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Empathetic Expression and Public Response in Weibo Comments Following Youth Self-Disclosure

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Abstract. This study examined how different forms of empathetic-supportive expression in Weibo comments were associated with public responses to youth self-disclosure. The sample included 1,296 comments nested within 180 distress-related posts by users whose public self-presentation indicated an age or educational stage consistent with 14–19 years. Comments were multilabel-coded for six components: emotional validation, cognitive understanding, emotional care, action support, moral defense, and brief reassurance. Negative binomial models were used to predict comment likes and replies separately. Action support was positively associated with both likes and replies, whereas emotional validation and emotional care were associated primarily with replies. In addition, comments combining understanding-oriented expression with action support received more replies, but not more likes. These findings suggest that different supportive functions correspond to different forms of public interaction and that empathy should not be treated as a unitary category. Because the study is observational, the results reflect associations rather than causal effects.

Keywords: adolescent self-disclosure, empathetic expression, online social support, Weibo

1. Introduction

Social media places adolescent self-disclosure within public and quantifiable interaction environments. When young users disclose academic pressure, family conflict, loneliness, or emotional distress, subsequent likes and replies become visible social signals that can be observed and interpreted by both the discloser and other users. This issue is particularly relevant during adolescence, when peer evaluation, identity formation, and help-seeking practices remain under development. Previous research suggests that social media increases the visibility and quantifiability of public responses and may incorporate digital reactions into adolescents' processes of social evaluation [1-3].

However, responses to distress disclosures are not functionally equivalent. Comments that validate emotions, demonstrate understanding, express care, or provide practical assistance may all be described as empathetic, although they perform different communicative functions. Empathy itself is a multidimensional construct involving affective and cognitive processes [4, 5]. Moreover, public comments reveal observable expressions rather than commenters' internal psychological states. Existing studies have often examined online support as an aggregate construct or focused on

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sentiment, emotional intensity, and overall engagement [6, 7]. Such approaches may obscure differences among specific forms of supportive expression. A binary empathy classification or conventional sentiment analysis cannot adequately distinguish understanding, care, advice, moral defense, and brief reassurance, nor can it represent their co-occurrence within a single comment.

A further limitation concerns the measurement of engagement. Likes and replies are often combined as general indicators of interaction, although they represent different forms of public response. Likes provide relatively low-cost recognition, whereas replies require an additional communicative action and more directly indicate the continuation of public interaction. Importantly, neither outcome measures actual exposure, comment sorting position, or algorithmic recommendation. They should therefore be interpreted as observable public responses rather than indicators of algorithmic visibility.

The present study examines 1,296 comments nested within 180 Weibo posts containing personal-distress disclosures by users whose public self-presentation indicated an age or educational stage consistent with 14–19 years. Using a multilabel coding framework, comments were classified into six empathetic expression components: emotional validation, cognitive understanding, emotional care, action support, moral defense, and brief reassurance. The study investigates (1) the distribution of these components, (2) their respective associations with comment likes and replies, and (3) whether combining understanding-oriented expression with action support is more strongly associated with reply-based response. By distinguishing among supportive functions and interaction outcomes, this study provides a more precise account of empathetic communication in a Chinese social media context. Because the analysis is observational, the findings concern statistical associations rather than causal effects or platform algorithm preferences.

2. Literature review

2.1. Youth self-disclosure in quantified social media environments

Adolescence is a developmental period in which peer evaluation, identity formation, emotion regulation, and help-seeking become closely intertwined. Social media does not merely relocate these processes online; it reorganizes them within interaction environments that are public, persistent, and quantifiable [1] argue that social media transforms public responses relations by altering the visibility, availability, and numerical representation of social feedback. When young users publicly disclose academic pressure, family conflict, interpersonal difficulties, or emotional distress, the disclosure becomes part of an interaction episode that can be observed not only by the discloser and the respondent but also by a wider audience. The meaning of a response is therefore shaped by both its interpersonal function and its public visibility.

Visible metrics may acquire particular social significance in this context. Longitudinal research has linked adolescents' digital status seeking with risk-related behavior, while experimental evidence indicates that peer-endorsed like counts can influence adolescents' neural and behavioral responses to social media content [2, 3]. These findings do not imply that every like carries the same meaning or that visible feedback directly indexes psychological well-being. They do, however, establish likes and replies as socially interpretable signals within public-response environments. Public self-disclosure on Weibo consequently offers a relevant setting in which to examine how different responses to distress become associated with different forms of visible interaction.

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2.2. Empathy as a multidimensional and observable communicative practice

Empathy is not a unitary psychological construct [4] demonstrated the value of distinguishing dimensions such as perspective taking, empathic concern, and personal distress, and [5] described empathy as a functional architecture involving both affective and cognitive processes. This multidimensionality is especially important for social media research. A public comment may communicate emotional resonance, an understanding of another person's situation, interpersonal concern, or a practical orientation toward assistance. Collapsing these functions into a single empathy score risks obscuring theoretically meaningful differences.

At the same time, comment text cannot disclose a commenter's internal empathic capacity or psychological state. A phrase such as "I understand" may reflect genuine perspective taking, a conventional expression of support, or a platform-specific norm. The appropriate object of analysis is therefore empathetic expression: the observable communicative work performed by a comment in relation to a disclosed difficulty. The present framework distinguishes six nonexclusive components: emotional validation acknowledges the disclosed feeling; cognitive understanding articulates the situation or perspective; emotional care conveys concern or relational presence; action support offers concrete advice, resources, or assistance; moral defense affirms the discloser's legitimacy or identifies unfair treatment; and brief reassurance provides concise encouragement with limited elaboration.

