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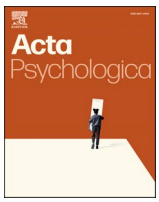

The influence of clothing style on student perceptions of lecturers: A cross-cultural extension of the Room-Product-Effect

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ABSTRACT

The Room-Product-Effect is an extension of the Room-Effect theory, exploring whether products (e.g., vehicles, clothing, logos, glasses, and lipstick), like spatial environments (e.g., rooms), influence people's perceptions of individuals associated with them. Previous studies of the Room-Product-Effect have primarily been conducted in English-speaking Western contexts and have rarely considered culture-specific influences. This study employs a Chinese sample within a Chinese cultural context to examine whether the Room-Product-Effect extends to Chinese culture. A paper-based questionnaire using a 9-point Likert scale was administered to 240 Chinese university students to investigate whether different Eastern and Western clothing styles influence their perceptions of female lecturers. Participants were shown one of four images and asked 27 questions designed to assess their perceptions. The data were analyzed using one-way analysis of variance (ANOVA) to examine the main effect of clothing style on Chinese university students' perceptions of lecturers. The results indicated that different styles of clothing significantly influenced Chinese university students' perceptions of lecturers. Lecturers dressed in a cheongsam or a Western-style long dress were perceived as having higher educational levels, more positive personal characteristics, greater knowledge, and stronger supervisory ability than those dressed in a Western-style short dress. These findings are consistent with prior research on the Room-Product-Effect, demonstrating that the cultural attributes of clothing can be transferred to the wearer and influence observers' perceptions of the individual. The results provide empirical support for the cross-cultural applicability of this effect and offer implications for multicultural education, classroom attire practices, and intercultural communication.

1. Introduction

Since the Room-Effect was first identified in 1956, research has consistently shown that environmental cues shape how individuals are perceived. Subsequent work expanded this idea into the Room-Product-Effect, demonstrating that qualities of objects (including vehicles, logos, glasses, and clothing) can transfer to associated individuals and influence social judgments. This line of research has substantially advanced our understanding of how product attributes contribute to social perception, offering important insights for design studies, social cognition, and experimental aesthetics. However, most existing empirical evidence comes from Western cultural contexts, raising the question of whether the Room-Product-Effect extends to non-Western populations.

Despite increasing attention to cross-cultural research in social psychology, no published study has investigated the Room-Product-Effect in Chinese cultural contexts or among Chinese participants. This gap is

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noteworthy because China's distinct value orientations, including collectivism, modesty norms, and a holistic aesthetic tradition, may shape how symbolic cues in clothing are interpreted. In addition, Chinese-language scholarship has rarely examined perceptions of Chinese-style clothing, and existing research on teacher attire has focused mainly on teaching effectiveness rather than students' evaluative judgments (Chen, 2011; Cui, 2010; Ding, 2014; Qi et al., 2013). Taken together, these gaps indicate a lack of empirical understanding of how culturally specific clothing influences students' perceptions of lecturers in China.

Drawing on cross-cultural psychology, research on cultural dimensions helps clarify why symbolic cues conveyed through clothing may function differently in China. According to Hofstede's cultural framework (Hofstede, 2011), China's high power distance and strong collectivistic orientation shape how individuals attend to authority-related and group-oriented cues. In this context, clothing that reflects modesty, propriety, and traditional values—central elements of Confucian norms—may be interpreted as indicators of moral standing and professional suitability rather than solely as aesthetic choices. These cultural mechanisms provide a theoretical basis for expecting the Room-Product-Effect to manifest differently when lecturers wear Chinese-style clothing. However, it remains unclear whether such attire leads students to evaluate lecturers more positively.

This question becomes especially salient in China, where recent national policies have emphasized the integration of traditional Chinese culture into education at all levels. Universities are encouraged to adopt culturally grounded approaches to strengthen cultural transmission, including the incorporation of traditional aesthetic symbols and practices into everyday educational settings. Among these symbolic carriers, clothing, particularly Chinese-style clothing, is one of the most visible and immediate expressions of cultural meaning. Traditional Chinese dress is often interpreted as reflecting core cultural ideals such as "*Zhongyong Zhi Dao*" (Doctrine of the Mean), "*Tianren Heyi*" (Unity of Heaven and Humanity), and the aesthetic principle of implicit beauty. Because these cultural ideals align with prevailing expectations of lecturer professionalism, including modesty, propriety, and restraint, Chinese-style clothing provides a theoretically meaningful context for examining whether product attributes may be transferred to lecturers and subsequently shape students' perceptions.

Against this background, the present study investigates whether clothing style, specifically Chinese-style and Western-style clothing, shapes Chinese university students' perceptions of female lecturers. A quantitative research design was adopted, using a paper-based questionnaire administered to Chinese university students. The experimental stimuli consisted of two images of Chinese-style cheongsams and two images of Western-style dresses. Participants evaluated the lecturer depicted in the stimuli, and a one-way ANOVA was conducted to examine the main effect of clothing style on students' perceptions.

By providing empirical evidence based on Chinese participants and culturally meaningful stimuli, the study extends the theoretical boundaries of the Room-Product-Effect beyond Western contexts. In addition, the study contributes to the limited body of research examining how Chinese-style clothing, as a culturally embedded form of attire, influences students' perceptions of university lecturers. The findings also offer practical implications for higher education, suggesting that culturally symbolic clothing may play a role in shaping students' impressions of instructors and may inform institutional policies or guidance related to professional attire in educational settings.

2. Literature review and research background

2.1. The room-product-effect

The Room-Effect framework posits that the physical environment in which a person is situated influences how that individual is perceived. The qualities of a room are transferred to its occupants, thereby influencing observers' judgments (Campbell, 1979; Canter et al., 1974; Cherulnik & Souders, 1984; Larsson et al., 2022; Maslow & Mintz, 1956; Nasar, 1989; Rosenthal, 1976; Sadalla et al., 1987; Wilson & Mackenzie, 2000; Zweigenhaft, 1976). Early experimental evidence for this effect was provided by Maslow and Mintz (1956), who demonstrated that the aesthetic quality of a room significantly influenced participants' evaluations of individuals presented within that environment. Specifically, photographs shown in a "beautiful" room were rated significantly higher in terms of perceived energy and well-being than those displayed in "average" or "ugly" rooms. Subsequent research has further demonstrated the influence of environmental cues on person perception. For example, Campbell (1979) examined how features of faculty offices affected students' impressions of professors. The findings indicated that offices decorated with plants and wall posters were associated with more positive evaluations of the professors occupying them, whereas cluttered offices led to markedly negative judgments.

