with baseline presentation and/or change. A larger demographic/service block including biological sex, age, out-of-town status, department and clinician expertise was evaluated as a parsimony check but was not retained if it did not improve explained variance. Second, baseline log-GSI was added to account for initial symptom intensity and differential room for improvement. Third, residualised symptom distribution was added to test whether broader-than-expected distribution explained additional variation in change beyond contextual predictors and baseline severity. Model performance was summarised using R^2 , adjusted R^2 , nested model comparisons, incremental R^2 and Cohen's f^2 for incremental predictor effects. Continuous predictors and the change outcome were standardised, allowing coefficients to be compared across baseline severity and residualised symptom distribution. The primary interpretation focused on the direction and magnitude of standardised coefficients, confidence intervals and incremental explained variance. Predictor retention followed three criteria. First, baseline severity and residualised symptom distribution were retained a priori because they represented the central clinical contrast of the study. Second, contextual variables were retained when they were clinically interpretable, showed evidence of association with baseline presentation or change and contributed to a parsimonious adjustment set. Third, additional demographic or service variables were not retained in the main model when they produced minimal incremental explained variance, non-significant block improvement or increased model complexity without improving interpretability. Robustness analyses addressed the dependence of symptom distribution on the selected threshold and residualisation method. First, residualised symptom distribution was recomputed using a quasibinomial model for the bounded count of elevated domains, and the primary regression model was repeated. Second, threshold sensitivity analyses repeated the residualisation and change model across alternative raw-score and T-score definitions of elevated domains. These analyses tested whether the association between symptom distribution and change was specific to mild-to-moderate elevations or generalised to stricter clinical-threshold definitions. Finally, to provide a clinically interpretable endpoint, we examined students who began above the clinical GSI threshold of 1. Among this subgroup, logistic regression tested whether baseline severity

TABLE 2 | Clinical scores pre- and post-intervention.

Variable	Pre				Post			
	Mean	SD	Q1	Q3	Mean	SD	Q1	Q3
Global Severity Index (GSI)	1.15	0.54	0.76	1.49	0.72	0.49	0.36	1.01
Positive Symptom Total (PST)	49.03	15.93	38	61	38.23	18.19	25	52
Positive Symptom Distress Index (PSDI)	2.04	0.47	1.7	2.35	1.56	0.45	1.23	1.84
Anxiety	1.22	0.76	0.6	1.7	0.75	0.65	0.3	1
Depression	1.72	0.78	1.08	2.23	1.04	0.7	0.46	1.46
Hostility	0.7	0.59	0.33	1	0.47	0.5	0.17	0.67
Interpersonal sensitivity	1.3	0.78	0.67	1.78	0.83	0.66	0.33	1.22
Obsessive-compulsive	1.64	0.79	1	2.2	1.09	0.71	0.5	1.5
Other	1.27	0.7	0.71	1.71	0.84	0.6	0.43	1.14
Paranoid ideation	1.01	0.78	0.33	1.5	0.71	0.64	0.17	1.17
Phobic anxiety	0.55	0.59	0.14	0.86	0.34	0.44	0	0.43
Psychoticism	0.84	0.56	0.4	1.2	0.48	0.47	0.1	0.7
Somatisation	0.8	0.66	0.25	1.17	0.46	0.51	0.08	0.67

Note: SCL-90-R global indices and subscales at pre- and post-intervention (mean, standard deviation and interquartile range).

and residualised symptom distribution were associated with favourable crossing below GSI=1 at post-counselling. This end-point was used to complement the continuous change model by identifying whether students moved from above to below a clinically meaningful global-distress threshold. A sensitivity power analysis was conducted for the planned incremental regression test. With $N=357$, $\alpha=0.05$, one tested predictor, and a maximum of seven predictor parameters in the full model, the analysis indicated 80% power to detect a small incremental effect of approximately Cohen's $f^2=0.022$. Data analysis was conducted using R (version 4.5.0) with packages for regression modelling, diagnostic checking, bootstrapping and visualisation.

3 | Results

Sample demographics, contextual and clinical variables are summarised in Tables 1 and 2.