This functional approach treats comments as relational acts rather than as isolated collections of emotional words. Research on conversational narration shows that listeners' responses can participate in the construction and continuation of a speaker's account [8]. Although that work was developed in face-to-face interaction, it provides a useful interactional principle for public comments: a response may acknowledge, elaborate, redirect, or close down a disclosure. The framework also differs from conventional sentiment analysis. Emotional valence describes whether language is relatively positive or negative, whereas empathetic expression coding describes what the comment does in response to another person's situation. A negatively worded comment may validate distress, and a positively worded encouragement may offer little evidence of understanding. A multilabel functional representation is therefore better suited to examining both distinct components and their co-occurrence.

2.3. Online supportive communication and differentiated public response

Research on online supportive interaction indicates that the consequences of digital communication depend on how support is enacted [7] situated online supportive interaction within a broader process involving affect, perceived social support, sense of community, and life satisfaction. Similarly, [9] showed that associations between social network use and well-being vary with communication type and relationship strength. Although these studies do not examine component-level expressions under youth distress disclosures, they challenge the assumption that all supportive communication is functionally equivalent. They also caution against interpreting a visible response as evidence of psychological benefit when recipient well-being and relationship quality have not been measured.

A related body of research has examined the characteristics associated with online attention and diffusion. Emotional arousal is associated with the sharing of online content, and moral-emotional language can shape diffusion in social networks [6, 10]. This literature demonstrates that public interaction is sensitive to content features, but it does not determine whether emotional validation, care, advice, moral defense, or reassurance receive the same response when they appear in

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comments on youth self-disclosure. Diffusion-level findings cannot therefore substitute for a comment-level analysis of supportive function.

The form of public response must also be differentiated. A like is a comparatively low-cost and standardized acknowledgment; a reply requires an additional communicative contribution and leaves a further textual turn in the public exchange. Neither action is inherently more sincere or more beneficial, and a reply may express agreement, clarification, disagreement, or unrelated content. Nevertheless, likes and replies represent behaviorally distinct outcomes. Aggregating them into a single engagement measure may conceal whether a supportive function is associated primarily with rapid recognition or with the visible continuation of interaction.

2.4. Research gap, competing explanations, and research questions

The existing literature leaves three related gaps. First, empathy and online support are often represented as aggregate categories, even though their affective, cognitive, relational, practical, and moral functions may be associated with different responses. Second, visible reactions are frequently combined as general engagement, limiting the ability to distinguish recognition from continued public exchange. Third, studies of online support and content diffusion do not directly explain comment-level response patterns following public self-disclosure by youth in a Chinese social media context. The combination of a multilabel expression framework and separate like and reply outcomes is needed to address these gaps.

Any observed association must also be considered against competing explanations. A social-connection account predicts that expressions which acknowledge distress, communicate care, or provide assistance will be associated especially with reply-based interaction. An attention account attributes public response to observable features such as text length, emotional intensity, account visibility, elapsed time, topic, and comment sorting position. A type-specific account instead predicts that different supportive functions will exhibit different associations with likes and replies. Algorithmic research further emphasizes that platforms organize visibility and relevance [11, 12]. Because public Weibo pages do not provide actual exposure or recommendation logs, like and reply counts must be interpreted as observable public responses rather than measures of reach or algorithmic preference.

Guided by these distinctions, the present study addresses the following research questions:

RQ.How frequently do emotional validation, cognitive understanding, emotional care, action support, moral defense, and brief reassurance occur in Weibo comments responding to public self-disclosure by youth?

RQ.How is each empathetic-supportive component associated with comment likes and comment replies after observable post-, comment-, and account-level characteristics are taken into account?

RQ.When the number of expressed components is taken into account, how is the co-occurrence of understanding-oriented expression (emotional validation or cognitive understanding) and action support associated with likes and replies?

By answering these questions, the study moves beyond a binary judgment of whether empathy is present and instead examines how the functional organization of supportive expression corresponds to distinct forms of public response. The resulting framework is intentionally associational: it identifies observable patterns in public interaction without inferring commenters' internal empathy, recipients' psychological improvement, causal effects, or platform algorithm preferences.

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3. Method

3.1. Research design and data source

This observational study used a comment-level design to examine empathetic expression in responses to publicly accessible Weibo posts authored by users who publicly presented themselves as being in the 14–19-year-old developmental stage. The unit of analysis was an individual comment nested within an eligible post. Original posts provided the contextual basis for interpreting the self-disclosure, whereas likes and replies attached to comments constituted the visible public-response outcomes.

The dataset comprised publicly visible post- and comment-level fields, including post text, publication time, topic, media format, public indicators of the author's influence, comment text, comment time, like count, reply count, and public indicators of the commenter's influence. Back-end age verification, real-name authentication status, actual page views, recommender placement, and browsing behavior without visible interaction were unavailable. Accordingly, the analysis concerned observable communicative features and public responses rather than verified demographic identity, exposure, or algorithmic reach.

3.2. Sample and eligibility criteria

Eligible posts were authored by users whose public profile information or first-person post content indicated an age or educational stage consistent with 14–19 years. Because exact age could not generally be verified from public Weibo pages, eligibility was determined from public self-descriptions, educational-stage indicators, and contextual first-person cues. Examples included "high school student," "sophomore," "9th grade," "countdown to the college entrance examination," and "born after 2007." General expressions such as "student," "minor," or "campus life" were insufficient on their own.

Posts were excluded when they were written by parents or teachers, originated from promotional or role-playing accounts, described adult recollections, or lacked interpretable identity cues. To qualify as self-disclosure, a post also had to address academic pressure, interpersonal relationships, family pressure, or emotional distress.

3.3. Data collection and preprocessing

The initial dataset contained 720 posts and 5,922 comments. At the post level, records duplicated through keyword-search overlap, pagination overlap, or repeated saving of the same post were identified and removed. The remaining posts were screened against the age-related identity cues, self-disclosure criteria, topic relevance, and the prespecified study window. After deduplication, 700 unique posts remained, of which 180 met the eligibility criteria.

