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AI Emotional Companionship Services Among University Students: Usage and Payment Intentions in Zhejiang's Higher Education Institutions

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Abstract: In the context of growing mental health needs among university students facing academic and social pressures, AI-driven emotional companionship has emerged as a promising support channel. Focusing on Zhejiang Province, this study examined students' usage patterns, functional preferences, willingness to pay, and market potential for AI emotional companionship services. Through 1,361 valid questionnaires and 30 in-depth interviews, data were analyzed using factor analysis, logistic regression, and XGBoost modeling. Findings indicate high acceptance of these services, yet actual usage and payment conversion rates remain limited, with privacy, user experience, and ethical safety identified as critical determinants. The study offers practical recommendations regarding product design, ethical guidelines, pricing strategies, and market positioning, providing empirical support for service development and contributing to the literature on AI adoption in emotional support contexts.

Keywords: AI companionship services; University students' mental health; Willingness to pay; Empirical research

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1. Introduction

In contemporary higher education, university students face significant pressures from academics, careers, and social interactions, often leading to loneliness and psychological strain. Meanwhile, advances in AI—especially in natural language processing and affective computing—have driven the emergence of "AI emotional companionship services." These systems simulate human interaction to provide accessible, low-threshold emotional support, increasingly serving as a supplementary outlet for youth mental well-being.

Moreover, within China's domestic AI companionship services sector, two primary product models have emerged: generative AI conversational assistants like Doubao, Timi, and DeepSeek, which focus on delivering precise information services and emotional support; and role-playing virtual companions such as Love and Deep Space, which employ meticulously designed personas and emotional interactions to simulate authentic emotional experiences [1]. This study primarily focuses on generative AI chat functionalities.

As a region with concentrated higher education resources, Zhejiang Province's university student population exhibits high receptivity to emerging technologies, rendering it both typical and representative. However, empirical research on the

demand structure, usage motivations, and consumption willingness regarding AI companionship services among regional university students remains scarce.

2. Research objectives and innovative contributions

2.1. Research objectives

This study empirically investigates the usage behavior, payment willingness, and market potential of AI companionship services among university students in Zhejiang, focusing on awareness assessment, hierarchical needs, functional preferences, acceptance motivation, privacy concerns, and service optimization suggestions to inform product development.

2.2. Research innovation points

This study employs a mixed-methods approach combining surveys and interviews, utilizes a multi-model analytical framework to identify key factors like privacy and personalization, and synthesizes Maslow's Hierarchy, TAM, and UGT theories with empirical data to analyze emotional drivers.

3. Literature review and theoretical foundations

3.1. Literature review

Research indicates that university students exhibit emotional needs characterized by immediacy and escapism, often resorting to fragmented digital support like "Wangyiyun," though such existing means lack sustained empathy, leaving space for AI companionship services [2]. These services, built on NLP and generative AI, include products such as Doubao, Replika, and virtual idols, which meet psychological needs through personalized interactions [3,4]. Studies confirm AI's emotional support value, noting its effectiveness in reducing isolation and perceived reliability among socially isolated users [5], yet also highlighting post-interaction negative emotions observed via social media analysis [6]. Empirical work finds depression and loneliness drive student adoption, moderated by gender and perceptions of AI's "mental state" [7]. Furthermore, companion chatbots are perceived increasingly as confidants over time, yet raise concerns about dependency and privacy [8].

3.2. Theoretical foundations

Based on the following theoretical foundations, this study primarily constructs its analytical framework:

(1) Maslow's Hierarchy of Needs: Generative AI partially fulfils users' needs for belonging and love [9];

(2) Technology Acceptance Model (TAM): Perceived usefulness and ease of use are key variables influencing user adoption [10];

(3) Use and Gratification Theory (UGT): Users actively select media based on psychological motivations to achieve self-fulfillment.

3.3. Research gap

While previous studies have explored various aspects of AI companionship services—including user motivations, emotional support effectiveness, and ethical concerns—several research gaps remain:

(1) Regional specificity: Studies lack focus on regional adoption patterns, particularly among university students in culturally distinct, high-tech contexts like China's Zhejiang Province.

(2) Willingness to pay: Limited empirical research assesses payment willingness for such services, especially among students with constrained disposable income.