3.1 | Biological Sex and Age

Overall, the proportion of female students accessing the psychological service was significantly higher than expected assuming equal referral rates across sexes ($p<0.001$). Based on baseline sex distribution across departments, significantly more female referrals in the Engineering department were found ($p=0.01$). In other departments, referral distributions did not differ significantly.

Clinically, no significant differences were found between males and females for GSI, PST or Positive Symptom Distress Index (PSDI), either pre- or post-intervention. Regarding SCL-90-R subscales before intervention, only the Somatisation scale showed a significant difference, with females reporting higher

somatic symptom intensity ($W=11,852$; $p=0.004$). All other symptom dimensions were comparable between sexes at pre-intervention. The same pattern persisted following the intervention. Furthermore, no sex-related effects emerged after p -value correction concerning the most prominent symptomatic area or the number of clinically relevant subscales. When considering age groups (18–21; 22–25; > 25), no differences were observed in GSI, PST or PSDI at either time point, as well as clinical subdimensions and any other variables considered in this study.

3.2 | Department

By department, no significant differences emerged in GSI, PST or PSDI. Subscale totals also did not differ significantly, indicating similar symptom intensity across departments. A chi-squared test showed a significant difference in most elevated symptom dimensions ($X^2=86.71$; $p=0.03$). A significantly higher proportion of students in Humanities and Philosophy identified anxiety as their main clinical issue than expected ($p<0.001$). No differences between departments emerged when considering the number of clinically significant subdimensions.

3.3 | Geographic Origin

Regarding students' origin, all the SCL-90-R indices showed significant differences: GSI (KW $X^2=22.01$; $p<0.001$), PST ($F=5.475$; $p=0.001$) and PSDI (KW $X^2=25.16$; $p<0.001$). Individuals from the north of Italy consistently showed significantly lower GSI ($Z=3.85$; $p<0.001$), PST ($Z=2.94$; $p=0.003$) and PSDI ($Z=4.30$; $p<0.001$) compared to those from abroad. This pattern was also observed when comparing foreign students with those coming from the region where the university is located ($Z=3.51$; $p<0.001$). For GSI ($Z=2.96$; $p=0.003$) and

PSDI ($Z = 2.92$; $p = 0.003$), a similar trend emerged when comparing students from the centre-south of Italy to those from the north, while students from the centre-south also scored significantly higher than those from the university region on the PSDI ($Z = 2.73$; $p = 0.006$). When considering clinical sub-dimensions, significant differences based on geographic origin emerged in the subscales of obsessive-compulsive (KW $X^2 = 15.24$; $p = 0.001$), phobic anxiety (KW $X^2 = 13.91$; $p = 0.003$), psychoticism (KW $X^2 = 21.10$; $p < 0.001$), paranoid ideation (KW $X^2 = 17.33$; $p < 0.001$), depression (KW $X^2 = 21.73$; $p < 0.001$) and interpersonal sensitivity (KW $X^2 = 19.33$; $p < 0.001$). Pairwise comparisons between geographic origin and SCL-90-R subscales can be found in the [Supporting Information](#).

When considering the most relevant symptom dimensions, no differences based on geographic origin emerged. However, a significant difference was found in symptom breadth (KW $X^2 = 20.94$; $p < 0.001$). Students from the centre-south ($Z = 3.16$; $p = 0.002$) and from abroad ($Z = 3.66$; $p < 0.001$) reported a significantly higher number of clinically relevant subscales compared to students from the north. This comparison also held for students from abroad compared to those from the university region ($Z = 3.15$; $p = 0.002$).