At the comment level, only records linked to eligible posts were retained. Duplicate comments, deleted or empty content, nested reply records, observations with missing interaction counts, and comments with unparseable timestamps were excluded. Human-readable interaction counts containing Chinese magnitude units or plus signs were converted to numeric values. Informal language, repeated punctuation, emoticons, hashtags, and user mentions were preserved to retain the communicative features of Weibo discourse. The 180 eligible posts yielded 2,570 candidate comments; 1,296 comments remained after quality control, corresponding to a mean of 7.20 analyzed comments per post.

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3.4. Measures

3.4.1. Public response outcomes

Comment likes and comment replies were modeled as separate outcome variables. Likes indexed a comparatively low-cost form of visible public recognition, whereas replies indexed further visible dialogic engagement. Both variables were retained as nonnegative integer counts. Neither measure was treated as a direct indicator of exposure, algorithmic visibility, supportive intent, or psychological benefit.

3.4.2. Empathetic expression components

Empathetic expression was operationalized as an observable response function directed toward another person's public self-disclosure, rather than as an inference about the commenter's internal empathic state. Each comment was coded 0 or 1 on six non-mutually-exclusive dimensions:

V — Emotional validation:
Acknowledging or responding to the author's emotional state.
P — Cognitive understanding:
Recognizing or explaining the author's situation, its causes, or the author's perspective.
C — Emotional care:
Expressing concern, companionship, presence, or relational care.
S — Action support:
Offering concrete advice, resources, assistance, or a direction for action.
M — Moral defense:
Defending the author, identifying injustice, or affirming the legitimacy of the author's position.
R — Brief reassurance:
Providing a short, low-information expression of reassurance.

Because multiple labels were permitted, a comment could contain more than one component. Component count was defined as the sum of the six binary indicators. An understanding–action-support combination was coded as 1 when action support (S) co-occurred with emotional validation (V) or cognitive understanding (P), and as 0 otherwise.

3.4.3. Covariates

The adjusted models included author follower count, commenter follower count, post length, comment length, elapsed time between comment publication and data capture, topic, and comment sorting position. These variables were included to account for observable differences in account prominence, textual characteristics, interaction opportunity, content context, and the displayed ordering of comments.

3.5. Coding procedure and reliability

Comments were manually coded using a multilabel scheme. The coding manual specified the conceptual definition, exclusion criteria, and boundary examples for each expression category. Coders evaluated the complete comment in conjunction with the original post context rather than assigning labels from isolated keywords.

Two coders independently coded 20% of the analytic comments ($n = 259$). Intercoder reliability was assessed separately for each binary category using Cohen's κ [13]. The resulting κ

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coefficients were .72 for emotional validation, .63 for cognitive understanding, .72 for emotional care, .64 for action support, .57 for moral defense, and .73 for brief reassurance.

3.6. Statistical analysis

Comment likes and replies were nonnegative counts characterized by substantial right skew and overdispersion. Separate negative binomial regression models were therefore estimated for the two outcomes [14]. In the primary specification, the six empathetic expression indicators were entered simultaneously as predictors, together with the covariates described above. The model is given in Equation (1):

$$\begin{aligned} Y_{ij} &\sim NegativeBinomial(\mu_{ij}, \theta), \\ log(\mu_{ij}) &= \beta_0 + \beta_1 V_{ij} + \beta_2 P_{ij} + \beta_3 C_{ij} + \beta_4 S_{ij} + \beta_5 M_{ij} + \beta_6 R_{ij} + \gamma^T X_{ij}. \end{aligned} \tag{1}$$

Here, Y_{ij} denotes the like or reply count for comment i nested within post j; μ_{ij} denotes its conditional mean; θ is the negative binomial dispersion parameter; V_{ij} through R_{ij} represent the six expression indicators; and $\mathbf{X}_{ij}$ is the covariate vector. Because comments associated with the same post shared a common self-disclosure context, standard errors were estimated using a post-level cluster-robust adjustment.

Supplementary models replaced the six separate component indicators with component count and the understanding–action-support combination, as shown in Equation (1):

$$\log(\mu_{ij}) = \alpha_0 + \alpha_1 \text{Count}_{ij} + \alpha_2 \text{Combo}_{ij} + \boldsymbol{\delta}^{\top} \mathbf{X}_{ij}. \tag{2}$$

Regression coefficients, cluster-robust standard errors, incidence-rate ratios (IRRs), computed as $\exp(b)$, 95% confidence intervals, and two-sided p values were reported. Model-predicted response counts were calculated with the covariates held at their sample means. Given the observational design, all model estimates were interpreted as adjusted associations rather than causal effects.

4. Results

4.1. Sample characteristics and outcome distributions

The final analytic sample comprised 180 eligible posts and 1,296 comments. Comment likes averaged 6.57 ($SD = 11.01$; median $= 2$; range $= 0$ –120), and 34.0% of comments received no likes. Comment replies averaged 2.08 ($SD = 3.37$; median $= 1$; range $= 0$ –30), with zero replies for 42.0% of comments. Additional descriptive statistics for the analytic variables are reported in Table 1.

Mean comment length was 21.32 Chinese characters ($SD = 8.58$), and the mean elapsed time between comment publication and data capture was 36.13 hours ($SD = 20.13$). Comments contained an average of 1.05 empathetic expression components ($SD = 0.79$), and the understanding–action-support combination occurred in 6.4% of comments.

Table 1. Descriptive statistics of the analytic variables

Variable	n	M	SD	Median	Range
Comment likes	1,296	6.57	11.01	2	0–120

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Table 1. (continued)

Comment replies	1,296	2.08	3.37	1	0–30
Expression component count	1,296	1.05	0.79	1	0–3
Understanding–action-support combination	1,296	0.064	0.245	0	0–1
Comment length	1,296	21.32	8.58	23	5–51
Elapsed time (hours)	1,296	36.13	20.13	36.85	0.42–71.65

Note. M = mean; SD = standard deviation. For the binary combination variable, the mean represents the proportion of comments containing the combination.