Building on this line of research, later studies have broadened the concept into what is now referred to as the Room-Product-Effect. This extended framework demonstrates that the qualities of products—such as vehicles, logos, clothing, glasses, and lipsticks—are similarly transferred to the individuals associated with them, influencing how these individuals are evaluated by others (Wang et al., 2024; Shepherd & Yeon, 2022; Effendi, 2011; Effendi & Whitfield, 2012; Idris, 2011; Idris & Whitfield, 2014; Hashim, 2012; Md Hashim & Whitfield, 2018; Rollman, 1980; Chowdhary, 1988; Butler & Roesel, 1989; Phillips & Smith, 1992; Morris et al., 1996; Sebastian & Bristow, 2008; Lightstone et al., 2011; Tamura & Hirabayashi, 2014; McKeachie, 1952; Thornton, 1944). Empirical studies have provided evidence for this product-based transfer process. For instance, Effendi and Whitfield (2012) conducted an online survey involving 1053 participants from English-speaking international backgrounds, using highly controlled stimulus images. Their findings indicated that the perceived quality of a vehicle influenced observers' judgments of the vehicle owner's physical characteristics, such as height and weight, as well as socioeconomic attributes, including educational attainment and income level. Similarly, Idris and Whitfield (2014) investigated how university names and logos shape perceptions of the lecturers associated with them. Their results showed that lecturers linked to traditional heraldic university names and logos were perceived as holding higher academic status.

2.2. Teacher clothing and student perceptions

International research has consistently shown that teachers' attire influences students' perceptions of teacher characteristics. Studies conducted in the United States, Canada, and Japan, using either photographic stimuli or live classroom observations, demonstrate that different styles of dress elicit distinct evaluations from students (Butler & Roesel, 1989; Chowdhary, 1988; Lightstone et al., 2011; Morris et al., 1996; Phillips & Smith, 1992; Rollman, 1980; Sebastian & Bristow, 2008; Shepherd & Yeon, 2022; Tamura & Hirabayashi, 2014). Although specific findings vary across studies, formal attire is generally associated with perceptions of competence and professionalism, whereas casual clothing tends to be linked with approachability and warmth. For example, Shepherd and Yeon (2022) reported that business-casual attire enhanced both perceived competence and approachability, while Sebastian and Bristow (2008) identified complementary patterns in which casual dress increased perceptions of approachability and formal dress strengthened judgments of professionalism.

Research conducted within the Chinese educational context has not directly examined how teachers' attire shapes students' perceptual judgments. Existing studies in China have primarily focused on the influence of teacher clothing on teaching effectiveness or classroom climate (Chen, 2011; Cui, 2010; Ding, 2014; Qi et al., 2013), rather than on students' psychological evaluations of teachers. Moreover, empirical research has not yet investigated how Chinese-style clothing worn by

lecturers influences students' perceptions. Scholarship on Chinese clothing aesthetics remains largely theoretical (Pan, 2015), resulting in limited empirical evidence regarding how culturally symbolic attire functions in educational settings.

Despite this body of evidence, the literature has focused predominantly on the distinction between formal and informal attire, with relatively little attention given to national or traditional dress, such as Chinese-style clothing. Furthermore, most studies have relied on Western or English-speaking samples, raising questions about the cross-cultural generalizability of these findings.

2.3. Cultural symbolism of Chinese-style clothing

Chinese-style clothing constitutes an important component of Chinese cultural heritage and carries distinctive historical and cultural characteristics (Liu, 2012). Traditional Chinese clothing, including the *Qipao* (cheongsam), functions not only as items of dress but also as cultural symbols that embody aesthetic ideals and philosophical values rooted in Chinese traditions. These garments reflect core cultural principles such as "*Zhongyong Zhi Dao*" (Doctrine of the Mean), "*Tianren Heyi*" (Unity of Heaven and Humanity), and implicit beauty (He, 2008; Zhang, 2023).

Among these garments, the *Qipao* is widely regarded as one of the most iconic forms of modern Chinese traditional dress and is often recognized as a symbol of Chinese cultural identity (Shao, 2015). Its design integrates elements that convey both aesthetic and cultural meanings. In cultural and design scholarship, elements such as the high-standing collar have often been interpreted as reflecting ideals of modesty and restraint, while decorative frog buttons (*Pankou*, a traditional Chinese button knot) and embroidered fabrics are commonly described as carrying symbolic meanings related to harmony, prosperity, or good fortune (Shang, 2023; Zhao, 2020). These visual elements form a symbolic system through which traditional cultural values are communicated (Davis, 1994). Consequently, Chinese-style garments may function not only as elements of personal appearance but also as visible representations of cultural identity and cultural continuity.

In recent years, national education policies in China have emphasized the importance of integrating fine traditional Chinese culture into education in order to strengthen cultural confidence (Ministry of Education of the People's Republic of China, 2018; The General Office …, 2017). Within this context, university classrooms function not only as sites of knowledge transmission but also as spaces for cultural communication. When lecturers wear culturally symbolic attire such as Chinese-style clothing, their appearance may activate associations with tradition, cultural continuity, or national identity. From the perspective of the Room-Product-Effect, these symbolic cultural meanings may be transferred from the clothing to the individual associated with it. In other words, observers may infer certain symbolic qualities associated with culturally meaningful attire and attribute them to the wearer, thereby influencing evaluative judgments.

Despite this theoretical plausibility, empirical research has not directly examined whether culturally symbolic clothing influences students' perceptions of lecturers in Chinese educational settings. Existing studies in China have primarily focused on classroom atmosphere or teaching effectiveness rather than perceptual evaluations of lecturers. Consequently, it remains unclear whether the transfer-of-meaning mechanism proposed by the Room-Product-Effect operates similarly when the "product" involved is culturally embedded attire. This gap highlights the need for empirical research examining whether culturally symbolic clothing influences students' perceptions of lecturers within Chinese educational contexts.

2.4. Hypothesis development

The theoretical perspectives reviewed above suggest that clothing functions as a symbolic cue in impression formation and that attributes associated with products may be transferred to the individuals who use them. Prior research has consistently demonstrated that variations in teachers' attire influence students' evaluations of instructors. At the same time, the cultural symbolism embedded in Chinese-style clothing introduces a dimension that extends beyond the conventional distinction between formal and casual dress.

