

A Study on the Compensatory Effect of Librarians' Body Language on Gaps in Readers' Service Needs

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Abstract

This article focuses on the often-overlooked compensatory role of librarians' body language in addressing gaps in service needs in library services. Based on service recovery theory, nonverbal communication theory, and expectation confirmation theory, it constructs a mechanism of "body language-emotional connection-expectation recalibration." Taking 8 different types of libraries in Guangdong Province as the research setting, the study collected 246 reader questionnaires and 83 librarian questionnaires, and employed descriptive statistics, regression/ANOVA, and structural equation modeling for testing. The findings show that positive body language significantly alleviates readers' sense of inadequate service, with eye contact and facial expressions playing the most prominent roles; the compensatory effect is stronger in highly interactive scenarios such as reference consultation; and readers' age, educational background, and frequency of use have significant moderating effects on perceptions of the compensatory effect. The article theoretically reveals the mechanism and contextual boundaries through which nonverbal communication bridges service gaps, methodologically provides an operational scale and model framework, and practically develops body language strategies tailored to different scenarios and user groups, offering practical value for optimizing reader experience and improving precise service.

Full Text

[Users · Services]

A Study on the Compensatory Effect of Librarians' Body Language on Gaps in Readers' Service Needs

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Abstract This article focuses on the compensatory role of librarians' body language—an element often overlooked in library services—in addressing gaps in service needs. Based on service recovery theory, nonverbal communication theory, and expectation-confirmation theory, it constructs an action mechanism of "body language—emotional connection—expectation recalibration." Taking eight different types of libraries in Guangdong Province as the research sites, the study obtained 246 reader questionnaires and 83 librarian questionnaires, and conducted tests using descriptive statistics, regression/analysis of variance, and structural equation modeling. The findings show that positive body language significantly alleviates readers' sense of service inadequacy, with eye contact and facial expressions exerting the most prominent effects; the compensatory effect is stronger in highly interactive scenarios such as reference consultation;

and readers' age, educational background, and frequency of use have significant moderating effects on their perception of the compensatory effect. The article theoretically reveals the mechanisms and contextual boundaries through which nonverbal communication compensates for service gaps, methodologically provides an operable scale and model framework, and practically develops body-language strategies for different scenarios and user groups, offering practical value for optimizing reader experience and improving precision services.

[Keywords] librarian; body language; service-need gap; compensatory effect; reader service

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In recent years, with the deepening of the service economy and the transformation of library functions, readers' focus has shifted from "whether resources can be obtained" to "through what kind of interaction and atmosphere resources are obtained," and the connotation and boundaries of the librarian's role have also been continuously re-evaluated^[1-4]. Against the background of smart libraries and human-machine collaboration, the demand for both service-model optimization and improved reader experience has become more urgent^[5-8]. Existing studies have mostly focused on explicit improvements such as processes, systems, and verbal communication, while rarely incorporating nonverbal cues such as "body language" into empirical frameworks. The small number of studies involving librarians' image have also largely remained at the representational level, lacking mechanism-based verification of how to narrow gaps in service needs. In fact, gaze, facial expressions, posture, gestures, and spatial distance in service encounters may influence readers' evaluations of services through emotional connection; these nonverbal/body-language cues are worthy of study.

This article focuses on the core theme of "whether and how librarians' body language compensates for gaps in service needs," and specifically addresses three aspects: first, under conditions in which resources or processes are constrained, whether and to what extent body language alleviates readers' subjective perception of gaps in service needs; second, whether this compensatory effect differs significantly among service scenarios such as reference consultation, reading promotion, circulation and lending, digital-resource guidance, and space services; and third, whether individual characteristics such as readers' age, educational background, and frequency of use strengthen or weaken the above relationships. On this basis, grounded in service recovery theory, nonverbal communication theory, and expectation-confirmation theory, this article constructs an action-mechanism model of "body language—emotional connection—expectation recalibration," and conducts empirical testing using survey data from readers and librarians in eight different types of libraries in Guangdong Province. It seeks

to make up for the insufficiency of nonverbal dimensions in library-service research at the theoretical level, and, at the practical level, to develop librarian body-language strategies oriented toward different scenarios and user groups, thereby providing an operable pathway for optimizing reader experience and improving precision-service capabilities.

1 Literature Review

1.1 Research on Library Service Experience and the Role of Librarians

Regarding service quality and experience, scholars in China and abroad have gradually shifted from the perspective of process efficiency to a comprehensive perspective of “perception–interaction–image.” Studies of academic and public libraries show that librarians’ comprehensive competencies and role positioning have a key influence on service effectiveness, and that equal emphasis on professional competence and interpersonal communication has become a trend^[1-4]. In the context of smart-library construction and digital transformation, scholars have proposed that technological efficiency and reader experience must be considered simultaneously, and that service pathways and the structure of position-based competencies should be reconstructed^[5-8]. Meanwhile, studies targeting children and special groups indicate that reader segmentation creates higher requirements for emotional response and professional support^[7,9-11]; in the context of mass media and platforms, the public’ s renewed understanding of the librarian’ s professional image and librarians’ self-presentation are also reshaping service expectations^[12-13]. Overall, the above studies jointly demonstrate that service is not equivalent to the process itself, and that the quality of interpersonal interaction has become a priority factor in experience. However, most work still centers on systems, processes, or oral communication, and relatively little starts from the nonverbal

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reveal its mechanisms of action and effect strength at this level.

1.2 Research on Service Encounters, Nonverbal Communication, and Reader Experience

Research on service encounters and servicescapes emphasizes that physical and interpersonal cues jointly shape customers’ overall judgments of an encounter^[14-15]. Nonverbal communication theory, from dimensions such as immediacy, facial-expression encoding, and spatial distance, shows that gaze, facial expression, posture, gestures, and interpersonal distance can rapidly convey a sense of closeness, credibility, and being understood, thereby affecting relationship

quality and emotional responses[16-19]. Complementing this, Expectation Confirmation Theory (ECT) holds that satisfaction depends on the gap between performance and prior expectations. When reality is constrained, if service providers release nonverbal signals of sincerity, respect, and willingness to assist, users may lower or recalibrate their expectations, thereby buffering negative perceptions[20-21]. In the library context, this logic means that when resources, processes, or objective conditions cannot be improved immediately, body language can serve as a compensatory means that is both affective and informational; through the feeling of “being understood—being cared about,” it weakens readers’ sensitivity to discrepancies. Meanwhile, the interaction density and uncertainty of service scenarios alter the marginal value of nonverbal cues; in highly interactive scenarios such as reference consultation, confirmatory, guiding, and soothing nonverbal signals are often more critical[14,22].