As shown in Figure 1, both public-response outcomes were strongly right-skewed and contained substantial concentrations at zero. These distributional features were consistent with the use of count models that allow overdispersion.

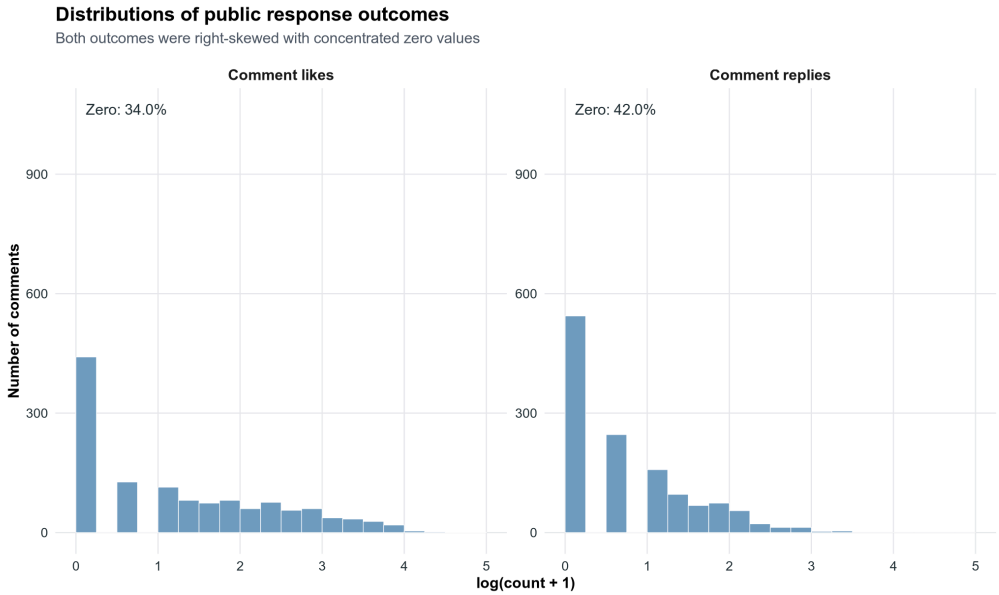


Figure 1. Distributions of public response outcomes

Note. The figure displays log-transformed counts, log (count + 1), to make the right-skewed distributions easier to inspect.

4.2. Expression prevalence and coding reliability

Emotional care was the most prevalent component, appearing in 358 comments (27.6%), followed by action support in 308 comments (23.8%), emotional validation in 249 comments (19.2%), and cognitive understanding in 233 comments (18.0%). Brief reassurance appeared in 132 comments (10.2%), whereas moral defense was least frequent, occurring in 87 comments (6.7%). Because multilabel coding was permitted, these percentages were not mutually exclusive. Counts, Wilson 95% confidence intervals, and reliability statistics are reported in Table 2.

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Table 2. Prevalence and coding reliability of expression components

Component	Count	Proportion	95%CI	Cohen's r	Raw agreement
V Emotional validation	249	19.2%	[17.2%,21.4%]	.72	90.3%
P Cognitive understanding	233	18.0%	[16.0%,20.2%	.63	89.6%
C Emotional care	358	27.6%	[25.3%,30.1%j	.72	88.8%
S Action support	308	23.8%	[21.5%,26.2%j	.64	86.9%
M Moral defense	87	6.7%	[5.5%,8.2%	.57	93.1%
R Brief reassurance	132	10.2%	8.7%,12.0%	.73	93.8%

Note. Proportons use Wilson 95%confidence intervals.Reliability estimates are based on the double-coded subset (*n*=259). Multiple labels were permitted.

Figure 2 visualizes the prevalence estimates and their Wilson 95% confidence intervals. The ordering in the figure confirms that emotional care and action support were the most common categories, whereas moral defense was comparatively uncommon.

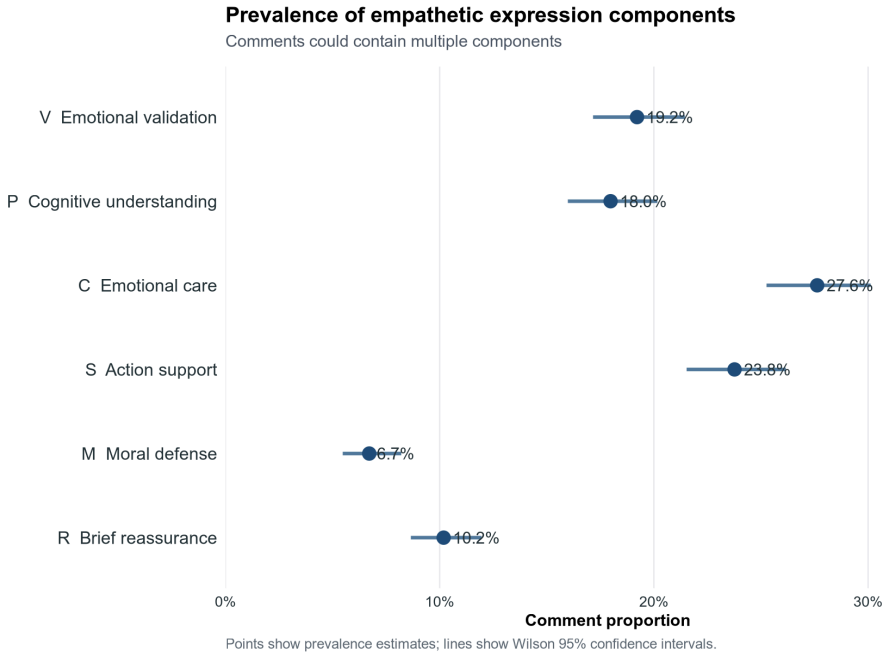


Figure 2. Prevalence of empathetic expression components

Note. Points show prevalence estimates; lines show Wilson 95%confidence intervals. Comments could contain multiple components.

