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Research on the Effect of Sports Dance Costume Design on Athletes' Psychological State and Competitive Performance

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ABSTRACT

This study aims to explore the comprehensive influence of competition costume on athletes' psychological states and their underlying mechanisms. To achieve this goal, this study employed a mixed-method approach, conducting a questionnaire survey (including a self-developed perception questionnaire of competition uniforms, CSAI-2, and POMS scale) on 88 Chinese high-level sports dance athletes and conducting in-depth semi-structured interviews with 12 of them. Results showed that the "aesthetic experience" and "confidence boost" of the athletes towards the competition costume were significantly positively correlated with their "confidence" and "energy" levels ($r = 0.315–0.607$ $p < 0.01$); while "functional comfort" was significantly negatively correlated with "cognitive–somatic anxiety" ($r = −0.219$, $p < 0.05$). Qualitative analysis further revealed the underlying mechanisms, extracting three core themes: "psychological empowerment of the battle robe," "functional guarantee of the integration of person and clothing," and "artistic extension of design narrative." In conclusion, this study confirms that sports dance competition costumes are not merely decorative items but are active factors that profoundly influence athletes' psychological states through three key paths: psychological empowerment, functional guarantee, and design narrative. Research results have important theoretical and practical implications for athletes, coaches, and competition uniform designers in optimizing training strategies and design practices.

KEYWORDS

textile technology, textile products, functional clothing, sports costume design

INTRODUCTION

Sport dance is a unique competitive sport that integrates intense physical confrontation, precise technical control, and highly compelling artistic expression. As the level of competitionization of this sport continues to

rise, the outcome of the competition often hinges on the tiniest details, making the mental preparation and on-field performance of the athletes become the key variables determining the competitive result [1]. Among the various factors influencing the psychology of athletes, competition costume—the element that is closest to the athlete's body and has the most visual impact—often receives underestimated attention or is merely evaluated purely from an aesthetic perspective. To ensure the consistency and accuracy of the expression, this article will uniformly use the term “competition costume” to refer to this type of professional clothing that combines the functions of sports equipment and artistic performance.

In recent years, the technological and psychological research on competition costume has made significant progress. Studies have shown that functional clothing (such as compression wear and quick-drying fabrics) not only enhances athletic performance and delays fatigue [2] but also brings about a sense of comfort and professionalism that can significantly boost the psychological comfort and self-confidence of athletes [3,4]. The rise of the “embodied cognition” theory provides a new perspective for understanding the deep connection between clothing and psychology, namely, the physical experience of the clothing and its symbolic meaning can systematically influence the cognition, emotions, and even behaviors of the wearer [5,6]. In the unique context of sports dance, this theory is particularly apt because the competition costume is not a passive cover but an active interface between the athlete's body, dance movements, and artistic expression. The texture of the fabric, the freedom of movement provided by the cut, and the visual image created by the costume together form a continuous stream of sensory information, which constantly shapes the athlete's cognitive and emotional state on the field.

However, the sports dance competition costume has its own uniqueness. The costume is not only a functional "sports equipment" for performing difficult movements but also an "artistic costume" that conveys dance emotions, shapes the character image, and guides the attention of judges and audience. This high degree of unity of functionality and artistry determines that its psychological impact on athletes may be more complex and profound than that of regular sports attire. A well-designed competition outfit may directly evoke the competitive passion of the athlete through its colors, cuts, and dynamic effects. Conversely, an ill-fitting or contrary-to-the-dance-theme competition outfit may become a direct cause of distraction, anxiety, and even technical errors for the athlete.

Although industry experts generally recognize the significance of competition costume, the current research in this field remains insufficient. Most of the relevant literature focuses on the analysis of aesthetic changes

in competition costume [7,8] or the exploration of popular design trends, lacking systematic empirical studies that link competition uniform design with the psychological state of athletes. Through which specific paths does competition costume affect athletes' confidence and anxiety? How do athletes themselves perceive and experience these effects? The answers to these questions are crucial for achieving the scientificization of competition uniform design and maximizing its service to athletes' competitive needs.