4. Research methodology and design

Building on the theoretical foundations discussed above, the following section outlines the research methodology employed in this study.

4.1. Survey population and sampling method

The study targeted university students in Zhejiang Province. Using stratified sampling, 41 institutions were categorized into three tiers: 985/211 (1 institution), medical universities (3), and general universities (37). A total of 1,500 questionnaires were distributed, with 1,468 returned (response rate 97.8%). After excluding invalid responses, 1,361 valid questionnaires remained (validity rate 92.7%). The sampling process is shown in **Figure 1**.

Among valid responses, gender distribution was approximately balanced, with slightly more female participants. Respondents spanned all undergraduate years, with each year representing about 25% of the sample. In terms of disciplines, science and engineering majors accounted for the largest proportion (32.7%), followed by economics/management (24.8%) and humanities/history (25.6%), indicating a diversified academic background overall.

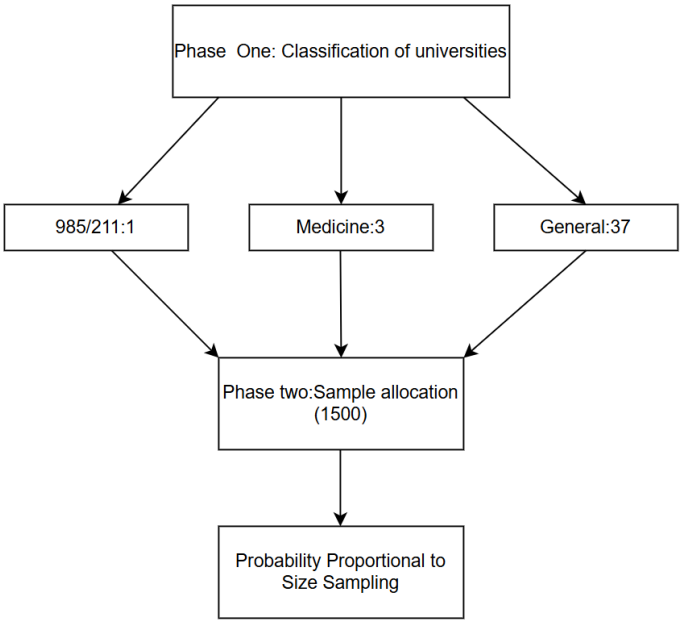

Figure 1. Stratified sampling flowchart

4.2. Data collection and quality control

A pilot study using a 180-questionnaire sample (153 valid, 85% response rate) was conducted to refine the instrument. The formal survey was administered both online and offline from June 1 to September 10, 2025. Quality control included logical checks, validity/reliability items, removal of 107 invalid responses, and structured interviews to ensure data integrity.

Quality control measures included: pre-survey modifications to questionnaire logic and addition of reliability/validity test items; removal of 107 invalid questionnaires during the formal survey (due to inconsistencies, arbitrary responses, etc.); and use of structured interview outlines to ensure data authenticity and validity.

Reliability analysis revealed an overall Cronbach's alpha of 0.902, with good reliability across dimensions (0.671–0.888). Validity analysis showed a KMO value of 0.936 and a significant Bartlett's test ($P < 0.001$), confirming data suitability for factor analysis, as shown in **Tables 1** and **2** below.

Table 1. Cronbach's alpha coefficients

Cronbach's alpha	Cronbach's alpha based on standardized items
0.902	0.904

Table 2. KMO and Bartlett's test

KMO measure of sampling adequacy		0.936
Bartlett's sphericity test	Bartlett's sphericity test	8077.093
	Degrees of freedom	78
	Significance	<0.001

4.3. Analytical methods

Employing a combination of SPSS27.0, Python, and Excel tools, we conducted descriptive statistics, factor analysis, logistic regression, and XGBoost machine learning models to analyze data characteristics and variable relationships from multiple perspectives, with particular focus on the drivers of user behavior and intent. The research process flowchart is shown in **Figure 2** below.