However, the meanings attached to culturally embedded attire may vary depending on social and contextual factors. As a result, existing theory does not provide a clear basis for predicting the direction of these effects. What can be theoretically examined is whether clothing style—when associated with culturally specific meanings—systematically shapes students' perceptions within an educational setting.

Accordingly, the present study examines whether lecturers' clothing style (Chinese-style vs. Western-style) influences Chinese students' evaluations of female lecturers across multiple perceptual domains. In doing so, the study provides a cross-cultural test of the Room-Product-Effect by examining whether the proposed transfer-of-meaning mechanism operates when the product involved is culturally symbolic attire within a Chinese university context. To control for potential gender-related differences in clothing perception, the study focuses specifically on evaluations of female lecturers. Based on the theoretical considerations outlined above, the following hypothesis is proposed: Lecturers' clothing style (Chinese-style vs. Western-style) will influence Chinese students' evaluations of female lecturers.

To assess the scope of this effect, students' evaluations are examined across four domains: physical appearance, personality characteristics, perceived research competence, and perceived teaching quality.

3. Method

3.1. Participants

A total of 240 students participated in the study. The required sample size was estimated using the *pwr* package in R, assuming a moderate effect size of $f = 0.25$ (Chuan, 2006; Cohen, 1988), a statistical power of $1 - \beta = 0.80$, and a significance level of $\alpha = 0.05$, which indicated that a minimum sample sizes of 180 participants was required. Sample sizes used in prior studies on clothing and perception (ranging from 31 to 401 participants) were also considered. The final effective sample of 240 participants exceeded these requirements and therefore provided sufficient statistical power for the one-way ANOVA analysis conducted using the Statistical Package for the Social Sciences (SPSS).

The sample exhibited a relatively balanced gender distribution, with 107 male participants (44.6%) and 133 female participants (55.4%). Participants ranged from 18 to 23 years of age, with the following distributions: 18 years (10%, $n = 24$), 19 years (20%, $n = 48$), 20 years (33.3%, $n = 80$), 21 years (25%, $n = 60$), 22 years (9.6%, $n = 23$), and 23 years (2.1%, $n = 5$).

3.2. Stimulus materials

The stimulus materials were developed following an experimental format consistent with Canter et al. (1974) experimental paradigm on the Room-Effect paradigm and presentation approaches adopted in subsequent Product-Effect studies (Effendi & Whitfield, 2012; Idris & Whitfield, 2014; Md Hashim, 2015). Highly controlled digital images were used as experimental stimuli to ensure that the manipulation targeted only the focal independent variable.

To minimize the influence of extraneous factors, stimulus construction was systematically controlled across three dimensions: clothing style selection, model selection, and standardized image editing procedures. These controls were implemented to ensure that differences between experimental conditions could be attributed primarily to clothing style.

3.2.1. Clothing style selection

To minimize the influence of irrelevant variables, the experimental stimuli included two clothing styles: Chinese-style clothing and non-Chinese-style clothing. Chinese-style clothing was represented by the contemporary cheongsam (*Qipao*). The cheongsam has long been recognized as a prominent form of traditional Chinese women's dress and frequently appears in national ceremonies, cultural exhibitions, and formal public events, where it maintains strong social visibility.

Compared with traditional garments such as hanfu, tangzhuang, or ethnic costumes, the contemporary cheongsam has evolved into semi-formal or formal attire in modern society, integrating traditional elements with professional applicability. This makes it suitable for educational and other public professional contexts. The garment also preserves traditional aesthetic and cultural values, embodying principles such as the Doctrine of the Mean, the unity of heaven and humanity, and the concept of implicit beauty (He, 2008; Wang et al., 2025). Given its stable cultural symbolism and contemporary relevance, the cheongsam was selected as the representative stimulus for the Chinese-style clothing condition.

The non-Chinese-style clothing was represented by a Western-style dress. To avoid the significant variable effects arising from the differences between Western-style and Chinese-style clothing (*Qipao*), this study did not use pantsuits or overly casual outfits, instead selecting a dress comparable in overall structure to the cheongsam. The Western-style dress reflects modern fashion design, featuring a tailored fit and three-dimensional construction, but does not carry explicit traditional Chinese cultural symbolism.

Differences in brand positioning and perceived quality may influence participants' evaluations of a wearer. To minimize potential interference from brand reputation, price, or garment quality, the selection of stimulus materials aimed to control for social-status signals conveyed by clothing. Specifically, the study drew on formal attire worn by public figures of comparable social standing in China and France to ensure that the two clothing categories were broadly comparable in their social symbolism. This approach minimized evaluation biases related to brand prestige or perceived garment quality.

The original images were obtained from publicly accessible online sources, including Google and Baidu image databases. During the clothing images selection process, the study adopted a perceptual mapping approach similar to that described by Idris (2011). Candidate images were systematically categorized and clustered according to their visual and semantic attributes. By representing these attributes spatially, perceptual mapping facilitated the identification of stylistically representative exemplars within each category. This procedure enabled a clearer understanding of clustering patterns across apparel categories and provided a structured basis for selecting representative clothing images.

Based on two predefined dimensions, a total of 32 clothing images (Chinese-style and non-Chinese-style) were compiled and organized into a perceptual map (see Supplementary Fig. S1). The original stimulus images are not reproduced in the main article due to copyright considerations and are provided in the Supplementary Materials for reference. The horizontal axis represented formal category, distinguishing Chinese-style from non-Chinese-style clothing, whereas the vertical axis represented cultural referential attributes, distinguishing Chinese from Western cultural characteristics. This two-dimensional structure generated four domains:

(1) Chinese-style clothing with Chinese cultural characteristics;
(2) non-Chinese-style clothing with Chinese cultural characteristics;
(3) Chinese-style clothing with Western cultural characteristics;
(4) non-Chinese-style clothing with Western cultural characteristics.

Within the perceptual map, clothing images were positioned according to their similarity in style and cultural attributes. Spatial proximity indicated greater similarity in stylistic features and cultural references, with shorter distances reflecting stronger resemblance across these dimensions. Based on clustering patterns and spatial distribution within the perceptual map, four highly representative images were selected as stimulus prototypes (see Supplementary Fig. S2), including two Chinese-style cheongsams and two Western-style dresses. To capture potential stylistic variation within each cultural category, two representative images were retained for both the Chinese-style and non-Chinese-style conditions. Including two exemplars per category reduced reliance on a single instance and provided greater within-category robustness for testing the proposed effects.