In the independently double-coded subset ($n = 259$), Cohen's κ ranged from .57 for moral defense to .73 for brief reassurance. As displayed in Figure 3, κ was .72 for both emotional validation and emotional care, .63 for cognitive understanding, and .64 for action support; raw agreement ranged from 86.9% to 93.8% (Table 2).

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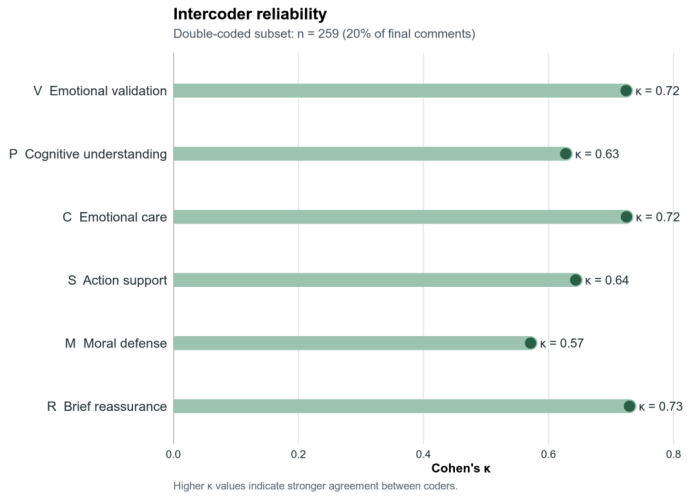


Figure 3. Intercoder reliability across expression components.

Note. The figure reports Cohen's κ and raw agreement for the double-coded subset.

4.3. Correlations among expression and public response variables

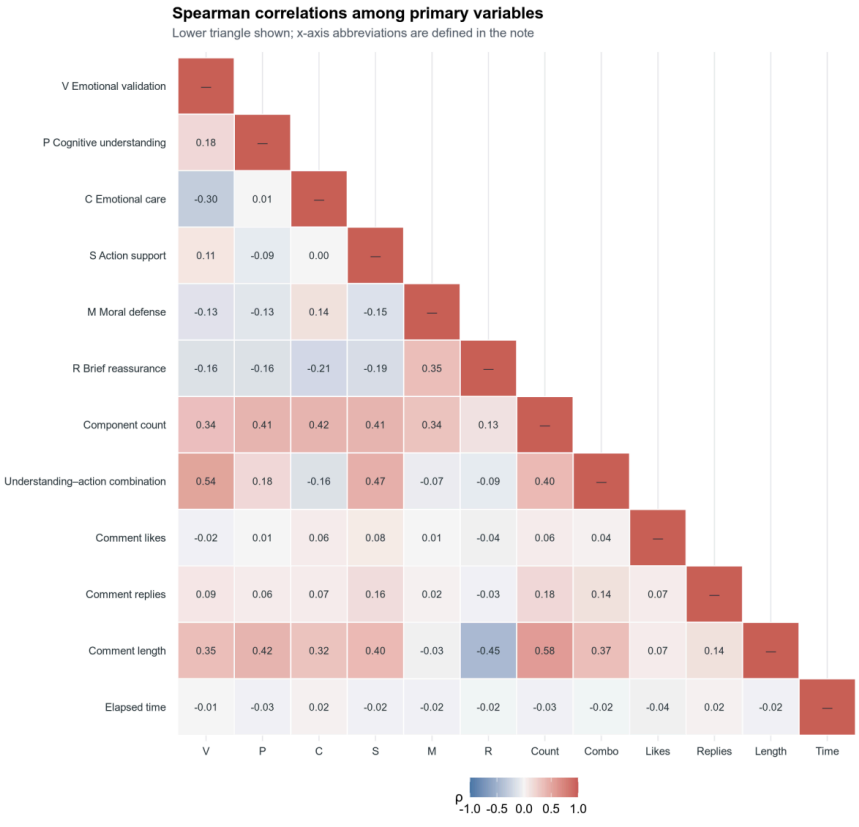


Figure 4. Spearman correlation matrix of the primary variables

Note. The lower triangle displays correlations among the primary variables. Abbreviations are V, emotional validation; P, cognitive understanding; C, emotional care; S, action support; M, moral defense; R, brief reassurance; Count, component count; Combo, understanding–action-support combination; Likes, comment likes; Replies, comment replies; Length, comment length;and Time, elapsed time.

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Spearman correlations indicated that total expression component count was more strongly related to comment replies ($\rho = .18$) than to comment likes ($\rho = .06$). The understanding–action-support combination correlated with replies at $\rho = .14$ and with likes at $\rho = .04$. Correlations between the six individual components and replies ranged from $-.03$ to $.16$, with action support showing the largest association; correlations with likes ranged from $-.04$ to $.08$. These focal coefficients are reported in Table 2.

Table 3. Spearman correlations between expression variables and public response

Predictor	Comment likes	Comment replies
V Emotional validation	−.02	.09
P Cognitive understanding	.01	.06
C Emotional care	.06	.07
S Action support	.08	.16
M Moral defense	.01	.02
R Brief reassurance	−.04	−.03
Component count	.06	.18
Understanding–action-support combination	.04	.14

Note. Values are Spearman's ρ. The complete matrix also included comment length and elapsed time.

The complete correlation matrix is displayed in Figure 4. Expression component count correlated with comment length at $\rho = .58$, the largest correlation involving a modeled covariate; comment length was therefore retained in the adjusted regression models.

4.4. Negative binomial regression results

4.4.1. Comment likes

In the comment-like model, action support was positively associated with the number of likes, IRR $= 1.48$, 95% CI [1.12, 1.96], $p = .005$. Holding the covariates constant, comments containing action support had an expected like count approximately 1.48 times that of comments without action support. The confidence intervals for emotional validation, cognitive understanding, emotional care, moral defense, and brief reassurance all included 1.