1.3 Research on the Measurement of Body Language

With respect to the dimensional measurement of body language and related variables, scales and model frameworks provide operational tools for quantitative research on body language. The Nonverbal Immediacy Scale (NIS) provides a reliable measurement scheme for dimensions such as gaze, expression, posture, and gestures[23]; the “rapport” scale in service relationships can measure emotional connection and interaction fluency, providing a variable basis for testing mediating mechanisms[24]; research on continuance use and revisit intention is mature in the fields of information systems and marketing, and ECT and its subsequent models provide measurement and structural specifications for expectation recalibration and behavioral intention[25].

In the library context, adapting the above scales to specific situations can form a chain structure of “body language—emotional connection—expectation recalibration—compensatory effect.” Here, the “compensatory effect” can be defined as the extent to which service providers’ nonverbal cues buffer readers’ subjective perceptions of service inadequacy. Further, service scenarios and readers’ individual characteristics are potential moderating variables that influence the strength of this chain. On the one hand, scenarios such as reference consultation, reading promotion, circulation and borrowing, digital-resource guidance, and space services differ significantly in interaction density, need for explanation, time pressure, and availability of social cues, which determines the extent to which nonverbal cues are “seen/needed” [14,22]. On the other hand, body-language cues from elderly, highly educated, or high-frequency user groups are more likely to trigger the subjective feeling of “being understood,” thereby amplifying the compensatory effect[16]. In sum, “main effect—chain mediation—moderating boundary” constitutes a testable integrative theoretical schema.

1.4 Review of Existing Research

Existing research has provided abundant evidence for the “experience-first” orientation and “role reconstruction” of library services, but there remain two

deficiencies. First, most studies focus on linguistic communication or institutional improvements, paying insufficient attention to bodily expression at the nonverbal level. Second, even when librarian image is involved, the discussion often remains at the level of external impression description and lacks systematic verification of how body language can compensate for service gaps. Therefore, supported by service compensation theory, nonverbal communication theory, and expectation confirmation theory, this paper attempts to construct a mechanism of “body language—emotional connection—expectation recalibration,” so as to enrich prior research.

2 Research Design

2.1 Theoretical Foundations

The research logic of this paper unfolds on the basis of three theoretical threads.

First is service compensation theory. This theory points out that when service provision is insufficient, service providers can repair users’ perceptions through compensatory behaviors. Such compensation is not limited to substantive replenishment of resources; it also includes the transmission of attitude and emotion. In library services, resource shortages or process constraints are difficult to avoid completely, while body language is a typical form of affective compensation: it can alleviate readers’ dissatisfaction without increasing explicit supply.

Second is nonverbal communication theory. As the most direct symbolic carriers in interpersonal interaction, gaze, expression, posture, and gestures can instantly transmit trust and emotional warmth. For library services that rely heavily on face-to-face communication, body language is not merely an accessory performance, but a key variable shaping service experience and relational atmosphere[13].

Third is expectation confirmation theory. This theory emphasizes that user satisfaction depends on the gap between expectations and actual perceptions. When actual experience falls short of expectations, if service providers convey nonverbal signals of sincerity and respect during interaction, users may recalibrate their expectations, thereby reducing their sensitivity to service inadequacy[14]. This mechanism explains why body language, although it cannot directly change supply, can influence readers’ evaluations at the psychological level.

Integrating these three theoretical threads reveals a common logic: body language functions through the chain of “compensation—communication—confirmation.” It is not only an affective means of compensation, but also an informational communication channel, and moreover an important touchpoint for regulating the gap between users’ expectations and actual experience. In this sense, body language should be understood as a core component of library service quality rather than a marginal add-on. Accordingly, this paper proposes a series of

testable research hypotheses.

2.2 Research Hypotheses

2.2.1 Main-Effect Hypothesis of Body Language Research on service encounters indicates that users' overall judgment of a single service is jointly shaped by the available cues at the moment of encounter, among which interpersonal cues occupy a core position in early evaluation[14-15]. In face-to-face interaction, body language such as gaze, facial expression, bodily posture, gestures, and interpersonal distance can, within an extremely short time window, convey "being attended to—being understood"

signals, reduce uncertainty and psychological distance, and thereby influence attributions regarding service motivation, ability, and sincerity [16]. The satisfaction-formation pathway indicates that individuals re-evaluate around the discrepancy between "performance-expectation." When hard conditions such as resources, procedures, or timeliness are temporarily difficult to meet, positive body-language cues can, through dual channels of affect and information, foster emotional connection and trigger expectation recalibration, thereby buffering the gap in service needs in the overall evaluation. This paper defines this as the "compensation effect" [20,24]. Specifically, confirmatory eye contact and appropriate gaze can enhance the sense of being valued and the sense of interaction control; a natural smile and timely facial feedback help relieve tension and maintain a cooperative orientation; synchronized and directional gestures can strengthen the visualization of explanations and the clarity of steps; appropriate service distance and positioning convey respect and a sense of safety; and an open, forward-facing bodily posture reinforces presence and engagement. This series of cues first increases proximity and trust, and then, through the chain of "being understood—re-evaluation," prompts readers to adjust their judgments about accessible resources, acceptable steps, and expected duration, ultimately manifesting as greater tolerance of deficiencies and a rebound in satisfaction [16,24]. Meanwhile, body language is low-cost, immediate, and trainable, and can be perceived consistently across different positions and spatial environments. Thus, its main effect has both theoretical and practical necessity for explaining experience recovery in situations of service insufficiency [14,22]. Accordingly, the following hypotheses are proposed:

H1a: Eye contact has a significant positive effect on the compensation effect.

H1b: Facial expressions have a significant positive effect on the compensation effect.

H1c: Gestural movements have a significant positive effect on the compensation effect.

H1d: Spatial distance has a significant positive effect on the compensation effect.

H1e: Body posture has a significant positive effect on the compensation effect.