To fill this research gap, this study aims to draw on the theory of "embodied cognition" and related literature, and adopt a mixed research method to systematically explore the relationship between the perception of competition costumes of sports dance athletes and their psychological states. This study specifically aims to answer two core questions. First, what is the relationship between different perception dimensions of competition costumes (such as aesthetic experience, functional comfort) and key psychological indicators of athletes (such as competition anxiety, self-confidence)? On this basis, we propose the following hypotheses: (1) The aesthetic experience and confidence enhancement brought by competition costumes are positively correlated with athletes' self-confidence and energy. (2) The functional comfort of competition costumes is negatively correlated with athletes' cognitive and somatic anxiety. Second, through what deep mechanisms do competition costumes influence athletes' psychological and performance on the field in their subjective experience? By answering these questions, we hope to provide a scientific theoretical basis and practical guidance for the training practice and costume design of sports dance.

METHOD

Research Design

This study adopts the "explanatory sequential design" in the mixed methods. First, a large-scale quantitative data collection is conducted through questionnaires to analyze the correlation between the perception of competition costume and psychological state variables. Subsequently, based on the results of the quantitative analysis, typical samples are selected for in-depth semi-structured interviews, aiming to provide a deeper qualitative explanation and richer details for the questionnaire results.

Perception of Costume Design: Measured through a self-compiled questionnaire, it encompasses four dimensions: aesthetic experience, functional comfort, alignment with the dance theme, and perceived confidence boost.

Athletes' Psychological State: This includes competitive state anxiety (cognitive anxiety, physical anxiety, self-confidence) and general mood state.

Participants

This study will conduct purposive sampling to recruit professional or semi-professional Latin dance athletes from domestic sports colleges or those currently active in the field.

This research plan distributed 80 to 100 questionnaires. This target sample size was determined through a prior power analysis using the G*Power software. Under the conditions of a medium effect size ($r = 0.30$), a significance level of $\alpha = 0.05$, and a statistical power of 80%, a correlation analysis requires at least 84 participants. The sample size set for this research therefore meets the statistical requirements.

Interviews were conducted with 10 to 15 representative athletes. The determination of this sample size follows the saturation principle of qualitative research, which means continuing the interviews until no new core themes emerge. After interviewing 10 participants, the core themes repeatedly appeared in this study, and finally, through 12 interviews, the saturation state of the themes was confirmed to be reached.

Inclusion Criteria

(1) Age between 18 and 28 years old;
(2) Having received professional sports dance training for no less than five years;
(3) Having participated in at least three provincial or higher-level sports dance competitions in the past two years;
(4) Being able to clearly recall and describe the details and feelings of the sports uniforms worn in recent important competitions;
(5) Voluntarily participating in this study and signing the informed consent form.

Exclusion Criteria

(1) Has been retired for more than two years;
(2) During the research period, is undergoing systematic treatment that may affect mental state.

Instruments

Questionnaire on Perception of Sport Dance Competition Costume and Psychological State

(1) Basic Information Survey Form. Information such as the age, gender, dancing experience, and best competition result of the participants was collected.

(2) Self-compiled Perception Questionnaire of Sports Dance Competition Garments. Athletes were required to recall the competition garments of a recent important competition and evaluate them. The questionnaire contains approximately 20 items, covering four dimensions: "Aesthetic and Design Sense" (five items), "Comfort and Functionality of Wearing" (five items), "Match between Dance Style and Music" (five items), and "Impact on Self-confidence and Performance" (five items). It uses a Likert five-point scoring method (1="strongly disagree" to 5="strongly agree"). The score of this scale ranges from 20 to 100 points. The higher scores indicate more positive perceptions of the competition costume. Before the formal test, its content validity and structural validity will be verified through expert evaluation and pre-tests. In the present study, overall Cronbach's alpha was 0.89, subscales range from 0.78 to 0.86 (based on pre-test with N=30 athletes).