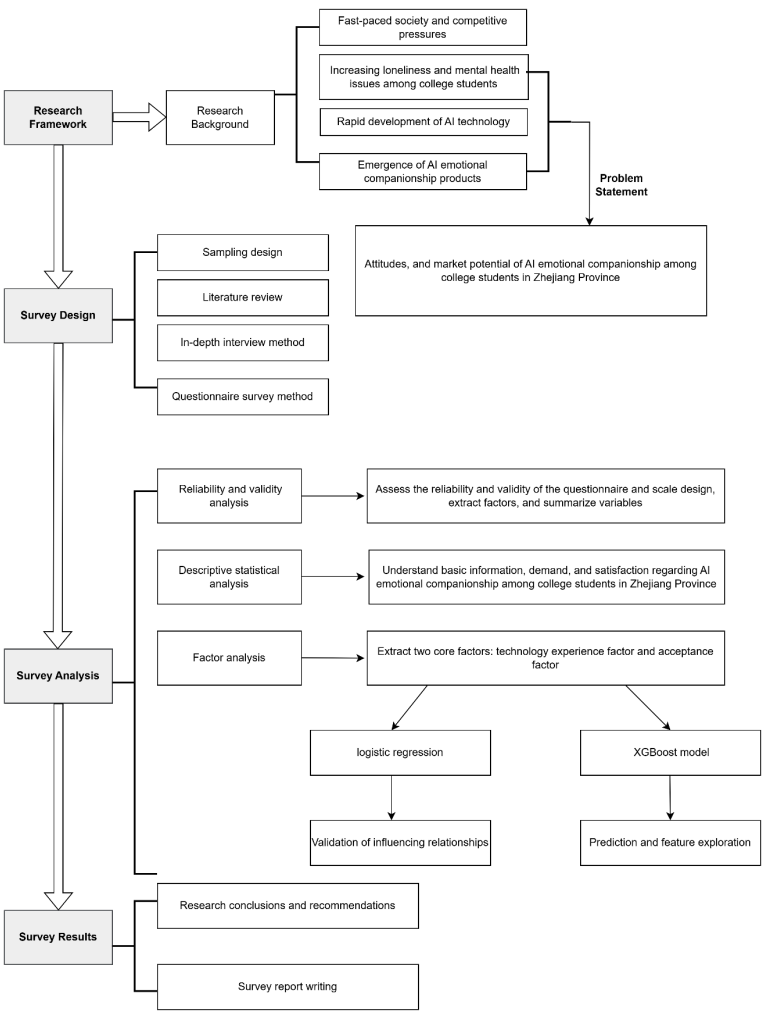

Figure 2. Research process flowchart

5. Research findings

5.1. Current state of awareness and usage

Descriptive statistical analysis reveals that while 87.29% of university students are aware of AI companionship services, only 78.77% have actually used them, indicating a gap between awareness and adoption consistent with the Technology Acceptance Model. Although over 65% of students require emotional support at least weekly, they primarily rely on traditional methods such as talking to friends or family, while AI companionship services, utilized by around 37.4% (**Figure 3**) of respondents, remain a supplementary option.

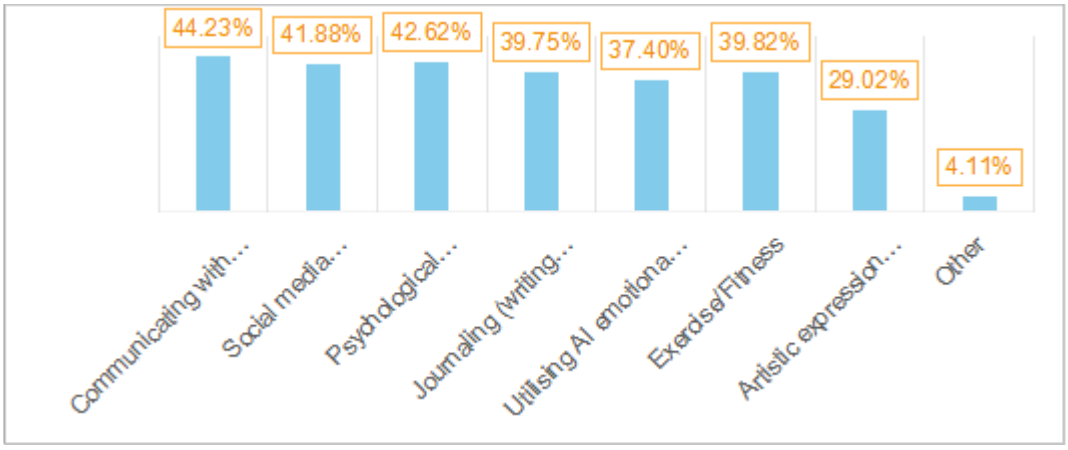

Figure 3. What are your primary methods for addressing emotional needs?