3.2.2. Model selection

To minimize the influence of individual differences unrelated to the research variables, model selection was conducted under systematic control. The female model was selected based on predefined criteria, including nationality, physical features, body type, age, facial expression, ornamentation, and pose. All models were of Chinese ethnicity, aligning with the study's objective of extending the Room-Product-Effect to Chinese culture contexts. Their physical appearance was designed to resemble typical features of Chinese women, including black hair, single eyelids, and relatively flat facial contours. Body measurements were calibrated to approximate the average physique of adult Chinese women, avoiding extremes in height, weight, or body proportions. The models were approximately 30 years of age, corresponding to the typical age range of female lecturers in Chinese universities.

All models maintained neutral facial expression, with no discernible emotional cues such as smiling or frowning. They wore minimal makeup and avoided bright-colored lipstick, consistent with McKeachie's (1952) observation that lipstick can influence first impressions. The models did not wear accessories that might signal socioeconomic status, such as earrings, necklaces, watches, or glasses. Prior research suggests that glasses, for example, can influence perceptions of intelligence, diligence, and reliability (Thornton, 1944). Finally, all models adopted a standardized frontal posture with their hands naturally positioned at their sides, in order to minimize the influence of body language and reduce potential bias resulting from variations in posture or viewing perspectives.

3.2.3. Stimulus image editing

Based on the selected clothing prototypes and models, the stimulus images were created and standardized using Adobe Photoshop CS6 (2022 version) and Procreate (2023 version). Throughout the editing process, the overall structure, cut proportions, and clothing length were carefully preserved to maintain consistency with the original clothing designs and to prevent unintended stylistic distortion resulting from image manipulation. To reduce potential color-related cognitive bias, all garments were uniformly rendered in camel, a relatively neutral hue compared with more vivid colors such as red, yellow, blue, or purple. Clothing color can function as a form of abstract visual language that elicits distinct psychological responses (Elliot & Maier, 2014), as different colors evoke emotional and cognitive reactions shaped by individuals' life experiences and cultural backgrounds (Lucas, 2022).

All models were positioned against the same blackboard background to establish a consistent instructional context and reinforce the role of a university lecturer. Four final stimulus images were produced, each representing a distinct clothing style (see Fig. 1). Two images depicted Chinese-style clothing: Stimulus 1 featured a plain cheongsam, and Stimulus 2 featured a cheongsam with a floral pattern. The remaining two images depicted Western-style clothing: Stimulus 3 presented a short Western-style dress, and Stimulus 4 presented a long Western-style dress. By adhering to these design controls, the stimulus set was structured to isolate the intended manipulation, thereby supporting the reliability and internal validity of the study. The visual distinction between Chinese-style cheongsams and Western-style dresses also represents a culturally recognizable cue, enabling participants to readily differentiate between the experimental conditions.

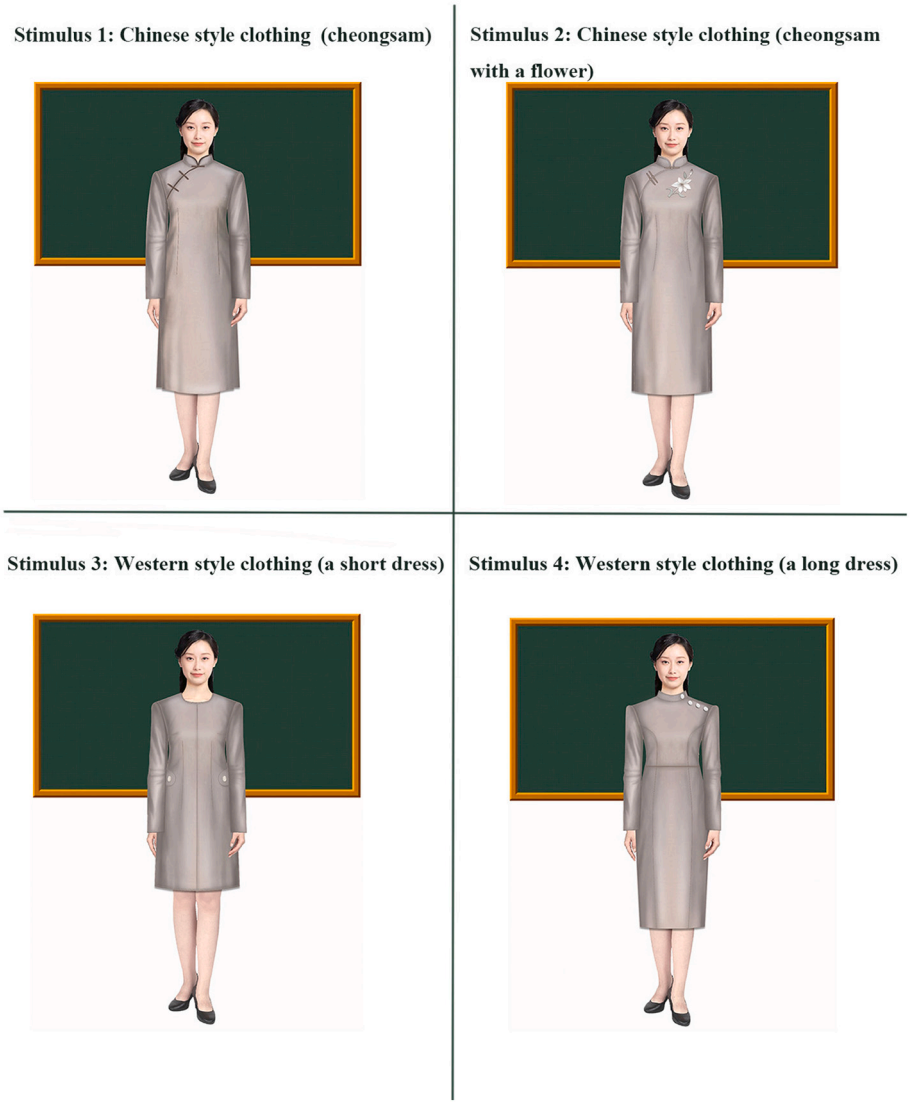

Fig. 1. Four highly controlled stimulus images used in the study (Source: Authors). Note. *The top two images present Stimulus 1 and Stimulus 2, both depicting Chinese-style cheongsams. The primary distinction is that Stimulus 2 features an embroidered floral pattern that is absent in Stimulus 1. The two images also differ in collar structure, decorative buttons, and skirt silhouette. The bottom two images display Stimulus 3 and Stimulus 4, both Western-style dresses. Their primary difference concerns dress length: the dress in Stimulus 4 falls below the knee, whereas the dress in Stimulus 3 falls above the knee. Additional variations include neckline design, waistline placement, and decorative details.*