3.4 | Initial Motivation for Referral

Kruskal-Wallis test revealed significant motivation-based differences for the three SCL-90-R indices: GSI (KW $X^2 = 20.63$; $p < 0.001$), PST (KW $X^2 = 18.67$; $p < 0.001$) and PSDI (KW $X^2 = 14.06$; $p = 0.007$). For GSI, students reporting anxiety as the main motivation scored significantly higher than those citing more general motivations related to sleep, eating behaviour or those who did not specify a motivation ($Z = -3.22$; $p = 0.001$). This was also true for students citing depression-related motivations including suicidal thoughts ($Z = -4.22$; $p < 0.001$), who also scored significantly higher than those indicating interpersonal motivations ($Z = 2.92$; $p = 0.003$). PST showed similar patterns: students reporting anxiety ($Z = -3.30$; $p < 0.001$) and depression ($Z = -4.01$; $p < 0.001$) scored significantly higher than those with sleep/eating/other/no-answer motivations. For PSDI, this pattern held only for students reporting depression-related motivations, who scored significantly higher than those with sleep/eating/other/no-answer ($Z = -3.41$; $p < 0.001$) and interpersonal ($Z = 2.96$; $p = 0.003$) motivations. When analysing SCL-90-R symptom subscales, significant motivation-based differences emerged for anxiety (KW $X^2 = 30.13$; $p < 0.001$), obsessive-compulsive (KW $X^2 = 26.72$; $p < 0.001$), phobic anxiety (KW $X^2 = 18.04$; $p = 0.001$), psychoticism (KW $X^2 = 16.14$; $p = 0.003$), depression (KW $X^2 = 30.24$; $p < 0.001$) and somatisation (KW $X^2 = 24.54$; $p < 0.001$). Pairwise comparisons between initial motivation and SCL-90-R subscales can be found in the [Supporting Information](#).

Concerning the most elevated clinical dimension, significant distribution differences emerged based on initial motivation; however, no pairwise associations reached significance after Bonferroni correction in Fisher's tests. Regarding the number of clinically relevant subscales, significant differences also emerged based on initial motivation (KW $X^2 = 17.42$; $p = 0.002$). Specifically, students citing anxiety ($Z = -3.42$; $p < 0.001$) and

depression ($Z = -3.73$; $p < 0.001$) scored significantly higher than those citing sleep/eating/other/no-answer motivations.

Overall, these descriptive analyses indicated that geographic origin and initial motivation were the contextual variables most consistently related to baseline severity and raw symptom distribution. These variables were therefore retained as the compact contextual adjustment set in the response-profile models.

3.5 | Correlation Analysis and Symptom Profiles

At baseline, correlation analysis revealed several significant positive associations between symptom dimensions. The strongest correlations ($r > 0.70$) included the obsessive-compulsive dimension, which showed a significant correlation with depression ($r = 0.77$; $p < 0.001$). Interpersonal sensitivity was correlated with paranoid ideation ($r = 0.72$; $p < 0.001$) and psychoticism ($r = 0.70$; $p < 0.001$). Depression also correlated with the 'other' dimension ($r = 0.71$; $p < 0.001$).

Post-intervention, broader patterns of association emerged. The obsessive-compulsive dimension correlated strongly with depression ($r = 0.85$; $p < 0.001$) and anxiety ($r = 0.75$; $p < 0.001$). Interpersonal sensitivity correlated with depression ($r = 0.77$; $p < 0.001$), paranoid ideation ($r = 0.75$; $p < 0.001$) and psychoticism ($r = 0.72$; $p < 0.001$). Moreover, depression correlated with anxiety ($r = 0.81$; $p < 0.001$), psychoticism ($r = 0.75$; $p < 0.001$) and the 'other' dimension ($r = 0.73$; $p < 0.001$).

Hierarchical cluster analysis with silhouette-based cluster-number optimisation consistently identified two clusters both pre- and post-intervention. The first cluster grouped interpersonal sensitivity, hostility, paranoid ideation and psychoticism. The second cluster included somatisation, obsessive-compulsive, depression, anxiety, phobic anxiety and the 'other' symptom dimension (see Figure 1).

3.6 | Baseline Severity, Symptom Distribution and Clinical Change

Students showed a substantial reduction in global distress from intake to post-counselling. Mean GSI decreased from 1.15 (SD = 0.54) to 0.72 (SD = 0.49), corresponding to a mean raw change of -0.43 . The paired pre-post difference was significant, $t(356) = -16.32$, $p < 0.001$, with a large within-person standardised effect (Cohen's $d_z = -0.86$). On the log-transformed scale, change was defined as post-counselling log-GSI minus baseline log-GSI.