5.2. Functional preferences and interaction expectations

5.2.1. Interaction preferences: Anthropomorphic and multimodal

Descriptive statistical analysis indicates that virtual avatar interaction and voice/video dialogue were the most favored interaction formats, though text-based chat retained a significant market share. Over 60% of students believed AI should incorporate virtual avatars (**Figure 4**), reflecting a preference for tangible, visualized interaction.

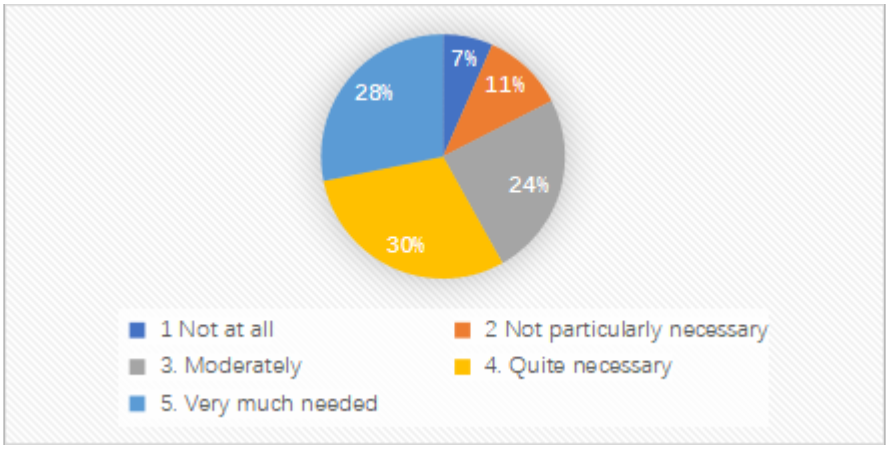

Figure 4. Do you believe AI emotional companionship services should feature a virtual avatar?

5.2.2. Technical experience is a key influencing dimension

Factor analysis identified two primary dimensions: "Technical Experience Factor" and "Emotional Acceptance Factor." The former encompasses privacy protection, interaction fluidity, and emotional recognition accuracy, while the latter covers trustworthiness, willingness to use, and satisfaction with existing support. The scree plot (**Figure 5**) and the cumulative variance explained plot (**Figure 6**) visually support the extraction of these two primary factors.

The extracted dimensions—"Technical Experience Factor" and "Emotional Acceptance Factor"—align with TAM's perceived ease of use and UGT's emotional gratification, respectively. This indicates AI companionship acceptance is driven by both instrumental utility and affective fulfillment.