3.3. Questionnaires

The survey questionnaire was primarily adapted from the Students' Evaluations of Teaching (SET) instrument for college teachers and from the framework used in the Times Higher Education (THE) World University Rankings. It consisted of five main sections: physical appearance and characteristics, personality characteristics, research quality, teaching quality, and participant demographics (see Table 1 for details). The questionnaire included 27 items, comprising 25 evaluative items (including one open-ended item and two multiple-choice items) and two demographic items. Responses were recorded on a 9-point Likert scale, ranging from "strongly disagree" (1) to "strongly agree" (9). Four versions of the questionnaire were created, each paired with one of the stimulus images. To minimize potential response bias, questionnaire items were randomly ordered; half of the questionnaires presented items in a randomized sequence, while the other half used the reverse order of this sequence.

3.4. Procedures

Color-printed paper questionnaires were distributed to Chinese university students either before the start of classes or during class meetings. Four versions of the questionnaire were prepared, each containing a different stimulus image. Each participant viewed only one stimulus image and rated the items based on their perception of the lecturer depicted in the image. The questionnaire items were presented as concise statements, and participants responded using a 9-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (9).

Participants were undergraduate students from several provinces in China. To avoid potential bias, students majoring in design-related disciplines and international students were excluded. To enhance representativeness within the university context rather than rely solely on convenience sampling, a multistage probabilistic sampling strategy was employed. First, stratified random sampling was used to select three faculties from the university's 22 faculties at Zhongyuan University of Technology. Within these faculties—Materials and Chemical Engineering, Journalism and Communication, and Science—four classes were

Table 1
Questionnaire content.

Theme	Question / Item	Format
Physical Appearance and Characteristics	D1. How old does she look	Open-ended
	D2. How tall does she look (In cm)	Multiple choice
	D3. How heavy do you think she is (In kg)	Multiple choice
	D4. She looks highly educated	9-point scale
Personality Characteristics	P1. She looks physically attractive	9-point scale
	P2. She looks trustworthy	9-point scale
	P3. She looks highly intelligent	9-point scale
	P4. She looks knowledgeable	9-point scale
	P5. She looks highly responsible	9-point scale
	P6. She looks creative	9-point scale
	P7. She looks elegant	9-point scale
	P8. She looks fashionable	9-point scale
	P9. She looks efficient	9-point scale
	P10. She looks friendly	9-point scale
	P11. She looks organized	9-point scale
Research Quality	R1. She looks like she has written many scholarly books	9-point scale
	R2. She looks like she has many grants from the government and industry to support her research	9-point scale
	R3. She looks like she is a good supervisor of her research students	9-point scale
Teaching Quality	T1. She looks like an excellent teacher	9-point scale
	T2. She looks like she has a genuine interest in her students	9-point scale
	T3. She looks like she is good at motivating students	9-point scale
	T4. She looks sympathetic toward students' problems	9-point scale
	T5. She looks like she is well-prepared for class	9-point scale
	T6. She looks like she has good classroom discipline	9-point scale
	T7. She looks like she is fair toward students	9-point scale
Demographic	PD1. Your age	Open-ended
	PD2. Your gender	Dual choice

selected through cluster sampling, with each class treated as a sampling unit. Finally, simple random sampling was used to select 20 students from each class to minimize potential influences such as classroom seating or instructor assignment.

Questionnaire distribution procedures were kept consistent across the selected faculties. Each class received one version of the questionnaire containing the corresponding stimulus image. To reduce potential order effects, half of the students in each class received questionnaires with randomized item sequences, while the remaining half received the reverse order of the same sequence. Each version yielded 60 valid responses, resulting in a total of 240 valid participants across the four versions. The study was approved by the Ethics Committee for Research Involving Human Subjects (No. JKEUPM-2023-447) and complied with relevant national ethical guidelines. Informed consent was obtained from all participants.

In summary, the study investigated the influence of Chinese-style and Western-style clothing on Chinese university students' perceptions of female lecturers using a questionnaire survey. Four highly controlled stimulus images representing different clothing styles were used, and participants evaluated the images using a nine-point Likert scale. The collected data were subsequently entered into the Statistical Package for the Social Sciences (SPSS) for statistical analysis.

4. Data analysis

4.1. Descriptive statistics

Data analysis was conducted using IBM SPSS Statistics (Version 26) on 240 valid questionnaires. The total sample size was $N = 240$, and no missing data were identified. The gender distribution was relatively balanced, comprising 107 male participants (44.6%) and 133 female participants (55.4%). Participants ranged in age from 18 to 23 years, with the largest proportion being 20 years old (33.3%). Each of the four stimulus images was evaluated by 60 participants, ensuring an equal distribution across the four questionnaire groups.

4.1.1. Reliability analysis

The questionnaire demonstrated strong internal consistency, with a Cronbach's alpha of 0.944, exceeding the recommended threshold of 0.70. This high coefficient indicates excellent internal consistency among the questionnaire items, supporting the reliability of the instrument for assessing Chinese university students' perceptions of female lecturers.

4.1.2. Factor analysis

An exploratory factor analysis (EFA) was conducted on the 21 items representing three conceptual dimensions of the questionnaire (personality characteristics, research quality, teaching quality) to examine the construct validity of the measurement instrument. Six items related to physical appearance and participant demographics were excluded because they did not meet the construct validity requirements. Principal axis factoring with direct oblimin rotation was applied. The data satisfied the assumptions for factor analysis, as indicated by a Kaiser-Meyer-Olkin (KMO) value greater than 0.60 and a statistically significant Bartlett's test of sphericity ($p < .05$). These indicators confirmed that the dataset was appropriate for conducting EFA.

The analysis yielded three common factors. As shown in the Pattern Matrix (Table 2), all retained items loaded above 0.50 on their respective factors, demonstrating satisfactory construct validity. Factor 1, labeled "F1: Personal Characteristics," comprising seven items: "looks physically attractive," "looks intelligent," "looks creative," "looks trustworthy," "looks elegant," "looks fashionable," and "looks knowledgeable." Factor 2, labeled "F2: Knowledge," including five items: "has good classroom discipline," "has research funding," "looks efficient," "writes many scholarly books," and "is well-prepared for class." Factor 3, labeled "F3: Professionalism," included five items: "looks sympathetic," "treats students fairly," "looks friendly," "is good at motivating students," and "has an interest in her students."