Before testing symptom distribution, we first examined the contextual adjustment set. Geographic origin and initial motivation were retained as compact contextual predictors because they were clinically interpretable and were the variables most consistently associated with baseline presentation in the descriptive analyses. This contextual model explained 6.2% of the variance in change ($R^2 = 0.062$). Adding the larger demographic and service block, including biological sex, age, living situation, department and clinician expertise, non-significantly increased explained variance ($\Delta R^2 = 0.029$,

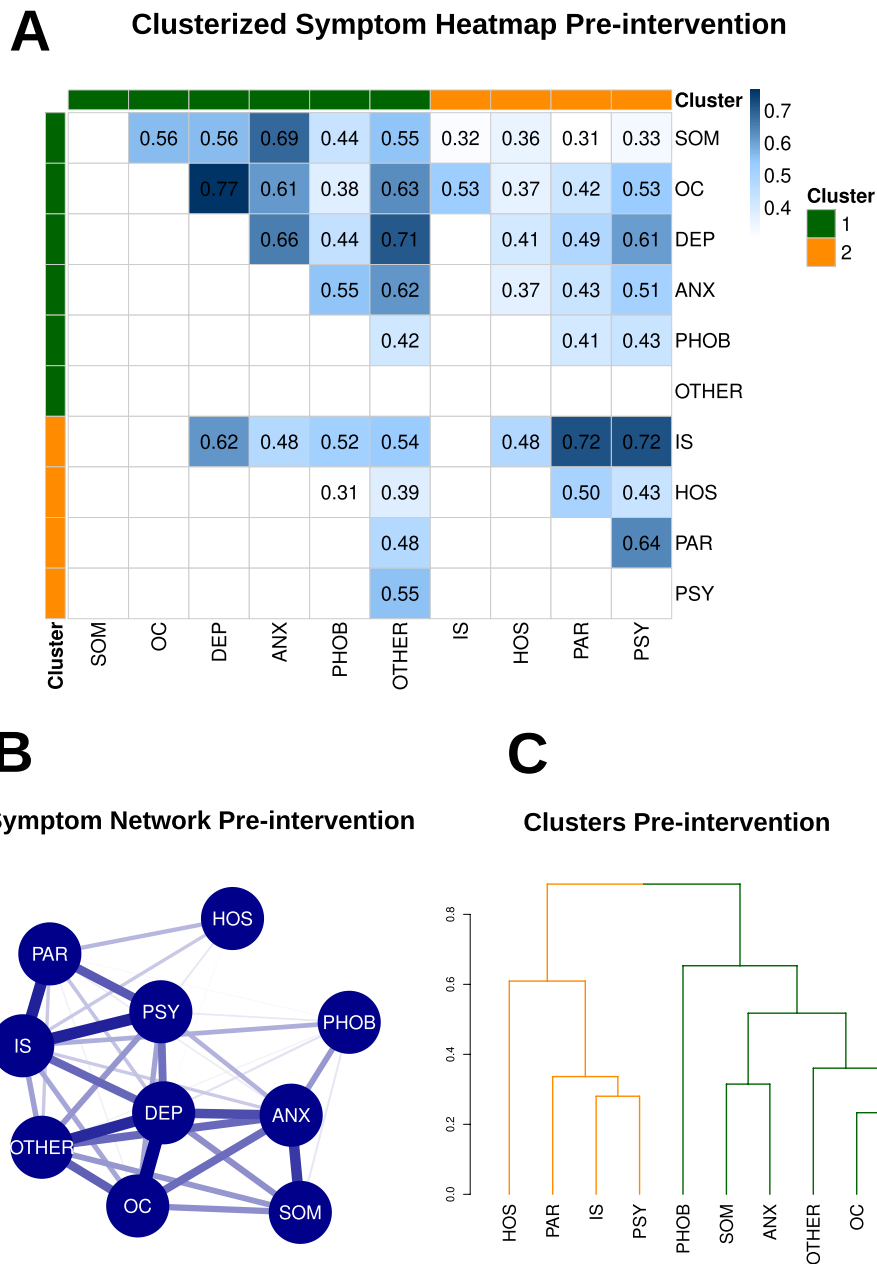


FIGURE 1 | Baseline associations among SCL-90-R symptom domains. (A) Heatmap of Bonferroni-corrected correlations between SCL-90 symptom dimensions. (B) Symptom network. (C) Tree-based hierarchical clustering with silhouette-based optimisation ($k=2$). ANX, anxiety subscale; DEP, depression subscale; HOS, hostility subscale; IS, interpersonal sensitivity subscale; OC, obsessive-compulsive subscale; OTHER, other symptom subscale; PAR, paranoid ideation subscale; PHOB, phobic anxiety subscale; PSY, psychoticism subscale; SOM, somatisation subscale.

$p=0.467$). Therefore, the subsequent models retained geographic origin and initial motivation as the contextual adjustment set.