(3) Chinese Revised Version of "Competition State Anxiety Scale-2" (CSAI-2). It consists of 27 items and requires athletes to recall their feelings at a specific moment before the competition to measure their cognitive state anxiety (nine items), physical state anxiety (nine items), and state self-confidence (nine items). It uses a Likert four-point scoring method (1="not at all", 4="very much so"). Overall, the score of the CSAI-2 ranges from 9 to 36 points per subscale. The higher anxiety subscale scores indicate greater anxiety, while higher self-confidence scores reflect stronger confidence. This scale has good reliability and validity and is a mature tool in sports psychology. Cronbach's alpha for the cognitive state anxiety was 0.84 in this study, physical state anxiety was 0.81, and state self-confidence was 0.88.

(4) Chinese Version of "Simple Mood State Scale" (POMS). It contains 40 adjectives and seven dimensions (five negative emotion scales: anger value, panic value, tension value, depression value, and fatigue value and two positive emotion scales: energy value and self-esteem value), which requires athletes to evaluate their general mood state during the preparation for the competition. It uses a Likert five-point scoring method (0="not at all" to 4="extremely"). Emotional Turmoil Index = (Total Score of Negative Emotion Scale - Total Score of Positive Emotion Scale) + 100. In the current study, Cronbach's alpha for

the POMS ranged from 0.72 to 0.91 for each subscale. Given the core hypothesis of this study, we mainly focused on the two emotional dimensions of energy and tension, which are most directly related to the athletes' pre-competition energy levels and stress states.

Semi-Structured Interview Outline

The literature review was independently designed by the research team, and the review was subsequently adjusted based on the results of expert consultations and pre-interviews, leading to the final interview outline. The outline consists of open-ended questions, aiming to encourage athletes to share their personal experiences and feelings. The core questions include:

- Could you please describe the set of competition costume that left the deepest impression on you? What was it like?
- When choosing or designing the competition costume, which factors do you consider most important (such as color, style, fabric, or the story behind it)? Why?
- Do you feel that certain designs (such as bold colors, specific cuts) have a direct impact on your pre-race mood or confidence?
- Has your sport dance competition costume ever given you a sense of restriction or insecurity? How did this situation affect your performance on the track?
- In your opinion, how should a "perfect" sport dance competition costume help an athlete perform on the field?

Procedure

Questionnaire Distribution and Collection

Questionnaires were distributed either through an online questionnaire platform or in centralized training venues. The researchers explained the purpose of the study and the filling requirements to the athletes, emphasizing the principle of anonymity. The athletes are required to complete the questionnaire based on their most recent or most memorable experience of an important competition.

Data Filtering and Analysis

After data collection, each questionnaire was screened for validity. A questionnaire was deemed invalid and

excluded from the final analysis if it met any of the following criteria: (1) the completion time was less than one-third of the median completion time, (2) more than 15% of the total items were left unanswered (excessive omissions), or (3) over 90% of the responses to the Likert-scale items were identical (e.g., "straight-lining"), indicating inattentive participation.

Selection of Interviewees and Implementation of the Interview

Based on the analysis results of the questionnaire (such as obtaining extremely high or extremely low scores on the "Perception Questionnaire of Sports Dance Competition Garments" or showing typical characteristics on the psychological state scale), 10 to 15 athletes were selected. Through phone or email appointments, one-on-one in-depth interviews lasting approximately 30 to 45 minutes were conducted. Before the interview, their consent was again obtained, and they were informed that the interview would be recorded. To accommodate the scattered geographical locations of the athletes and their tight training schedules, the interviews were mainly conducted through online video conferences. For a few local athletes, face-to-face interviews were carried out, with the location chosen in a quiet and isolated meeting room to ensure undisturbed communication. A total of 12 athletes ultimately completed one-on-one in-depth interviews.

Data Organization

The interview audio was transcribed into a written document, and all information that could identify the individual participants was removed to protect their privacy.