Four items — "looks organized," "looks responsible," "good supervisor," and "excellent teacher" — did not load significantly on any factor (factor loadings <0.50) (see Table 2). Consequently, these four items were retained as separate dependent variables in the subsequent statistical analyses.

4.2. Normality test

Normality was assessed using kurtosis and skewness statistics together with *probability–probability* (P—P) plots. The results showed that although the kurtosis and skewness values were not exactly zero, the deviations were minor and did not reach statistical significance, suggesting that the data were approximately normally distributed. The

Table 2
The output of the Pattern Matrix[a] ($N = 240$).

Pattern Matrix[a]			
	Factor		
	1	2	3
5. physical attraction	0.792		
7. intelligent	0.753		
10. creative	0.650		
6. trustworthy	0.649		
11. elegant	0.640		
12. fashionable	0.600		
8. knowledgeable	0.573		
24. good classroom discipline		0.693	
17. funding to support her research		0.637	
13. efficient		0.620	
16. many scholarly books		0.619	
23. well-prepared for class		0.535	
15. organized			
9. responsible			
18. good supervisor			
22. sympathetic			−0.712
25. fairness to students			−0.681
14. friendly			−0.671
21. good at motivating students			−0.645
20. interesting students			−0.576
19. excellent teacher			

Extraction Method: Principal Axis Factoring. *Rotation Method*: Oblimin with Kaiser Normalization.
[a] Rotation converged in 23 iterations.

P—P plots further indicated that the observed values aligned closely with the 45° reference line. Taken together, these results indicate that the data met the assumption of normality and were therefore suitable for parametric statistical analyses.

5. Results and discussion

5.1. Results

A one-way analysis of variance (ANOVA) was conducted to examine whether Chinese participants' perceptions of female lecturers differed across clothing styles. The independent variable included four clothing stimuli: Stimulus 1 (Chinese-style clothing: cheongsam), Stimulus 2 (Chinese-style clothing: cheongsam with a flower), Stimulus 3 (Western-style clothing: short dress), and Stimulus 4 (Western-style clothing: long dress). The dependent variables captured participants' evaluations of female lecturers across eleven dimensions: perceived age, height, weight, educational level, personal characteristics (Factor 1), knowledge (Factor 2), professionalism (Factor 3), organization, responsibility, perceived ability to supervise research students, and perceived teaching excellence.

The results of the main effect analysis are summarized in Table 3. Among the eleven dependent variables, perceived lecturer age and responsibility did not satisfy the assumption of homogeneity of variances (Levene's test: $p = .032$ and $p = .021$, respectively; both $p < .05$), whereas the remaining nine variables met this assumption ($p > .05$) (see Table 3). For these nine variables, no significant differences were found in participants' perceptions of lecturer height, weight, and professionalism (Factor 3) ($p > .05$). In contrast, significant differences emerged across the four clothing conditions for perceived lecturer educational level, personal characteristics (Factor 1), knowledge (Factor 2), organization, perceived ability to supervise research students, and perceived teaching excellence across the different clothing styles conditions ($p < .05$) (see Table 3).

5.1.1. Educational level

A significant main effect of clothing style on perceived educational level was found, $F(3, 236) = 4.159$, $p = .007$, indicating a moderate effect size (partial $\eta^2 = 0.050$) (see Table 3). Post hoc multiple comparisons using the least significant difference (LSD) test showed that Stimulus 1 (cheongsam), Stimulus 2 (cheongsam with a flower), and Stimulus 4 (long dress) were associated with significantly higher perceived educational levels than Stimulus 3 (short dress) (see Table 3). These differences are illustrated in Fig. 2.

5.1.2. Personal characteristics (Factor 1 composite variables)

A significant main effect of clothing style on perceived lecturers' personal characteristics was observed, $F(3, 236) = 5.355$, $p = .001$, with a moderate effect size (partial $\eta^2 = 0.064$) (see Table 3). LSD post hoc multiple comparisons indicated the following patterns: Stimulus 1 (cheongsam) was rated significantly higher than Stimulus 3 (short dress), Stimulus 4 (long dress) was rated higher than Stimulus 2 (cheongsam with a flower), and Stimulus 4 (long dress) also received higher ratings than Stimulus 3 (short dress) (see Table 3). These differences are illustrated in Fig. 2.

5.1.3. Knowledge (Factor 2 composite variables)

A significant main effect of clothing style on perceived female lecturers' knowledge was observed, $F(3, 236) = 5.699$, $p = .001$, indicating a moderate effect size (partial $\eta^2 = 0.068$) (see Table 3). LSD post hoc multiple comparisons showed that Stimulus 1 (cheongsam) received significantly higher knowledge ratings than both Stimulus 2 (cheongsam with a flower) and Stimulus 3 (short dress). Stimulus 4 (long dress) was also rated higher than Stimulus 2 (cheongsam with a flower) and Stimulus 3 (short dress) (see Table 3). These differences are illustrated in Fig. 2.

5.1.4. Organization

A significant main effect of clothing style on perceived female lecturers' organizational ability was observed, $F(3, 236) = 3.360$, $p = .020$, with a small-to-moderate effect size (partial $\eta^2 = 0.041$) (see Table 3). LSD post hoc multiple comparisons indicated that Stimulus 1 (cheongsam) was rated significantly higher than Stimulus 2 (cheongsam with a flower) and Stimulus 3 (short dress). In addition, Stimulus 4 (long dress) received higher organizational ratings than Stimulus 2 (cheongsam with a flower) (see Table 3). These differences are illustrated in Fig. 2.

5.1.5. Perceptions of good supervisors

A significant main effect of clothing style on Chinese university students' perceptions of whether female lecturers were good supervisors was observed, $F(3, 236) = 4.022$, $p = .008$, with a small-to-moderate effect size (partial $\eta^2 = 0.049$) (see Table 3). LSD post hoc multiple comparisons indicated the following preference pattern: Stimulus 1 (cheongsam) was rated higher than Stimulus 3 (short dress), Stimulus 4 (long dress) was rated higher than Stimulus 2 (cheongsam with a flower), and Stimulus 4 (long dress) was also rated higher than Stimulus 3 (short dress) (see Table 3). These differences are illustrated in Fig. 2.