Raw symptom distribution was strongly associated with baseline global severity. Specifically, the number of elevated baseline SCL-90-R domains at the primary raw-score threshold was largely explained by baseline log-GSI ($R^2=0.880$). This confirmed that raw distribution could not be interpreted as independent of symptom intensity. Therefore, the main response-profile analyses used residualised symptom distribution, defined as the number of elevated domains observed beyond the number expected from baseline GSI.

The model sequence supported distinct contributions of baseline severity and residualised symptom distribution. Baseline severity alone explained 17.7% of the variance in change ($R^2=0.177$), whereas residualised symptom distribution alone explained 1.5% ($R^2=0.015$). When added to the contextual model, baseline severity increased explained variance from $R^2=0.062$ to $R^2=0.193$ ($\Delta R^2=0.130$, $f^2=0.161$, $p<0.001$). Residualised symptom distribution also improved the contextual model, although more modestly ($R^2=0.076$; $\Delta R^2=0.014$, $f^2=0.015$, $p=0.021$). In the final model including contextual predictors, baseline severity and residualised symptom distribution, explained variance increased to $R^2=0.207$. The addition of residualised symptom distribution

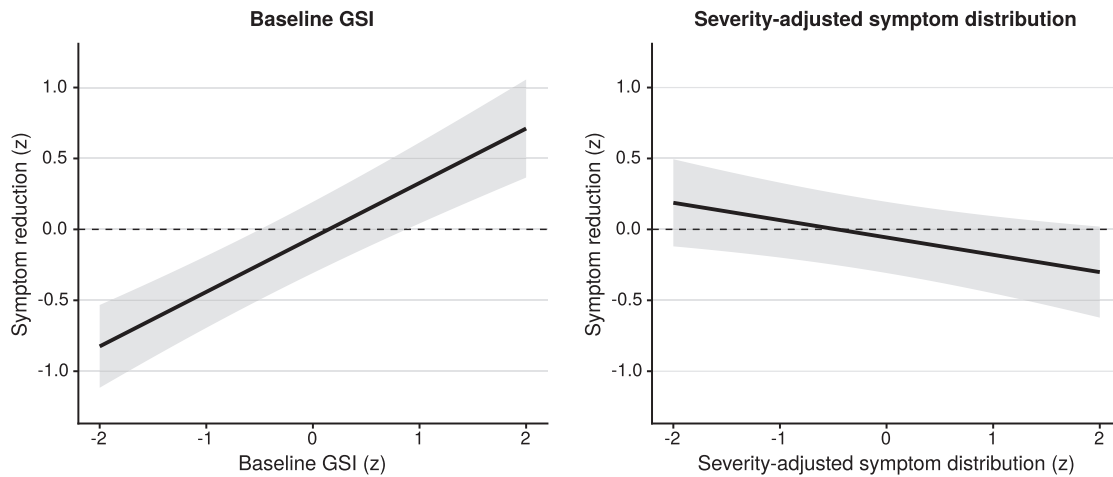


FIGURE 2 | Opposite associations of baseline severity and severity-adjusted symptom distribution with short-term symptom reduction. Higher baseline log-GSI was associated with greater improvement, whereas broader-than-expected symptom distribution was associated with less improvement after accounting for baseline severity and contextual predictors. Values are shown on the standardised improvement scale for visual interpretability.