4.4.2. Comment replies

The reply model showed clearer differentiation across expression types. Emotional validation was positively associated with replies, IRR $= 1.39$, 95% CI [1.12, 1.74], $p = .003$. Emotional care was also associated with replies, IRR $= 1.53$, 95% CI [1.23, 1.89], $p < .001$, as was action support, IRR $= 1.54$, 95% CI [1.24, 1.92], $p < .001$. Brief reassurance was not statistically significant, IRR $= 1.50$, 95% CI [.97, 2.30], $p = .065$. Cognitive understanding and moral defense were also not statistically significant.

Complete coefficient estimates, post-cluster-robust standard errors, IRRs, confidence intervals, and p values are reported in Table 4. Figure 5 presents the same IRRs and confidence intervals

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graphically: only action support excluded the null value in the likes model, whereas emotional validation, emotional care, and action support excluded the null in the replies model.

Note.b = negative binomial regression coefficient; SE = post-cluster-robust standard error; IRR = incidence-rate ratio. Models adjusted for author follower count, commenter follower count, post length, comment length, elapsed time, topic, and comment sorting position.

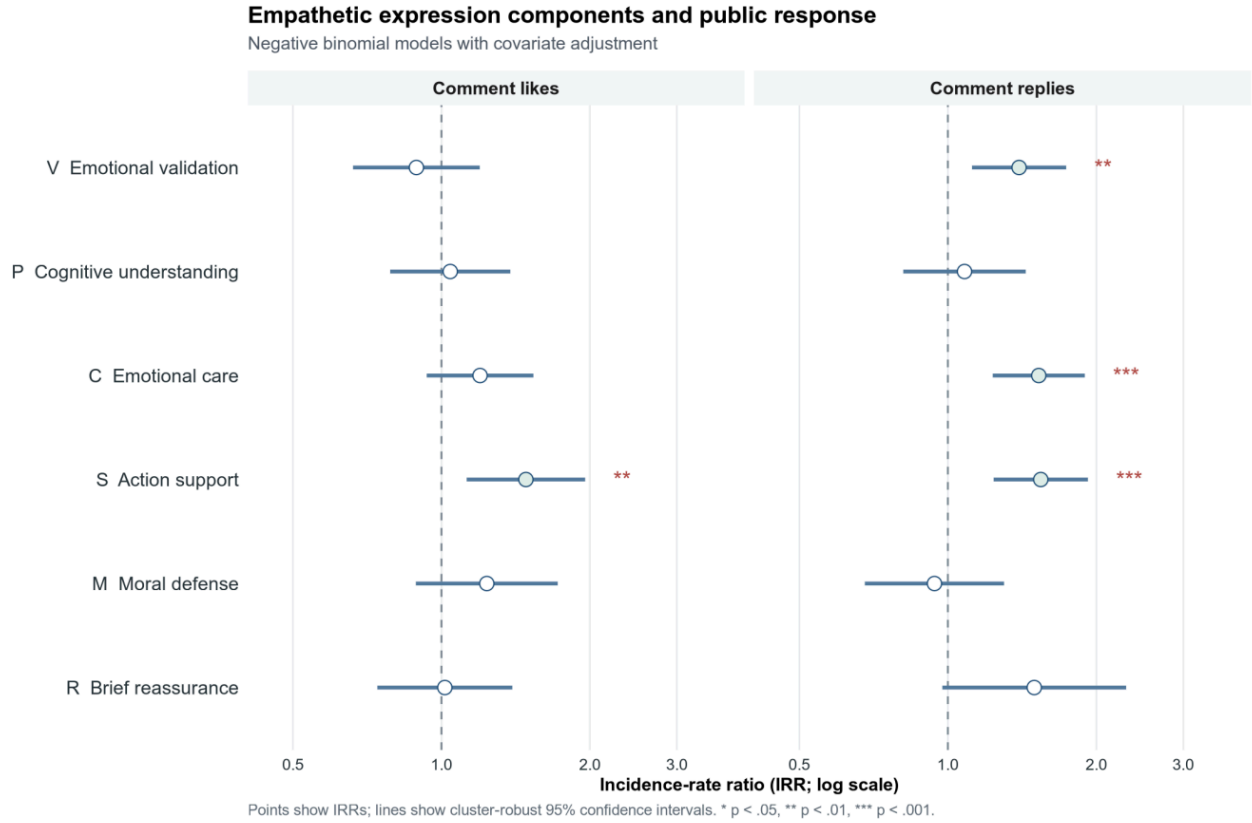


Figure 5. Incidence-rate ratios for expression components predicting likes and replies

Note. Points show IRRs; lines show post-cluster-robust 95% confidence intervals. The dashed vertical line marks IRR = 1. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

Table 4. Negative binomia regression results for comment likes and replies

Outcome	Predictor	*b*	SE	IRR	95%CI	*p*
Likes	V Emotional validation	-.117	.151	.89	[66,1.20]	.438
	P Cognitive understanding	.041	.143	1.04	[. 79,1.38]	.774
	C Emotional care	.180	.127	1.20	[.93,1.54]	.156
	S Action support	.394	.141	1.48	[1.12,1.96]	.005
	M Moral defense	.212	.169	1.24	[.89,1.72]	.210

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Table 4. (continued)

Likes	R Brief reassurance	.016	.161	1.02	[. 74,1.39]	.922
Replies	V Emotional validation	.332	.112	1.39	[1.12,1.74]	.003
	P Cognitive understanding	.078	.146	1.08	[81,1.44]	.594
Replies	C Emotional care	.424	.110	1.53	[1.23,1.89]	<.001
	S Action support	.434	.112	1.54	[1.24,1.92]	<.001
	M Moral defense	-.063	.166	.94	[68,1.30]	.705
	R Brief reassurance	.403	.219	1.50	[.97,2.30]	.065

Note.b= negative binomial regression coefficient; SE = post-cluster-robust standard error; IRR = incidence-rate ratio. Models adjusted for author follower count, commenter follower count, post length, comment length, elapsed time, topic, and comment sorting position.