2.2.2 Hypotheses on contextual differences across service scenarios

Service scenarios determine how readers allocate attention among “interpersonal cues–process cues–physical cues,” thereby affecting the entry and processing of nonverbal information [14-15,22]. Although front-line library services differ in interaction density and task complexity, they all contain input channels for body-language cues that can be “seen–decoded–internalized” by readers, thus repairing gaps in service needs through the pathway of “emotional connection–expectation recalibration” [24]. To ensure the external validity and generalizability of the proposition, this paper does not compare the strength of effects, but instead verifies the stable positive effect of body language across different service types. The specific definitions are as follows: reference consultation focuses on problem clarification and knowledge-based explanation, where common confirmatory gaze, nodding, and open posture help convey understanding and willingness to cooperate; reading promotion emphasizes group interaction and atmosphere building, where facial feedback and rhythmic gestures can enhance participation and presence; circulation and borrowing mainly involve rule explanation and procedure handling, where appropriate positioning, courteous posture, and directional gestures help maintain order and a friendly experience; digital-resource guidance depends on tools and steps, where co-screen positioning, demonstrative gestures, and gaze-checking can reduce operational anxiety and improve comprehension; and spatial services revolve around order maintenance and immediate reminders, where distance control, body orientation, and concise gestures can convey respect and goodwill within brief encounters. These cues can all reduce uncertainty and psychological distance within a short time window, prompting readers to re-evaluate procedures, timeliness, and accessible resources, thereby generally buffering dissatisfaction and improving evaluations [14,16,24]. Accordingly, the following decomposed hypotheses are proposed:

H2a: In reference consultation scenarios, librarians’ body language has a significant positive effect on the compensation effect.

H2b: In reading promotion scenarios, librarians’ body language has a significant positive effect on the compensation effect.

H2c: In circulation and borrowing scenarios, librarians’ body language has a significant positive effect on the compensation effect.

H2d: In digital-resource guidance scenarios, librarians’ body language has a significant positive effect on the compensation effect.

H2e: In spatial service scenarios, librarians’ body language has a significant positive effect on the compensation effect.

2.2.3 Moderation hypotheses concerning readers’ individual characteristics

For body language to take effect, in addition to the readability of the sender’s expression, it also depends on the receiver’s ability to “decode–attribute

—internalize” nonverbal cues. Existing studies have indicated that individual differences exist in sensitivity to recognizing cues such as gaze, expression, posture, and distance, as well as in semantic mapping and normative thresholds; these differences affect the formation of perceived closeness, credibility, and being understood [16,19]. In the satisfaction-formation pathway, individuals first establish emotional connection based on interpersonal cues, then recalibrate expectations regarding procedures, timeliness, and resource constraints, and ultimately manifest this in the overall evaluation as a buffering of the gap in service needs [20,24]. Therefore, readers who are better able to interpret nonverbal information or are more familiar with service scripts are more likely to internalize body-language cues as supportive evidence, thereby strengthening the chain of “body language—emotional connection—expectation recalibration—compensation effect.”

This is reflected in three categories of characteristics. First, age indicators are often associated with socialization experience, situational judgment, and attentional control. Older readers are more stable in recognizing expressions and inferring the meaning of gaze, are more likely to form low-conflict interaction rhythms and higher relational tolerance, and thus allow body-language cues to be transformed more quickly into drivers of connection and re-evaluation [19]. Second, educational background enhances abstract reasoning and contextual integration ability, which facilitates integrating dispersed posture, gesture, and distance cues into interpretable service intentions and cooperation signals, thereby increasing the willingness and degree of recalibration [16,24]. Third, usage frequency reflects familiarity with scenarios and role scripts. Repeated contact reduces decoding costs and uncertainty, making the same body-language input easier to “see—understand—adopt,” while accumulating positive expectations at the relational level, thereby improving the efficiency of compensation [19,24].

Based on the above reasoning, the following moderation hypotheses are proposed:

H3a: Reader age has a positive moderating effect on the relationship between body language and the compensation effect.

H3b: Reader educational background has a positive moderating effect on the relationship between body language and the compensation effect.

H3c: Readers’ frequency of use positively moderates the relationship between body language and the compensatory effect.

2.3 Research Model

Taking “nonverbal communication theory—expectancy-confirmation mechanism—service compensation theory” as the overall framework, this study constructs the research model shown in Figure 1. The model unfolds around “body language—emotional connection—expectation recalibration—compensatory effect—

service-demand gap,” revealing how librarians’ bodily behaviors influence readers’ service perceptions and satisfaction through both affective and cognitive pathways. Specifically, body language serves as the independent variable and covers five dimensions: eye contact, facial expression, gestural movement, spatial distance, and body posture, representing the nonverbal cues in service interactions. Emotional connection and expectation recalibration are set as serial mediators: the former reflects readers’ sense of being understood, respected, and trusted during service encounters, while the latter embodies readers’ process of self-adjustment and reconfirmation of their original expectations when facing information uncertainty and resource constraints. As the core outcome variable, the compensatory effect refers to the psychological buffering and satisfaction repair achieved by service behaviors in readers’ cognition; it negatively affects the service-demand gap and constitutes a key link in improving satisfaction. The model also introduces two types of moderating variables: service scenarios and readers’ individual characteristics. Service scenarios include five categories—reference consultation, reading promotion, circulation and borrowing, digital resource guidance, and space services—to test the stability of body-language effects across different service contexts; reader characteristics cover age, educational background, and frequency of use, in order to examine the influence of individual differences on body-language decoding and cognitive repair. Thus, an integrated structure of “main effects—serial mediation—dual moderation” is formed, providing theoretical grounds and model support for subsequent hypothesis testing.

Figure 1 Theoretical model

Service scenario (moderation)

Reference consultation / reading promotion / circulation and borrowing / digital resource guidance / space services

H2a-H2e: all positively strengthened

Body language

Five dimensions: eye contact, facial expression, gestural movement, spatial distance, body posture

H1a-H1e (main effects) → Compensatory effect

Service compensation theory

Serial mediation:

Emotional connection

Service relationship / rapport

→ **Expectation recalibration**

Expectancy-confirmation mechanism

→ **Compensatory effect**

Service compensation theory

→ **Service-demand gap**

Process partial satisfaction

Readers’ individual characteristics (moderation)

Age / educational background / frequency of use

H3a-H3e: all positively strengthened

3 Research Design

3.1 Samples and Data

This study used eight libraries in Guangdong Province as the sampling frame and conducted stratification by library type and service scenario. Library types included public libraries (2), university libraries (3), primary and secondary school libraries (2), and specialized libraries (1); service scenarios included reference consultation, reading promotion, circulation and borrowing, digital resource guidance, and space services. Quotas were set for each stratum according to the actual staffing levels and workloads within the libraries, and the questionnaire survey was completed on site in combination with convenience sampling.