beyond contextual predictors and baseline severity remained significant ($\Delta R^2 = 0.015$, $f^2 = 0.018$, $p = 0.012$). Standardised coefficients showed opposite associations for baseline symptom intensity and residualised symptom distribution. Higher baseline log-GSI was associated with greater symptom reduction ($\beta = -0.384$, 95% CI $[-0.483, -0.284]$, $p < 0.001$, on the post-minus-baseline change scale). In contrast, broader-than-expected symptom distribution was associated with less favourable change after accounting for severity and contextual predictors ($\beta = 0.122$, 95% CI $[0.027, 0.217]$, $p = 0.012$). The differential effects of symptom intensity and residualised distribution are illustrated in Figure 2.

The residualised-distribution result was retained when the bounded nature of the elevated-domain count was addressed using quasibinomial residualisation. In this robustness model, broader-than-expected symptom distribution remained associated with less favourable change ($\beta = 0.114$, 95% CI $[0.019, 0.208]$, $p = 0.018$), with a similar incremental contribution beyond contextual predictors and baseline severity ($\Delta R^2 = 0.013$, $f^2 = 0.016$).

Threshold sensitivity analyses clarified the clinical span of the effect. Residualised symptom distribution was associated with less favourable change when elevated domains were defined using mild-to-moderate raw-score thresholds: > 0.6 ($\beta = 0.118$, $p = 0.015$), > 0.8 ($\beta = 0.129$, $p = 0.008$) and > 1.0 ($\beta = 0.122$, $p = 0.012$). The association was not retained at stricter thresholds: > 1.2 ($\beta = 0.037$, $p = 0.448$), > 1.4 ($\beta = 0.066$, $p = 0.170$) or $T > 63$ ($\beta = -0.019$, $p = 0.701$). Thus, the distribution signal appeared to reflect diffuse mild-to-moderate symptom involvement rather than the accumulation of clearly clinical-range elevations.

To complement the continuous change model with a clinically interpretable endpoint, we examined students who began above the GSI threshold of 1. Among these students, favourable crossing was defined as moving below GSI = 1 at post-counselling. In

logistic regression, higher baseline severity was associated with a lower probability of favourable crossing ($OR = 0.32$, $p < 0.001$). Importantly, broader-than-expected symptom distribution was also associated with a lower probability of crossing below the threshold after accounting for baseline severity and contextual predictors ($OR = 0.61$, $p = 0.002$). Thus, among students starting above the clinical threshold, severity-adjusted symptom distribution provided information about whether global distress moved below the clinically relevant range. The probability curve of favourable crossing by residualised symptom distribution is illustrated in Figure 3.

4 | Discussion

University student well-being is increasingly recognised as relevant for academic functioning, mental health prevention and developmental support during emerging adulthood. This exploratory study characterised students accessing university counselling, described baseline symptom associations and examined baseline correlates of short-term symptom change. The central finding was that baseline symptom intensity and symptom distribution showed distinct and partly opposite associations with response profiles. Students with higher baseline GSI showed greater symptom reduction, whereas students whose symptoms were distributed across more domains than expected for their level of severity showed less favourable change. The sample was predominantly female, consistent with prior evidence that males are less likely to seek psychological help (Sheikh et al. 2025; Mackenzie et al. 2006). Notably, female overrepresentation was significant in engineering departments, which may reflect unique stressors in male-dominated fields (Richman et al. 2011). In contrast, other departments showed more balanced sex distributions. Clinically, males and females were similar, except for higher somatisation scores among females (Barsky et al. 2001; Haugland et al. 2001; Potrebny et al. 2017; Kroenke and Spitzer 1998; Delisle et al. 2012). Symptom profiles were