4.5. Supplementary combination models

Supplementary models replaced the six individual components with total component count and the understanding–action-support combination. For comment likes, component count showed a small positive association, IRR = 1.16, 95% CI [1.00, 1.34], $p = .049$. Because this estimate crossed the conventional threshold only narrowly and multiple estimates were examined, it should be interpreted cautiously. The understanding–action-support combination was not statistically significant, IRR $= .98$, 95% CI [.68, 1.41], $p = .901$.

For comment replies, component count was positively associated with replies, IRR = 1.27, 95% CI [1.09, 1.48], $p = .002$. The understanding–action-support combination was also positively associated with replies, IRR = 1.46, 95% CI [1.05, 2.02], $p = .025$. The complete supplementary model estimates are reported in Table 5.

Table 5. Supplementary regression using component count and the understanding–action-support combination

Outcome	Predictor	*b*	SE	IRR	95% CI	*p*
Likes	Component count	.148	.075	1.16	[1.00,1.34]	.049
	Understanding–action-support combination	-.023	.188	.98	[.68,1.41]	.901
Replies	Component count	.241	.077	1.27	[1.09,1.48]	.002
	Understanding–action-support combination	.376	.167	1.46	[1.05,2.02]	.025

Note. Models included the same covariates and post-level cluster-robust standard errors as the component models.

When covariates were held at their sample means and component count was fixed at two, the predicted number of replies was 2.12, 95% CI [1.72, 2.61], for comments without the combination and 3.08, 95% CI [2.24, 4.24], for comments containing the combination. The corresponding predicted like counts were 6.22 and 6.08. Figure 6 shows that the predicted separation by combination status was evident for replies but minimal for likes.

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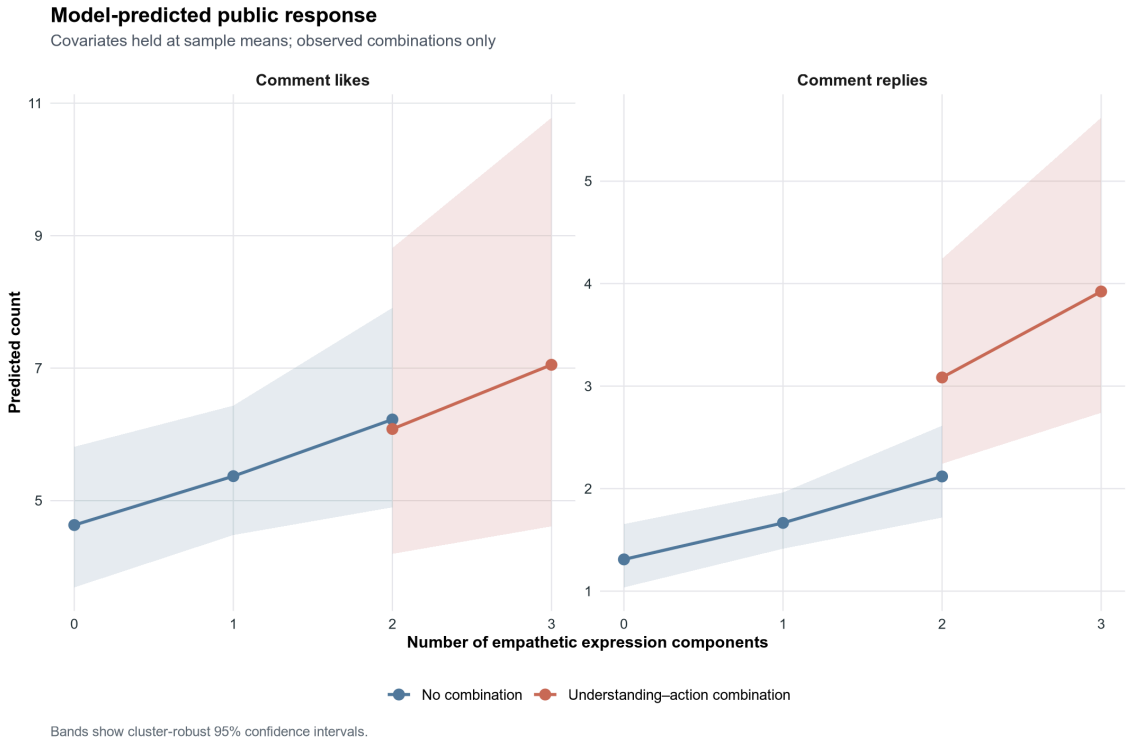


Figure 6. Model-predicted public response by expression count and combination status

Note. Predictions were calculated with covariates fixed at their sample means; shaded bands show post-cluster-robust 95% confidence intervals. Only observed combinations are displayed. The source figure abbreviates the full understanding–action-support combination as "Understanding-action combination"

4.6. Model fit

As reported in Table 3, the component and supplementary models showed similar AIC values. For comment likes, the component model yielded an AIC of 7,052.23, compared with 7,056.61 for the supplementary model. For comment replies, the corresponding AIC values were 4,850.97 and 4,849.96.

Table 6. Model fit statistics

Model	Outcome	n	Post clusters	AIC	θ	logLik
Component	Likes	1,296	180	7,052.23	.420	−3,508.11
Component	Replies	1,296	180	4,850.97	.643	−2,407.48
Supplementary	Likes	1,296	180	7,056.61	.414	−3,514.31
Supplementary	Replies	1,296	180	4,849.96	.636	−2,410.98

Note. AIC = Akaike information criterion; θ = negative binomial dispersion parameter; logLik = log likelihood. AIC values should be compared only within the same outcome variable.

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5. Discussion

The findings do not support a generalized public-response advantage for empathetic expressions. Instead, the observed associations varied across both expression types and response indicators. Action support was associated with both comment likes (IRR $= 1.48$) and replies (IRR $= 1.54$), whereas emotional validation (IRR $= 1.39$) and emotional care (IRR $= 1.53$) were primarily associated with replies. Cognitive understanding and moral defense showed no significant independent associations, while brief reassurance only approached significance in the reply model. These results indicate that treating supportive comments as a single category of "empathy" would conceal meaningful differences in their public interaction patterns.