Table 1 presents the basic structure of the sample. The reader sample was mainly composed of people aged 18–35 (46.7%), with educational attainment concentrated at the junior-college/undergraduate level (51.6%), and the most common frequency of use was “several times per month” (39.8%). This distribution is broadly consistent with the actual use of libraries in Guangdong. Among the librarian sample, the proportion of women was relatively high (67.5%); professional librarians accounted for more than 60% (65.1%); and the group with 6–10 years of work experience was the largest (31.3%), forming the backbone of library services.

Table 1 Basic Sample Information

Category	Variable	Level	Frequency	Percentage/%	Category	Variable	Level	Frequency	Percentage/%
Reader	Gender	Male	106	43.1	Librarian	Gender	Male	27	32.5
Reader	Gender	Female	140	56.9	Librarian	Gender	Female	56	67.5
Reader	Age	Under 18	42	17.1	Librarian	Years of service	Under 3 years	18	21.7
Reader	Age	18–35 years	115	46.7	Librarian	Years of service	3–5 years	24	28.9
Reader	Age	36–50 years	61	24.8	Librarian	Years of service	6–10 years	26	31.3
Reader	Age	50 years and above	28	11.4	Librarian	Years of service	10 years and above	15	18.1

Category	Variable	Level	Frequency	Percentage/%	Category	Variable	Level	Frequency	Percentage/%
Reader Education	Junior back-ground school or below	Junior high school	33	13.4	Librarian Position	Managerial staff		12	14.4
Reader Education	Senior back-ground school / technical secondary school	Senior high school	52	21.2	Librarian Position	Professional librarian		54	65.1
Reader Education	Junior back-ground college / undergraduate	Junior college	127	51.6	Librarian Position	Support staff		17	20.5
Reader Education	Master's degree or above	Master's degree	34	13.8	Librarian Post	Reference consultation		26	31.3
Reader Frequency of use	Several times per week	Several times per week	56	22.8	Librarian Post	Circulation and borrowing		22	26.5
Reader Frequency of use	Several times per month	Several times per month	98	39.8	Librarian Post	Reading promotion		14	16.9
Reader Frequency of use	Several times per quarter	Several times per quarter	67	27.2	Librarian Post	Digital resource guidance		9	10.8

Reader Frequency of use	Occasional	25	10.2	Librarian Post	Space services	12	14.5
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3.2 Measurement and Instruments

Drawing on the theories discussed above, and referring to the studies of Richmond V. P. et al. [23], Gremler D. D. et al. [24], and Bhattacharjee A. [25], a scale was designed (see Table 2). To further diagnose gaps in service needs, this study, in light of frontline library service scenarios, established five single-item diagnostic indicators: basic services, resource acquisition, professional knowledge consultation, environmental comfort, and personalized needs. This part adopts single-item measurement by category: readers evaluate, from their personal perspective, the gap between each dimension and their expectations, while librarians evaluate, from the librarian perspective, readers' gaps on the same dimensions. All items are rated on a Likert scale (1 = strongly disagree, 5 = strongly agree).

Table 2 Scale Design

Construct	Dimension	Item Code	Item Wording	Item Reference Source
Body language	Eye contact	EC1	When communicating with me, the librarian can make eye contact promptly, and will look back at me again to confirm attention when key points are mentioned.	[16, 23]

Construct	Dimension	Item Code	Item Wording	Item Reference Source
Body language	Eye contact	EC2	When I ask questions, the duration of the librarian' s gaze makes me feel attended to without making me feel constrained.	[16, 23]
Body language	Eye contact	EC3	When explaining steps or key points, the librarian uses eye contact to check whether I understand.	[16, 23]
Body language	Facial expression	FE1	The smile is natural and appropriate, and does not conflict with the content of the conversation.	[19]
Body language	Facial expression	FE2	The expression conveys understanding and encouragement, making me willing to continue communicating.	[19]

Construct	Dimension	Item Code	Item Wording	Item Reference Source
Body language	Facial expression	FE3	When I hesitate, the librarian' s facial feedback can ease my nervousness.	[19]
Body language	Gestures	GE1	Directional gestures are clear and can help me locate resources or places.	[14-15]
Body language	Gestures	GE2	During explanations, gestures are consistent with oral explanations and are appropriately paced.	[14-15]
Body language	Gestures	GE3	When an operation needs to be demonstrated, the movements are clear and easy to follow.	[14-15]
Body language	Spatial distance	SD1	The standing angle is reasonable and facilitates conversation and observation.	[18]

Construct	Dimension	Item Code	Item Wording	Item Reference Source
Body language	Spatial distance	SD2	The service distance is appropriate —neither too close nor too distant.	[18]
Body language	Spatial distance	SD3	In crowded settings, the librarian can proactively adjust their position, making me feel more comfortable.	[18]
Body language	Body posture	BP1	The librarian' s body is oriented toward me and listens attentively, without the perfunctory feeling of being “half-turned away.”	[17]
Body language	Body posture	BP2	The posture is open, such as nodding or leaning slightly forward, reflecting engagement and respect.	[17]

Construct	Dimension	Item Code	Item Wording	Item Reference Source
Body language	Body posture	BP3	Before the service ends, the librarian uses posture or movement to confirm whether I still need help.	[17]
Mediating variable	Emotional bonding	AB1	When interacting with the librarian, I feel understood and respected.	[24]
Mediating variable	Emotional bonding	AB2	I am willing to continue consulting the librarian or seeking help from them.	[24]
Mediating variable	Emotional bonding	AB3	Interacting with the librarian makes me feel relaxed and more willing to express my real needs.	[24]
Mediating variable	Expectation recalibration	ER1	Based on the current conditions, I have adjusted my original service expectations.	[20, 25]

Construct	Dimension	Item Code	Item Wording	Item Reference Source
Mediating variable	Expectation recalibration	ER2	I can accept this service method and pace.	[20, 25]
Mediating variable	Expectation recalibration	ER3	I have reassessed my requirements for resource provision or service timeliness.	[20, 25]
Outcome variable	Compensation effect	CE1	The librarian's body-language expression alleviated my feelings about deficiencies in the service.	[15]
Outcome variable	Compensation effect	CE2	Although there were shortcomings, my overall experience this time was still good.	[15]
Outcome variable	Compensation effect	CE3	In the future, I would still be willing to continue using or revisit this service.	[15]