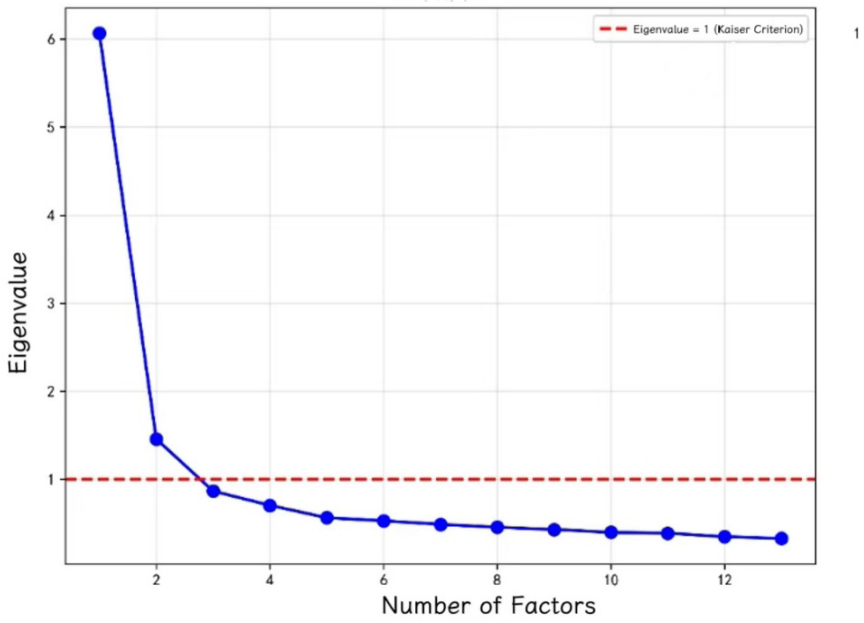

Figure 5. Scree plot

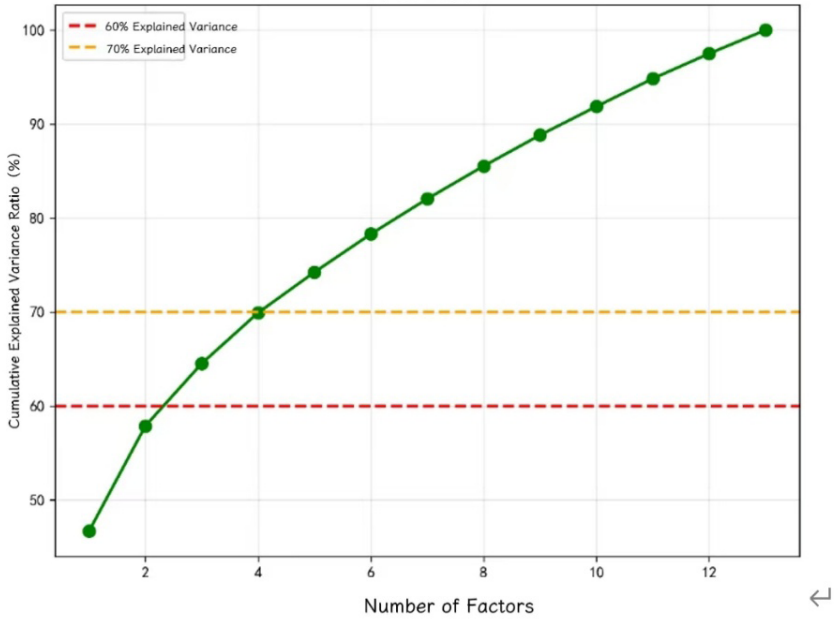

Figure 6. Cumulative variance explained plot

5.3. Payment willingness and market potential

Descriptive statistical analysis shows that while 63.48% of students expressed willingness to pay, nearly 80% would only accept monthly fees below 30 RMB, with 46.95% preferring the 1–10 RMB range, indicating a market still in the user education phase. Systematic XGBoost modeling reveals that emotional acceptance significantly drives usage behavior (AUC = 0.787). Payment willingness is influenced by multiple factors (0.6 < AUC < 0.7), with privacy protection,

emotional recognition accuracy, and virtual avatar demand identified as key predictors, confirming its linkage to high-value experiential features (**Figure 7**).

This study employs a systematic XGBoost modeling process. Parameters (e.g., learning rate, tree depth) were optimized via hyperparameter tuning, model stability was evaluated using 5-fold cross-validation, and performance was comprehensively assessed on an independent test set with metrics including accuracy, precision, recall, F1-score, and AUC.