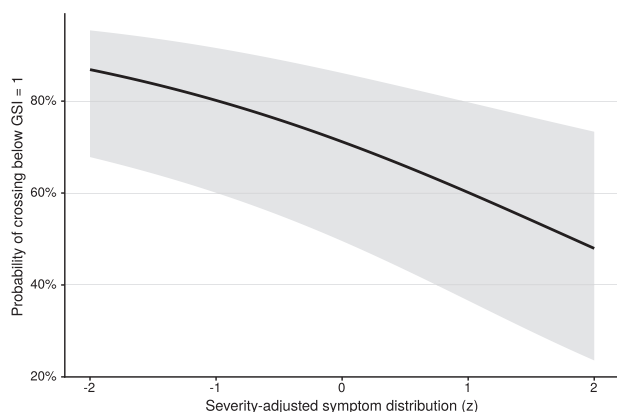


FIGURE 3 | Adjusted probability of crossing below GSI=1 by severity-adjusted symptom distribution. The figure shows predicted probabilities among students who began above GSI=1. Broader-than-expected symptom distribution was associated with a lower probability of moving below the threshold at post-counselling.

also consistent across departments, though students from humanities and philosophy more often reported anxiety as the primary symptom. Age was not associated with major differences in clinical presentation in this sample.

Geographic origin showed clearer associations. Symptom intensity and distress increased with distance from the university: local and northern Italian students reported lower symptoms, while those from the centre-south and abroad exhibited higher clinical severity and greater symptom breadth. Foreign students showed elevated obsessive-compulsive tendencies, phobic anxiety, psychoticism, interpersonal sensitivity and especially depression; centre-south students had higher psychoticism, paranoid ideation and interpersonal sensitivity. These patterns may reflect sociocultural, economic and adaptation-related stressors, including loneliness, reduced social support and challenges in cultural integration, although these mechanisms were not directly assessed (Hyun et al. 2007; Beiter et al. 2015; Ansari Lari et al. 2025; Prasath et al. 2022). Notably, the simpler variable 'living out of town' did not reveal differences, suggesting broader cultural and relational contexts, such as ease of returning home, are more relevant than mere relocation. In the Italian context, regional cultural distances and language barriers for international students may exacerbate these challenges. These findings suggest that geographic and cultural origin may be relevant contextual variables to consider during assessment and support.

Concerning initial motivation for referral, students reporting anxiety- or depression-related motivations scored significantly higher in general symptom intensity, variety and distress than those with more general motivations (e.g., sleep, eating) or no specific motivation. Depression-related motivations were associated with the highest burden, including greater comorbidity. These students also presented elevated scores across multiple dimensions (depression, anxiety, obsessive-compulsive symptoms, somatisation, phobic anxiety, psychoticism), suggesting that students' stated reasons for referral were broadly consistent with standardised symptom patterns, while also indicating

that anxiety- and depression-related motivations often occurred within broader distress profiles.

Correlation analysis revealed strong positive associations among symptom dimensions both at baseline and post-intervention, highlighting their interconnected nature. Hierarchical clustering consistently identified two clusters: one grouping interpersonal sensitivity, hostility, paranoid ideation and psychoticism (reflecting interpersonal distress and possible psychotic vulnerability); the other including somatisation, obsessive-compulsive symptoms, depression, anxiety, phobic anxiety and other symptoms (aligned with internalising psychopathology and affective dysregulation). Core associations within clusters, depression-obsessive-compulsive in the internalising group, paranoid ideation-interpersonal sensitivity in the interpersonal group, remained stable, with correlations strengthening post-intervention. For the present study, these associations mainly support treating SCL-90-R domains as interrelated symptom dimensions and interpreting distribution across domains as a descriptive marker of cross-domain expression rather than as a set of independent diagnostic categories (Borsboom and Cramer 2013; Shah et al. 2020).

Students showed substantial pre-post reductions in global distress over the four-session counselling cycle. Baseline severity was the strongest correlate of change. Students with higher baseline GSI showed larger reductions in global distress. This pattern may reflect greater room for improvement, reduction of acute distress, regression to the mean or the supportive function of the counselling process. Importantly, however, symptom distribution showed the opposite association once its overlap with severity was addressed. Raw distribution was strongly explained by baseline GSI, confirming the reviewer-relevant concern that a simple count of elevated domains largely reflects global distress. After residualising distribution on baseline GSI, students with more elevated domains than expected for their severity showed less favourable change.