Construct	Dimension	Item Code	Item Wording	Item Reference Source
Outcome variable	Service-needs gap	DG1	The actual experience was lower than my prior expectations.	[20, 25]
Outcome variable	Service-needs gap	DG2	In the aspects I value, the degree to which this service was fulfilled was insufficient.	[20, 25]
Outcome variable	Service-needs gap	DG3	Compared with my expectations, this service gave me a sense of gap.	[20, 25]
Moderating variable	Service scenario	SC	The type of service you experienced this time is: reference consultation; reading promotion; circulation and borrowing; digital-resource guidance; space service.	[14]
Moderating variable	Reader individual characteristics	RC1–RC3	Age / educational background / frequency of use	Self-reported scale items

Reliability and validity tests were performed. The Cronbach's α coefficients of the scales ranged from 0.85 to 0.92; the KMO value was 0.891, and Bartlett's test of sphericity was significant ($p < 0.001$). Standardized factor loadings ranged from 0.64 to 0.88; composite reliability (CR) for each dimension ranged from 0.86 to 0.93; and average variance extracted (AVE) ranged from 0.53 to 0.71. The AVE for each dimension was greater than the squared correlations between dimensions, and HTMT values ranged from 0.41 to 0.79, indicating good discriminant validity. Using "reader satisfaction" and "intention to revisit" as criterion variables, the correlation analysis showed that the compensation effect was significantly positively correlated with reader satisfaction ($r = 0.63$, $p < 0.001$) and intention to revisit ($r = 0.47$, $p < 0.001$), confirming the criterion validity of the scale.

3.3 Analysis Methods

For the main effects of body language on the compensation effect (H1a-H1e), multiple regression was first conducted in R, with the five body-language dimensions entered into the same model. Subsequently, a latent-variable structure was built in Mplus 8.10, specifying the direct path of "body language—compensation effect" to re-examine the main effects at the latent-variable level and to control for measurement error. The formal statistical conclusions are based on the Mplus output. This study also used AMOS 28 to draw the theoretical path diagram and to conduct a one-time sensitivity recheck of the baseline model, in order to examine the stability of path directions and significance across different software environments; however, the AMOS estimates are not reported separately, to avoid duplicate presentation.

For the hypotheses concerning service scenarios (H2a-H2e), one-way analysis of variance was first conducted in R to compare mean differences in the compensation effect across the five types of scenarios, along with tests of homogeneity of variance. Under conditions of heterogeneity, Welch's correction and Games-Howell post hoc comparisons were used. To verify at the structural level the proposition that "the effect of body language on the compensation effect is positive and significant in all service scenarios," multi-group structural equation modeling was further conducted in Mplus. Configural, loading, and intercept equivalence were tested in sequence, and, once invariance was satisfied, the significance and magnitude of key paths were compared.

For the moderating effects of readers' individual characteristics (H3a-H3c), hierarchical regression was conducted in R. In the first step, the composite body-language score was entered; in the second step, age, educational background, and usage frequency were added; in the third step, centered interaction terms were introduced. Incremental explanatory power and interaction coefficients were reported, and simple slopes as well as Johnson-Neyman regions of significance were provided. To control for measurement error and examine the robustness of latent interactions, the LMS/product-indicator approach was used for rechecking in Mplus.

To integrate the relationships among “body language—emotional connection—expectation recalibration—compensation effect—service demand gap (negative direction),” while simultaneously handling complex structures such as parallel and sequential mediation, groups, and interactions, this paper adopts structural equation modeling (SEM) as the core analytical tool. In Mplus, confirmatory factor analysis was first used to verify the reliability, validity, and discriminant validity of the measurement model, after which the structural model was estimated. For indirect effects, 5,000 bootstrap resamples were used to obtain bias-corrected confidence intervals, in order to determine whether the chain mediation was supported. The necessity of using SEM lies in the following: first, it can control measurement error at the latent-variable level and improve the validity of path estimates; second, it can estimate direct effects and chain-mediating effects synchronously within the same framework, avoiding coefficient bias caused by stepwise regression; third, it facilitates multi-group and latent-interaction tests within the same model, thereby presenting the boundary conditions of “scenarios and populations” at the structural level.

4 Research Results

4.1 Body-Language Conditions

From the readers’ perspective, perceived levels across the five body-language dimensions were not equal. Facial expression scored the highest ($M = 4.12$, $SD = 0.76$), followed by eye contact ($M = 3.95$, $SD = 0.82$) and body posture ($M = 3.87$, $SD = 0.79$). Gestures were at a medium level ($M = 3.71$, $SD = 0.88$), while spatial distance was the lowest ($M = 3.56$, $SD = 0.91$) (see Table 3). This indicates that in real service situations, readers more readily capture cues that are “direct and emotionally dense” (such as expressions and eye contact), whereas they are less sensitive to the relatively indirect cue of spatial distance. Librarians’ self-ratings were generally higher than readers’ evaluations, especially for eye contact and facial expression; however, for gestures and spatial distance, librarians attached insufficient importance to these aspects, forming a contrast with readers’ perceptions.

Table 3. Current Status of Perceived Body Language

Body-language dimension	Readers $M(SD)$	Librarians $M(SD)$
Eye contact	3.95 (0.82)	4.23 (0.68)
Facial expression	4.12 (0.76)	4.35 (0.62)
Gestures	3.71 (0.88)	3.65 (0.94)
Spatial distance	3.56 (0.91)	3.58 (0.89)
Body posture	3.87 (0.79)	3.92 (0.74)

4.2 Current Status of Service Demand Gaps

Readers perceived relatively large gaps in resource access ($M = 3.45$, $SD = 1.02$) and professional knowledge consultation ($M = 3.39$, $SD = 0.97$), while gaps in basic services ($M = 2.65$, $SD = 0.81$) and environmental comfort ($M = 2.78$, $SD = 0.85$) were relatively small (see Table 4). Librarians generally underestimated readers' dissatisfaction with resource access and overestimated the gap in personalized needs, indicating a mismatch between the supply and demand sides in identifying "pain points."

Table 4. Supply-Demand Comparison of Service Demand Gaps

Service dimension	Readers $M(SD)$	Librarians $M(SD)$	Difference ΔM (librarians – readers)
Basic services	2.65 (0.81)	2.80 (0.75)	0.15
Resource access	3.45 (1.02)	3.10 (0.90)	–0.35
Professional knowledge consultation	3.39 (0.97)	3.25 (0.88)	–0.14
Environmental comfort	2.78 (0.85)	2.95 (0.80)	0.17
Personalized needs	3.21 (0.94)	3.55 (0.80)	0.34

4.3 Main-Effects Regression Test

The five body-language dimensions were simultaneously entered into a multiple regression model. The model fit was good ($R^2 = 0.785$, Adj. $R^2 = 0.779$, $F = 175.324$, $p < 0.001$), and the VIF values ranged from 1.51 to 1.73, indicating that multicollinearity was within a safe range. All five dimensions had significant positive effects on the compensatory effect (see Table 5): eye contact and facial expressions ranked highest in coefficient size; body posture and gesture movements followed; spatial distance was weaker but still significant. The results are consistent with the expectation that "cues with higher emotional density and stronger intuitiveness have stronger compensatory power." H1a–H1e were all supported.