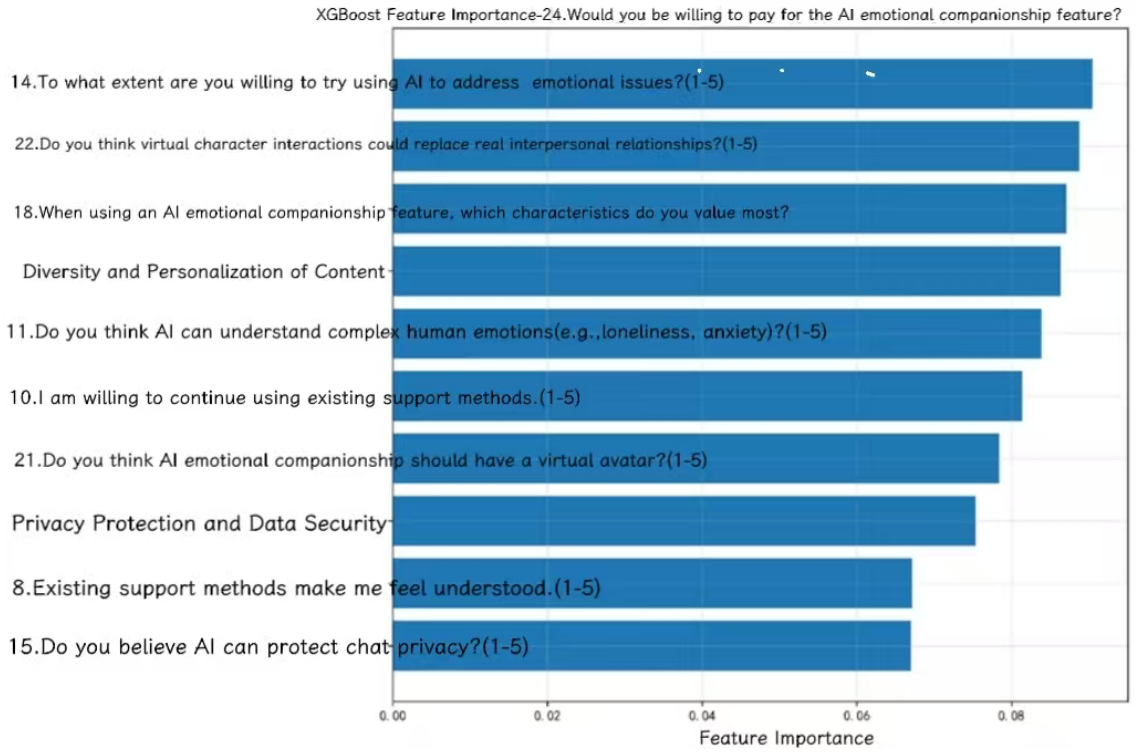

Figure 7. XGBoost feature importance

5.4. Ethical concerns and trust building

5.4.1. Privacy protection as the primary concern

Descriptive statistical analysis reveals that 41.66% of students expressed concern over the commercial exploitation of their private data, followed by worries about "patterned responses" (29.39%). Privacy trust levels directly influenced usage decisions.

5.4.2. Cautious stance on AI replacing human interaction

The majority of students did not believe AI could replace genuine human interaction, emphasizing its "complementary" rather than "substitutive" role.

6. Conclusions, recommendations, and limitations

6.1. Conclusions

Drawing on technological, psychological, and market perspectives, this study explains the phenomenon where university students in Zhejiang Province exhibit characteristics of "high awareness, moderate usage, and low willingness to pay" regarding AI companionship services:

(1) Limited usage depth stems from insufficient technical experience.

(2) Perceived as a supplement rather than a replacement for real relationships, payment willingness is constrained by financial capacity and consumption attitudes. The core issue lies in usage patterns, which should be positioned as "complementary rather than substitutive" [11];

(3) Ethical risks such as data misuse and emotional manipulation hinder trust-building.

The study validates UGT by showing usage is driven by proactive needs (e.g., stress relief), while emphasizing TAM's perceived ease of use (e.g., interaction fluency).

Additionally, no significant gender difference in AI attitudes was found (AUC = 0.451), suggesting a gender-neutral design is appropriate.

6.2. Recommendations

Based on this research, the following recommendations are proposed for the AI companionship services industry.

(1) Focus on core technology optimization: Enhance the accuracy of emotion recognition algorithms and the naturalness of interactions to meet personalized needs.

(2) Strengthen privacy, security, and ethical standards: Strictly comply with national laws and regulations, implement transparent data usage policies, and establish ethical review mechanisms.

(3) Implement a tiered payment strategy: Attract users with free basic features, then guide conversions through layered payments, emphasizing high-value experiences (e.g., personalized content).

6.3. Limitations and shortcomings

Whilst this study provides a systematic examination of university students' perceptions of AI companionship services, its limitations include a sample restricted to Zhejiang Province, necessitating further validation of generalizability. Future research should expand the geographical scope and track long-term usage effects [12].

7. Practical implications

This study offers practical implications for both university mental health services and AI product development. For university mental health services, ethically designed AI companionship can function as a scalable auxiliary tool, providing initial emotional support and guiding users to professional counseling when needed. For AI product development, key recommendations include building trust through transparent privacy protection, prioritizing high-value features such as emotional recognition accuracy and personalized interaction, and implementing a freemium model to cultivate user habits [13–16].

Disclosure statement

The authors declare no conflict of interest.

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