The association of action support with both outcomes may reflect its relatively concrete and recognizable communicative function. Suggestions, resources, and practical directions can be quickly evaluated as useful, potentially making them suitable for low-cost acknowledgment through likes. At the same time, such suggestions may provide specific content that can be accepted, questioned, or further discussed, thereby creating opportunities for replies. Emotional validation and emotional care, by contrast, were mainly associated with replies. These expressions acknowledge the discloser's emotional experience or communicate relational presence and may therefore function more directly as invitations to continued interaction. Nevertheless, the present data do not reveal why users liked or replied to a comment. These explanations should consequently be treated as theoretically plausible interpretations rather than demonstrated psychological mechanisms.

The supplementary findings further emphasize the importance of expression structure. The number of empathetic expression components was more consistently associated with replies than with likes. More importantly, the understanding–action configuration, defined as emotional validation or cognitive understanding combined with action support, was associated with replies but not with likes. With covariates held at their sample means, comments containing two components and this configuration had a predicted reply count of 3.08, compared with 2.12 for comments containing the same number of components without the configuration. No corresponding difference was observed for predicted likes. This pattern suggests that public response may depend not only on how many supportive components a comment contains, but also on how those components are organized. However, because the data contain only the completed comment text, they cannot establish a sequential process in which understanding occurs before action support or demonstrate that this structure causes conversation to continue.

These findings extend research on adolescent public responses and online support by showing that visible feedback should not be represented by a single engagement measure. Social media makes peer evaluation and feedback increasingly public and quantifiable [1], while the consequences of online communication may depend on communication type and relational context [7, 9]. The present results suggest that this functional differentiation may already be visible at the level of immediate public response. Likes appear to capture relatively lightweight recognition, whereas replies more directly reflect the continuation of public interaction. Replies should not, however, be interpreted as evidence of effective psychological support, improved well-being, or stronger relationships, as none of these outcomes was measured.

The nonsignificant findings are also theoretically informative. Cognitive understanding alone may be too subtle or context-dependent to generate a consistent public response, while moral defense occurred relatively infrequently and demonstrated lower coding reliability than the other components. Brief reassurance, such as short expressions of encouragement, may communicate care but provide limited material for continued interaction. These explanations remain tentative. A

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nonsignificant association with likes or replies does not imply that an expression has no interpersonal value; it only indicates that the present analysis did not detect a stable association with the measured public-response indicators.

Several limitations should be acknowledged. First, the coding framework captures observable textual expressions rather than commenters' internal empathic states and may be affected by irony, platform-specific language, or incomplete context. Second, adolescent status was inferred from public self-presentation and education-stage cues rather than verified age records. Third, the findings are specific to public interactions on Weibo and may not generalize to private messaging, anonymous communities, or other social media platforms. Fourth, the observational design cannot rule out unmeasured confounding, reverse directionality, differences in relationship strength, or the influence of comment timing and sorting position. The multiple comparisons and the small number of moral-defense comments also require cautious interpretation. Future research could combine textual coding with exposure logs, conversation sequences, recipient evaluations, longitudinal designs, or controlled experiments. Cross-platform and cross-cultural comparisons would further clarify whether the observed patterns reflect broader properties of supportive communication or features specific to Weibo.

Overall, the results suggest that the relevant question is not simply whether a comment expresses empathy, but how understanding, care, and action support are organized within a public response. The study therefore provides a differentiated framework for examining empathetic communication while maintaining a necessary distinction between public interaction, psychological benefit, and algorithmic visibility.

6. Conclusion

This study examined how observable empathetic expressions in Weibo comments were associated with public responses following youth self-disclosure. The analysis included 1,296 comments nested within 180 eligible posts authored by users whose public self-presentation indicated an age or educational stage consistent with 14-19 years. By distinguishing emotional validation, cognitive understanding, emotional care, action support, moral defense, and brief reassurance, while modeling comment likes and replies separately, the study treated empathy as a set of communicative functions observable in public discourse rather than as a unitary internal attribute.

The findings do not indicate a uniform public-response advantage for empathetic expression. Action support was associated with both likes and replies, whereas emotional validation and emotional care were associated primarily with replies. Cognitive understanding and moral defense did not show significant independent associations, and brief reassurance did not exhibit a robust pattern across outcomes. Supplementary analyses further showed that the number of supportive components, and especially the co-occurrence of understanding-oriented expression with action support, were associated more consistently with replies than with likes. Public response therefore appears to depend not simply on whether empathy is expressed, but also on how supportive functions are organized and how response is operationalized.

The study makes three contributions. First, its functional multilabel framework preserves distinctions among forms of supportive expression that would be obscured by a binary empathy classification or a general sentiment measure. Second, the separate analysis of likes and replies demonstrates the analytical importance of treating these behaviors as distinct forms of public response. Third, evidence from Weibo extends research on public responses feedback and online supportive communication to a Chinese social media setting. Rather than identifying an optimal

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comment formula, the findings demonstrate that different configurations of understanding, care, and practical assistance correspond to different observable interaction patterns.

These conclusions remain bounded by the observational design. The study measured publicly visible text and response counts rather than commenters' internal states, recipients' psychological outcomes, verified age, relationship strength, actual exposure, or algorithmic recommendation; it therefore cannot establish causality or explain why users liked or replied. Future research should combine component-level coding with exposure logs, longitudinal conversation sequences, recipient evaluations, experiments, and cross-platform or cross-cultural comparisons. Overall, research on empathy in public social media interaction should move beyond asking whether empathy is present and examine how understanding, care, and action support are organized within a response and what form of public interaction follows. This distinction supports a more precise analysis of communication after youth self-disclosure without unsupported claims about psychological benefit, causal influence, or algorithmic preference.

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