Table 5 Regression Results of Body Language on the Compensatory Effect

Independent variable	β	t value	p value	VIF
Eye contact	0.782	14.216	0.000***	1.685
Facial expression	0.731	12.954	0.000***	1.732
Gesture movement	0.526	8.375	0.000***	1.648

Independent variable	β	t value	p value	VIF
Spatial distance	0.412	6.743	0.000***	1.512
Body posture	0.594	9.762	0.000***	1.623

4.4 Analysis of Variance for Scenario Differences

Before conducting the one-way analysis of variance, the distributional characteristics of compensatory-effect scores under different service scenarios were first examined. The skewness and kurtosis of the samples in each scenario were all within conventional acceptable ranges, and the normality tests did not show significant deviations; thus, the data could be approximately regarded as normally distributed. Levene's test for homogeneity of variance was not significant ($p > 0.05$), indicating that the variance differences among scenario groups were not statistically significant and that the assumption of equal variances was satisfied. On this basis, one-way ANOVA under the equal-variance assumption and the corresponding post hoc comparison methods were used to compare the different service scenarios.

The one-way ANOVA results showed that the compensatory effect differed significantly across service scenarios ($F = 28.463$, $p < 0.001$). The mean for reference consultation was the highest, exceeding those for reading promotion and circulation/borrowing; digital-resource guidance and space services were slightly lower (see Table 6). This result indicates that service scenarios significantly affect the strength of the compensatory effect of librarians' body language.

Table 6 Compensatory Effects Under Different Service Scenarios

Service scenario	M	SD
Reference consultation	4.25	0.65
Reading promotion	4.13	0.69
Circulation/borrowing	4.06	0.72
Digital-resource guidance	4.02	0.83
Space services	4.00	0.87

Under the premise of homogeneity of variance, this study further conducted post hoc comparisons of the mean compensatory effects across the five types of service scenarios. To test the robustness of the conclusions, both the least significant difference (LSD) test and the Bonferroni correction were used (see Table 7). The results show that, under the Bonferroni correction, the difference between reference consultation and reading promotion was not significant, but reference consultation was significantly higher than circulation/borrowing ($p < 0.001$). Reading promotion was also significantly higher than circulation/borrowing ($p = 0.045$). In addition, the difference between circulation/borrowing and digital-resource guidance was significant under the LSD test ($p = 0.012$), but

did not reach significance after Bonferroni correction ($p = 0.06$), showing a marginally significant trend; the difference between digital-resource guidance and space services was not significant. Overall, the means across scenarios showed a gradient trend of “reference consultation reading promotion > circulation/borrowing > digital-resource guidance space services,” but under strict correction, only some scenario comparisons reached significance.

Table 7 Post Hoc Comparisons of Mean Differences in Compensatory Effects Between Service Scenarios

Scenario	Mean difference ΔM	Standard error SE	Lower limit of 95% confidence interval	Upper limit of 95% confidence interval	p (LSD)	p (Bonferroni)	Significance (Bonferroni)
Reference consultation vs Reading promotion	0.12	0.067	-0.01	0.25	0.078	0.39	Not significant
Reference consultation vs Circulation/borrowing	0.36	0.075	0.21	0.51	0	<0.001	***
Reading promotion vs Circulation/borrowing	0.24	0.086	0.07	0.41	0.009	0.045	*

Scenario	Mean difference ΔM	Standard error SE	Lower limit of 95% confidence interval	Upper limit of 95% confidence interval	p (LSD)	p (Bonferroni)	Significance (Bonferroni)
Circulation/Digital resource guidance vs Digital resource guidance	0.08	0.11	0.06	0.5	0.012	0.06	Not significant (close to 0.05)
Digital resource guidance vs Space services	0.07	0.091	-0.11	0.25	0.433	1	Not significant

4.5 Hierarchical Regression for Population Heterogeneity

After controlling for the main effects, age, educational background, usage frequency, and their interaction terms with body-language perception were gradually entered into the model. The explanatory power of the model increased from $R^2 = 0.523$ to 0.615, and the increment was significant ($\Delta R^2 = 0.053$, $p < 0.001$). All three interaction terms were significant (see Table 8): the positive effect of body language on the compensatory effect was stronger among older, more highly educated, and high-frequency user groups. Simple slopes and subgroup regressions showed that the predictive effect in the older group ($+1SD$, $\beta = 0.859$) was significantly stronger than that in the younger group ($-1SD$, $\beta = 0.507$); the higher-education group ($\beta = 0.826$) was significantly stronger than the lower-education group ($\beta = 0.540$); and the high-frequency use group ($\beta = 0.878$) was significantly stronger than the low-frequency use group ($\beta = 0.488$). All subgroup coefficients satisfied $p < 0.001$.

Table 8 Moderating effects of individual characteristics

Variable	Model 1	Model 2	Model 3
Body-language perception	0.723***	0.715***	0.683***
Age		0.128*	0.132*

Variable	Model 1	Model 2	Model 3
Educational background		0.146*	0.155*
Frequency of use		0.203**	0.212**
$X \times$ age			0.176**
$X \times$ educational background			0.143*
$X \times$ frequency of use			0.195**
R^2	0.523	0.562	0.615
ΔR^2	—	0.039**	0.053***

4.6 Structural equation model validation

To ensure consistency in the interpretation of the analytical results, this section reports all goodness-of-fit indices and threshold judgments for the structural equation models. Commonly used fit indices include: chi-square/degrees of freedom ($\chi^2/\text{df} < 3$ is good, < 5 is acceptable), comparative fit index ($\text{CFI} \geq 0.90$, preferably ≥ 0.95), incremental fit index ($\text{TLI} \geq 0.90$), root mean square error of approximation ($\text{RMSEA} \leq 0.08$, preferably ≤ 0.06), and standardized root mean square residual ($\text{SRMR} \leq 0.08$). In multi-group invariance testing, $\Delta\text{CFI} \leq 0.010$ and $\Delta\text{RMSEA} \leq 0.015$ were used as the decision thresholds. To examine the rationality of the overall structure, a covariance-based structural equation model (CB-SEM) was further constructed. The SEM in this study adopted the covariance-based structural equation modeling framework (CB-SEM), with the estimator being maximum likelihood estimation with robust standard errors (MLR). Mplus 8.10 was used for parameter estimation, R/lavaan was used to recheck the results, and AMOS 28 was used to draw the path diagram. The model fit indices were good: $\chi^2/\text{df} = 2.37$, $\text{CFI} = 0.942$, $\text{TLI} = 0.928$, $\text{RMSEA} = 0.058$, $\text{SRMR} = 0.045$. The direction and significance of each path were consistent with the regression results (see Table 9), among which eye contact and facial expression still had the strongest effects; the paths for service scenarios and individual characteristics were also significant, confirming the existence of the “scenario—population” boundary.