This contrast between intensity and distribution represents the main contribution of the study. Higher symptom intensity was associated with greater short-term reduction, whereas broader-than-expected symptom distribution was associated with less reduction. Thus, severity and distribution appear to capture partly distinct aspects of baseline presentation. A student may present with high global distress concentrated in fewer domains and still show marked short-term improvement, whereas another student with comparable severity but more diffuse symptom expression may show a slower or less complete reduction.

Threshold sensitivity analyses further clarified the clinical meaning of this effect. Residualised symptom distribution was associated with less favourable change when distribution was defined using mild-to-moderate raw-score elevations, but not when stricter thresholds or the reference $T > 63$ threshold were used. This suggests that the response-relevant signal may not be the accumulation of clearly clinical-range elevations. Rather, it may reflect diffuse mild-to-moderate symptom involvement across several domains. Clinically, this is important because such presentations may appear less severe on any single domain while still indicating a broadly distributed distress profile.

The analysis of favourable crossing below $GSI=1$ provided a clinically interpretable extension of the continuous change model. Among students who began above the clinical GSI threshold, both higher baseline severity and broader-than-expected symptom distribution were associated with a lower probability of moving below the threshold at post-counselling. This finding may be particularly relevant because it translates the response-profile result into a practical monitoring question: not only how much symptoms decrease, but whether students move from above to below a clinically meaningful level of global distress. In this sense, severity-adjusted symptom distribution may help identify students who require closer monitoring even when referral decisions are primarily guided by overall severity.

These findings are compatible with developmental perspectives that emphasise heterogeneous responses to transition-related distress in emerging adulthood. They also support the clinical value of routine multidimensional assessment in university counselling services. Moreover, symptom distribution appears most informative when interpreted relative to global severity and when linked to concrete response indicators, such as the likelihood of moving below the clinical GSI threshold. This may support using distribution information as part of monitoring and case formulation.

This study has several limitations. First, the observational, naturalistic design without a comparison group prevents causal attribution of the observed symptom reductions to counselling. Moreover, the present analyses identify associations between baseline characteristics and short-term change within this sample, but do not constitute a predictive model validated for forecasting outcomes in new students. Spontaneous improvement, regression to the mean, contextual changes and other unmeasured processes may have contributed to change. Second, the analyses were restricted to students who consented to the use of anonymised data and completed both baseline and post-counselling SCL-90-R assessments. Because records from other cases were not available for research analysis, attrition and dropout profiling could not be addressed. Third, the study was conducted in a single university counselling service, which may limit generalizability to other institutional, cultural and geographic contexts. Fourth, only two assessment points were available, so non-linear or session-by-session trajectories could not be modelled. Fifth, the study relied on self-report SCL-90-R scores, and the dimensional structure of the SCL-90-R has known psychometric limitations. Finally, relevant factors such as prior treatment history, social support, academic stressors, therapeutic alliance and session content were not available, and may explain the generally reduced explanatory explicative power of the models. Future studies should examine severity-adjusted symptom distribution in controlled, multi-site designs with broader clinical and process measures, independent validation samples and longer follow-up (Prasath et al. 2022).

To conclude, this study suggests that baseline symptom intensity and symptom distribution provide distinct information about short-term response profiles in university counselling. Students with higher global severity showed greater symptom reduction, whereas students with more elevated domains than expected for their severity showed less favourable change and a lower probability of crossing below $GSI=1$ when they began above that

threshold. These findings support interpreting symptom distribution relative to global severity, rather than as a raw count alone, and suggest that broader-than-expected distribution may be useful for monitoring response in brief university counselling services.

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Ethics Statement

The research protocol was approved by the University Ethics Board (Prot. 2025-021) and was conducted in accordance with the Declaration of Helsinki (World Medical Association 2025).

Consent

All the subjects involved in this study gave their informed consent for participation.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Data S1:** capr70200-sup-0001-Supinfo.docx.