5.1.6. Perceptions of teaching excellence

A significant main effect of clothing style on Chinese university students' perceptions of whether female lecturers were excellent teachers was observed, $F(3, 236) = 2.665$, $p = .049$, with a small effect size (partial $\eta^2 = 0.033$) (see Table 3). LSD post hoc multiple comparisons indicated a similar preference pattern: Stimulus 1 (cheongsam) was rated higher than Stimulus 3 (short dress); Stimulus 4 (long dress) was rated higher than Stimulus 2 (cheongsam with a flower); and Stimulus 4 (long dress) was rated higher than Stimulus 3 (short dress) (see Table 3). These differences are illustrated in Fig. 2.

This study examined whether the clothing style of female lecturers (Chinese-style vs. Western-style) influences Chinese university students' perceptions and explored whether the Room-Product-Effect extends to Chinese-style clothing and, by implication, to Chinese cultural cues. A one-way ANOVA indicated a significant main effect of clothing style

Table 3
Main effects of Chinese-style and Western-style clothing on Chinese university students' perceptions of female lecturers and results of post hoc multiple comparisons ($N = 240$).

Items	Stimulus 1 Chinese-style clothing (cheongsam)	Stimulus 2 Chinese-style clothing (cheongsam with a flower)	Stimulus 3 western-style clothing (a short dress)	Stimulus 4 western-style clothing (a long dress)	Levene's Test	*F* Test		Partial Eta Squared	Multiple Comparisons
	($\overline{x} \pm$ SD)	($\overline{x} \pm$ SD)	($\overline{x} \pm$ SD)	($\overline{x} \pm$ SD)	*p* (Sig.)	*F*	*p* (Sig.)		–
1.lecturers age	–	–	–	–	0.032	–	–		–
2.lecturers height	–	–	–	–	0.702	–	0.458	0.011	–
3.lecturers weight	–	–	–	–	0.343	–	0.072	0.029	–
4.educational level	7.58 ± 1.418	7.57 ± 1.307	7.07 ± 1.483	7.93 ± 1.191	0.553	4.159	**0.007**	0.050	stimulus 1 > stimulus 3 stimulus 2 > stimulus 3 stimulus 4 > stimulus 3
F1 personal characteristic	7.04 ± 1.374	6.72 ± 1.140	6.31 ± 1.33	7.24 ± 1.545	0.440	5.355	**0.001**	0.064	stimulus 1 > stimulus 3 stimulus 4 > stimulus 2 stimulus 4 > stimulus 3
F2 knowledge	6.91 ± 1.251	6.20 ± 1.492	6.26 ± 1.13	6.97 ± 1.431	0.268	5.699	**0.001**	0.068	stimulus 1 > stimulus 2 stimulus 1 > stimulus 3 stimulus 4 > stimulus2 stimulus 4 > stimulus 3
F3 professional					0.209		0.070		
15.organized	7.85 ± 1.233	7.17 ± 1.648	7.23 ± 1.345	7.68 ± 1.408	0.075	3.360	**0.020**	0.041	stimulus 1 > stimulus 2 stimulus 1 > stimulus 3 stimulus 4 > stimulus 2
9.responsible	–	–	–	–	0.021	–	–	–	–
18.good supervisor	6.53 ± 1.732	6.20 ± 1.973	5.75 ± 1.910	6.90 ± 1.937	0.922	4.022	**0.008**	0.049	stimulus 1 > stimulus 3 stimulus 4 > stimulus 2 stimulus 4 > stimulus 3
19.excellent teacher	7.28 ± 1.497	6.75 ± 1.762	6.72 ± 1.329	7.32 ± 1.600	0.342	2.665	**0.049**	0.033	stimulus 1 > stimulus 3 stimulus 4 > stimulus 2 stimulus 4 > stimulus 3

Note: *$p < .05$. Levene's Test *$p > .05$.
Bold values in this column indicate statistically significant differences ($p < .05$).

across several outcome measures. Among the 11 dependent variables assessed, six showed significant differences: perceived educational level, personal characteristics (Factor 1), knowledge (Factor 2), organization, the extent to which lecturers were perceived as good supervisors, and the extent to which they were perceived as excellent teachers.

Female lecturers wearing a cheongsam, a floral-patterned cheongsam, or a Western-style long dress were perceived as having higher educational qualifications than those wearing a Western-style short dress. Cheongsams and Western-style long dresses were also associated with more favorable evaluations of personal characteristics compared with Western-style short dresses, and lecturers in long dresses were rated more positively than those wearing a floral-patterned cheongsams.

For perceived knowledge, lecturers dressed in a cheongsam or a Western-style long dress received higher ratings than those wearing either a floral-patterned cheongsam or a Western-style short dress. With respect to organizational skills, lecturers in a cheongsam were viewed as more organized than those in a floral-patterned cheongsam or a short Western-style dress. Both the cheongsam and the Western-style long dress were also rated more favorably than the floral-patterned cheongsam.

Furthermore, students perceived lecturers in a cheongsam and those in Western-style long dresses as better research supervisors than those wearing Western-style short dresses, and long dresses were preferred over the floral-patterned cheongsam in this regard. A similar pattern emerged for perceptions of teaching excellence: lecturers in both the cheongsam and the Western-style long dress were rated higher than those in the Western-style short dress, and long dresses again received higher evaluations than the floral-patterned cheongsam.

Taken together, these findings indicate that the Room-Product-Effect extends to Chinese-style clothing, suggesting that both traditional Chinese clothing and certain Western clothing styles can shape students'