Table 9 Path coefficients of the structural equation model

Path	β	t value	p value
Eye contact—compensatory effect	0.776	14.053	0.000***

Path	β	t value	p value
Facial expression—compensatory effect	0.724	12.867	0.000***
Gestural action—compensatory effect	0.519	8.238	0.000***
Spatial distance—compensatory effect	0.405	6.615	0.000***
Body posture—compensatory effect	0.587	9.634	0.000***
Service scenario—compensatory effect	0.213	5.126	0.000***
Age—compensatory effect	0.132	2.953	0.003**
Educational background—compensatory effect	0.153	3.268	0.001**
Frequency of use—compensatory effect	0.209	4.736	0.000***

On the basis of the main model, two additional standard checks were conducted. First, 5,000 Bootstrap resamples were used to test the chain mediation: the indirect effects of body language on the compensatory effect through “emotional bonding” and “expectation recalibration” were both significant ($\beta = 0.31, 0.27$; chain $\beta = 0.18$, with 95% CIs all not crossing 0); meanwhile, “compensatory effect—service-demand gap” was significantly negative ($\beta = -0.43, p < 0.001$), forming a complete chain. Second, the multi-group invariance test for service scenarios was passed (ΔCFI and ΔRMSEA reached the thresholds), and the rechecking of latent interactions for reader characteristics (LMS/product-indicator terms) was consistent with the simple-slope and Johnson-Neyman results.

The good fit and significant paths of the SEM provided structural-level confirmation for the preceding hypothesis tests: the directions and significance of H1a–H1e, H2a–H2e, and H3a–H3c were all supported in the overall model.

5 Discussion of results

5.1 Basic conclusions

This paper confirms that librarians' body language—eye contact, facial expression, gestural action, spatial distance, and body posture—has a significant positive effect on the compensatory effect (H1a–H1e), and that this effect holds across five types of frontline service scenarios: reference consultation, reading promotion, circulation and borrowing, digital-resource guidance, and space services (H2a–H2e). Meanwhile, age, educational background, and frequency of use positively moderate the relationship between “body language—compensatory effect” (H3a–H3c). Overall, the results support the continuous chain of “interpersonal cues—emotional processing—expectation recalibration—overall evaluation,” indicating that in situations where resources or processes are constrained, nonverbal cues can buffer readers' adverse perceptions of the “service-demand gap” through dual affective and informational pathways^[14–16,24].

The chain mediation analysis further reveals the internal structure of the role of body language. Emotional bonding and expectation recalibration each play significant mediating roles between body language and the compensatory effect, and their joint effect forms a stable psychological compensation channel. The statistical results show that the indirect effect through “emotional bonding—compensatory effect” is the strongest, indicating that emotional factors have the most direct influence in short-term interactions; the path through “expectation recalibration—compensatory effect” is second, reflecting that after perceiving the sincerity and attentiveness of service providers, readers will spontaneously adjust their original expectations, thereby buffering dissatisfaction and the sense of discrepancy. Overall, the multilayer transmission mechanism of “body posture—emotion—cognition—outcome” has been verified, and it also indicates that in the field of public services, nonverbal communication is not an auxiliary behavior but an important signal system that regulates service perception.

All five types of service scenarios show positive relationships (H2a–H2e), but their strengths differ by degree. Reference consultation and reading promotion have the highest interaction density, and body language plays a role in both explanatory and affective cues; although circulation and borrowing are standardized processes, eye confirmation and posture orientation can still enhance the sense of order and trust; in digital-resource guidance and space services, the compensatory role of nonverbal behavior is relatively weaker, but its direc-

consistent in direction. This difference reflects the varying “diagnosticity” of nonverbal cues across different scenarios: in high-uncertainty and high-dependence scenarios, facial expressions, gestures, and distance are more readily noticed and understood, and thus exert a more significant influence on readers' psy-

chological perceptions; in low-interaction scenarios, readers' attention is more concentrated on efficiency and outcomes, so the marginal effect of nonverbal cues declines accordingly. Overall, body language can maintain a positive effect across different service environments, with its strength depending on task complexity and interaction intensity.

At the group level, the moderating effects of age, educational background, and frequency of use indicate that readers differ significantly in their sensitivity to, and ability to decode, nonverbal cues. Older readers place greater value on politeness and patience, and respond more sensitively to changes in micro-expressions and posture; readers with higher educational attainment tend to judge service quality based on behavioral consistency and logic; groups with higher frequency of use pay more attention to the stability and predictability of interactions. Based on this, segmented training strategies can be established in practice: reference consultation should emphasize "confirmatory eye contact and an open posture"; reading promotion should strengthen "rhythmic expressions and emotional transmission"; circulation and borrowing should stress "distance control and demonstrative gestures"; digital resource guidance should focus on "same-screen positioning and synchronized operation"; and space services should highlight "polite reminders and order maintenance." At the same time, key body-language behaviors should be translated into quantifiable indicators, and key nodes—such as the rate of eye-contact confirmation, expression consistency, gesture coordination rate, and qualified distance-maintenance rate—should be incorporated into training and assessment systems.

5.2 Comparison with Previous Studies

Compared with existing studies, the findings of this paper both echo prior work and offer innovation. They not only extend the dimensions of research but also lay a new empirical foundation for future studies on nonverbal communication. In terms of the effects of nonverbal communication, the results support the conclusion of Zhong Xiaohua et al.[1], namely that librarians' professional competence plays a decisive role in service quality. However, this paper further shows that body language itself is also a form of "implicit professional competence." This complements the psychological-contract research emphasized by Yang Feiying et al.[6]: while the latter stresses the importance of multidimensional communication, this paper specifically quantifies the relative effectiveness of various types of bodily signals.

With respect to differences among service scenarios, the results of this paper echo the study by Wang G et al.[4] on the multidimensional transformation of librarians' roles. The difference is that this paper presents, in more concrete terms, the differentiated performance of body language across various scenarios—especially the prominent position of the reference-consultation scenario—which can provide empirical support for optimizing service models in smart libraries. Even against the backdrop of an increasingly strong trend toward digitalization, face-to-face consultation remains irreplaceable.

In discussing individual differences, this paper specifies users' perceptual differences in service among adult groups, confirming that older, more highly educated, and high-frequency users rely more strongly on body language. This conclusion resonates with the study by Al-Hamad M M[2], but this paper is more specific in its operationalization, explicitly incorporating the three types of characteristics as moderating variables.

In terms of research methodology, this paper differs from the approach of Diao J[3] and Sun Sixi et al.[11], who relied on qualitative analysis. Instead, through scale development and empirical testing, it provides more objective and quantifiable evidence. In research perspective, this paper takes the "compensation effect" as its entry point, rather than merely examining service satisfaction, thereby complementing the mobile-service research of Hussain A et al.[10].

5.3 Policy Recommendations

First, systematically improve librarians' body-language competence. Body language is not only a matter of etiquette but also part of service capability. It should be incorporated into pre-service and in-service training, and a closed loop of "demonstration—practice—feedback—review" should be established, preferably over a cycle of 6–8 weeks. Operable checklists should be set up, covering eye contact, facial expressions, gestures, stance and distance, body posture, and closing confirmation, in combination with peer review and video playback. Monthly spot checks, quarterly retraining, and mystery visitors should be implemented in parallel; a regular assessment mechanism should be established, and librarians who fail to meet standards should receive follow-up coaching.

Second, refine scenario-based strategies. Reference consultation should emphasize "brief, intermittent eye-contact confirmation + concise restatement"; positioning should mainly adopt an open position to the front side, with directional gestures used when necessary, and the interaction should conclude by indicating the next steps. Reading promotion should highlight the rhythm of expressions and gestures while also taking into account eye-contact coverage across different areas. Circulation and borrowing services should maintain friendly greetings and avoid obstructing movement paths, with complex issues referred in a timely manner. Digital resource guidance should adopt same-screen positioning and an explanatory approach of "point—pause—confirm," while providing step cards/QR codes. Space services should mainly rely on patrols; the communication distance should be about one arm's length to one and a half arm's lengths, and eye-contact and gesture reminders should be used first.

Third, implement person-specific measures and communicate precisely. When facing older readers, slow the pace and leave more sufficient personal space; when facing readers with higher educational attainment, maintain an upright posture and concise gestures, highlighting logic and professionalism. High-frequency users value a stable and consistent service style, so the same set of interaction scripts should be maintained as much as possible. For users with special needs,

alternative methods should be provided, such as text cards, enlarged print, and pictorial explanations, while respecting cultural differences. Communication methods should be continuously calibrated through brief preference records and follow-up visits.

Fourth, promote the integration of body language with intelligent services. On-line consultation should pay attention to camera height, lighting, and a tidy background, while maintaining natural expressions and stable posture. During screen explanations, cursors/annotations should be used in place of exaggerated gestures. In-library navigation and self-service equipment should optimize icons and prompt actions to reduce the burden of verbal explanation. Friendly postures and nodding feedback should be preset in robots and digital navigation systems. A “body-language style library” should be established, and indicators such as satisfaction, willingness to revisit, complaint rate, and referral rate should be used for monthly dashboards and quarterly reviews, transforming body language from an initiative into a routine process.

5.4 Research Limitations and Prospects

This paper also has certain limitations. First, cross-sectional data cannot completely rule out reverse causality; that is, those with stronger service capabilities may simultaneously display more natural body language and receive better evaluation results. Second, self-report questionnaires may lead to common method bias. Future research may introduce behavioral

...video coding or third-party observation could be used to verify the correspondence between the objective manifestations of body language and subjective perceptions. The sample came from a single region, which limits generalizability; subsequent studies may conduct validation with samples from different types of libraries and regions. Overall, the findings provide data-based confirmation of the psychological compensatory function of body language, offer evidence for improving library service standards and training mechanisms, and also suggest that, beyond institutionalized procedures, public service organizations should attend to the foundational role of the emotional experience of “being understood” in the formation of service satisfaction.

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A Study on the Compensatory Effect of Librarians' Body Language on Reader Service Demand Gap

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Abstract This study focuses on the often-overlooked compensatory role of librarians' body language in addressing service demand gaps. Grounded in service compensation theory, nonverbal communication theory, and expectation confirmation theory, a mechanism of "body language-emotional connection-expectation recalibration" is constructed. Taking eight different types of libraries in Guangdong Province as the research setting, data from 246 reader questionnaires and 83 librarian questionnaires were collected and analyzed using descriptive statistics, regression/variance analysis, and structural equation

modeling. The findings reveal that positive body language significantly alleviates readers' perception of service inadequacy, with eye contact and facial expressions exhibiting the most prominent effects. The compensatory effect is stronger in high-interaction scenarios such as reference consultations. Readers' age, educational background, and frequency of use significantly moderate their perception of this compensatory effect. Theoretically, the study elucidates the mechanism and contextual boundaries of how nonverbal communication compensates for service gaps. Methodologically, it provides an operational scale and a model framework. Practically, it informs body-language strategies tailored to different scenarios and user groups, offering direct value for optimizing reader experience and enhancing precision in service delivery.

Keywords Librarian; Body language; Service demand gap; Compensatory effect; Reader service

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Controversies and Governance in International Journal Rankings in the Index and Citation Checking Services of University Libraries

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Abstract To address the frequent controversies surrounding international journal rankings in the index and citation checking services of university libraries, this study conducts a survey of 102 university libraries certified as Sci-Tech Novelty Search Workstations by the Ministry of Education in China, analyzing the types and causes of these controversies. The findings indicate that journal ranking tiers are widely applied in the evaluation of international journals. However, the implementation standards vary significantly, leading to eight typical categories of disputes. Building on these findings, this study further employs the theory of multiple institutional logics to analyze the differing logics of various actors within the research ecosystem. Accordingly, recommendations are proposed, including the design of a layered and nested rule system, rebalancing the authority of research evaluation entities, and establishing mechanisms for resolving contradictions and disputes. These measures offer practical solutions for addressing controversies under the current evaluation paradigm.

Keywords Index and citation checking; International journal; Grading certification; Dispute resolution; Multiple institutional logics

Note: Figure translations are in progress. See original paper for figures.

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