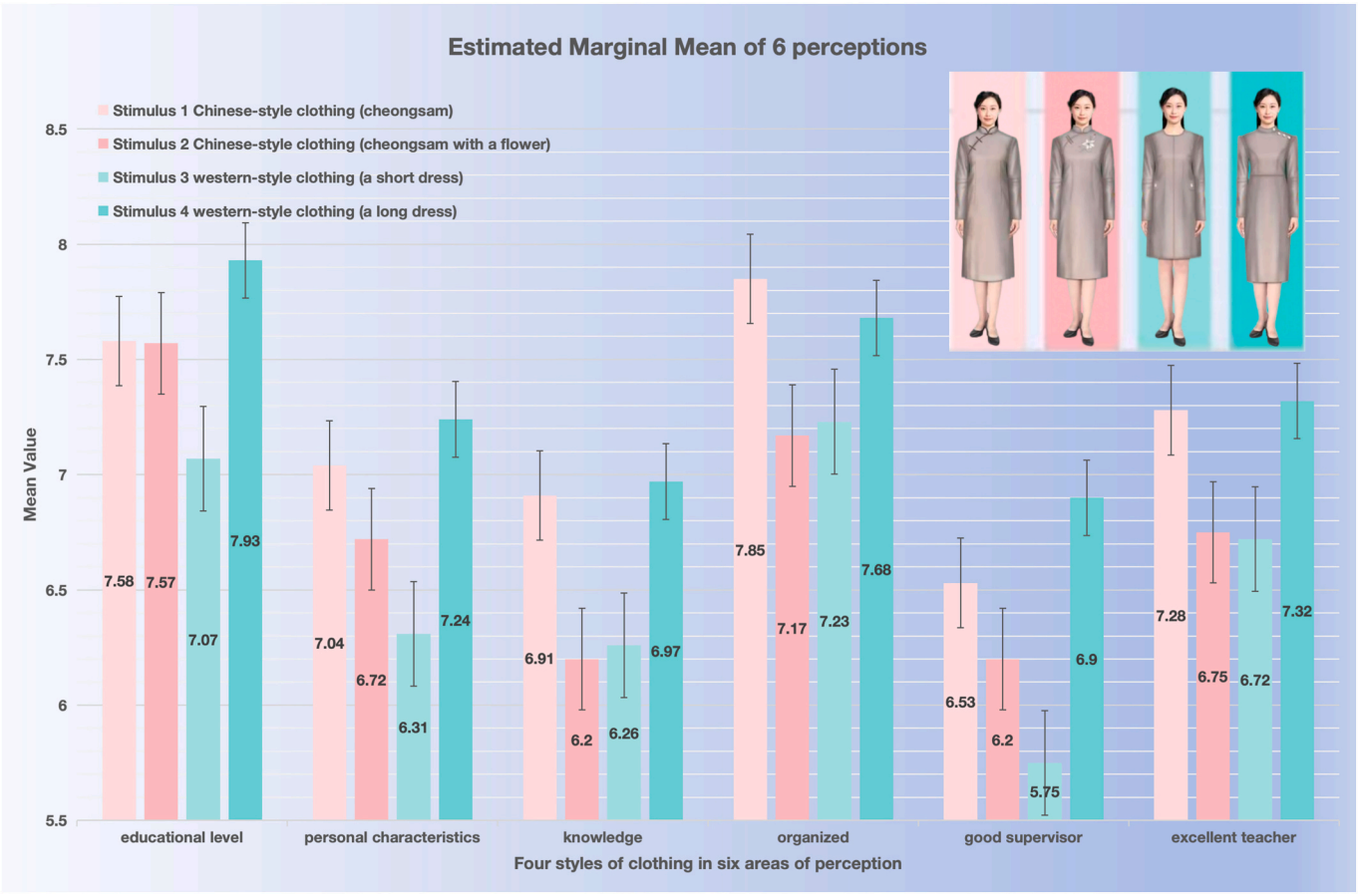

Fig. 2. Effects of different clothing styles on Chinese university students' perceptions of female lecturers across six dimensions: perceived educational level, personal characteristics (Factor 1), knowledge (Factor 2), organization, good supervisors of their research students, and excellent teachers (*Note*: $p < .05$, $N = 240$. *Ratings were measured on a 9-point Likert scale ranging from 1 (strongly disagree) to 9 (strongly agree)*).

perceptions of female lecturers. Although the post hoc comparisons involved multiple pairwise contrasts, the overall pattern of findings was consistent. Across the six dimensions with significant main effects, both Chinese-style clothing (plain and floral cheongsams) and the Western-style long dress were generally evaluated more positively than the Western-style short dress. The plain cheongsam, in particular, received higher ratings across several key dimensions. Although some differences emerged within clothing categories, particularly between the plain and floral cheongsams, these variations did not alter the broader pattern. In general, more formal and culturally meaningful clothing styles tended to elicit more favorable evaluations from students. This systematic trend provides consistent evidence supporting the proposed influence of clothing style on students' perceptions of female lecturers.

5.2. Discussion

The post hoc comparisons revealed several specific pairwise differences; however, the overall pattern of results was consistent with the study's hypothesis. Across key dimensions—including perceived educational level, personal characteristics, knowledge, and perceived teaching excellence—the Chinese-style clothing conditions were consistently evaluated more favorably than the Western-style short-dress condition. These convergent findings provide empirical support for the hypothesis and demonstrate that clothing style meaningfully shapes Chinese students' perceptions of female lecturers. Collectively, the results indicate that the Room-Product-Effect extends to Chinese-style clothing, offering empirical evidence of its relevance within Chinese cultural contexts.

This study also has several limitations. The sample consisted primarily of participants in their twenties, which may limit the generalisability of the findings to other age groups. Similar to much of the existing research on the Room-Product-Effect, the current study relies heavily on younger respondents, leaving it unclear whether the effect extends to older populations. Future studies are therefore encouraged to recruit participants across a broader age range, particularly middle-aged and older adults, to evaluate whether the Room-Product-Effect remains consistent across demographic groups. Increasing age diversity in future samples would help provide a more comprehensive assessment of the generalisability and broader applicability of the Room-Product-Effect.

6. Conclusion

The present study demonstrates that both Chinese- and Western-style clothing significantly influence Chinese university students' perceptions of female lecturers. The findings indicate that the Room-Product-Effect operates not only among English-speaking participants in Western cultural contexts but also among Chinese participants in an Eastern cultural context, thereby supporting its cross-cultural applicability. By showing that clothing style influences social evaluations in a non-Western context, this study provides evidence for the broader generalisability of the Room-Product-Effect and highlights the role of culturally embedded visual cues in shaping interpersonal judgments.

CRediT authorship contribution statement

Zheng Wang: Writing – review & editing, Writing – original draft, Visualization, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **R.A.A. Raja Ahmad Effendi:** Writing – review

& editing, Supervision, Project administration, Methodology, Conceptualization. **T.W. Allan Whitfield:** Writing – review & editing, Supervision. **Deirdre Barron:** Formal analysis. **Li Chen Tai:** Formal analysis. **Azhari bin Md Hashim:** Formal analysis. **Irwan Syah Md Yusoff:** Formal analysis. **Khairul Manami Kamarudin:** Formal analysis. **Wei Ni:** Writing – review & editing.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors did not use generative AI or AI-assisted technologies in the writing process.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request. The datasets generated and analyzed during the current study are also available on the Open Science Framework (OSF) at the following URL: https://osf.io/4peua/.

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