Data Analysis

To facilitate an intuitive comparison, in this study, the scores of each dimension of all scales were calculated and reported based on the average score of all items under that dimension, rather than reporting the original total score. Quantitative data processing was conducted using SPSS 26.0. Descriptive statistics (mean, standard deviation) were employed to analyze the overall status of the perception of competition costume, competition state anxiety, and mood state. Before conducting the correlation analysis, a normality test was first performed on all key variables. The results showed (for example, the Shapiro–Wilk test result indicated that $p > 0.05$) that the data of each variable met the normal distribution, satisfying the prerequisite conditions for using Pearson correlation analysis. Pearson correlation analysis was used to explore the correlations

between the scores of each dimension of the perception questionnaire of competition costume and the scores of CSAI-2 and POMS in each dimension. The significance level for all statistical tests was set at $\alpha = 0.05$. NVivo 12 was used to support the analysis. To ensure the rigor of the qualitative analysis, this study adopted a systematic three-stage thematic analysis process. The two researchers first conducted open coding to identify and label the initial concepts from the interview texts. Then, in the axial coding stage, they clustered the related concepts into broader thematic categories. Finally, through selective coding, they extracted a core theme that could integrate all the categories. To ensure the reliability of the coding process, the researchers independently conducted cross-coding on some interview samples (three, accounting for 25%) and resolved all inconsistencies through discussion to ensure the uniformity of the coding framework. The validity of the final themes was further confirmed through the “peer debriefing” and “triangulation” methods detailed in Section 2.6. The data collection and coding analysis in this study were a synchronous iterative process. After each interview, the research team would conduct a preliminary analysis and extract themes, and then adjust the subsequent interview questions. When the 10th participant was interviewed, the existing core themes had repeatedly appeared, and no new important themes had emerged. To ensure the stability of the conclusion, we continued to interview two more participants, and we found that their discussions were still within the existing theme framework. At this point, we confirmed that we had reached theme saturation, so we decided to stop the interviews.

Researcher Positionality and Trustworthiness

In qualitative research, the researcher serves as the primary research tool, and their personal background and experiences may influence the interpretation of the data. Therefore, a reflection on the researcher's stance and measures must be carried out to ensure the reliability of the research results.

The main researcher of this study has a dual academic background in sports psychology and fashion design, and they have had extensive, years-long professional training in national standard dance. This "insider" perspective helps to deeply understand the complex feelings of athletes towards their competition attire, but it may also bring potential biases, such as possibly placing more emphasis on the aesthetics or functionality of the attire while neglecting other potential themes.

To reduce potential biases and enhance the credibility of the research results, we have taken the following measures:

- Reflective Journaling: Throughout the entire data collection and analysis process, the researcher continuously maintained a reflective journal, documenting their personal feelings during the interviews, initial thoughts, and the decision-making process in the analysis, to constantly examine the potential impact of their personal stance on the research process.
- Peer Debriefing: The coding process and the initially formed themes are regularly discussed with a [for example: someone familiar with qualitative research methods but not a professional in sports dance] peer. Through this peer debriefing, the researcher's interpretation is subject to external scrutiny and challenge, helping ensure that the final refined themes are grounded in the participants' data rather than the researcher's preconceptions.
- Data Triangulation: The mixed research design adopted in this study itself provides a methodological triangulation. The themes that emerged from the qualitative interviews (such as functional anxiety triggering and aesthetic confidence enhancement) were corroborated by the results of the quantitative questionnaire data (such as a negative correlation between functional comfort and anxiety, and a positive correlation between aesthetic experience and self-confidence), thereby enhancing the overall credibility of the research conclusions.

RESULTS AND DISCUSSION

This study integrated and analyzed 88 valid questionnaire data and 12 interview texts. The sample size of these 12 in-depth interviews was considered adequate because during the data analysis process, when the interviews reached the final few cases, no new core themes emerged. The existing themes (such as “psychological empowerment of battle robes” and “functional concerns after the event”) repeatedly appeared, reaching a state of theoretical saturation, ensuring the stability and representativeness of the qualitative conclusions. The research aimed to reveal the intrinsic connection between the perception of sports dance competition costume and the psychological state of athletes. In general, the quantitative data clearly depicted "what" kind of attire perception was associated with "what" kind of psychological state, while the qualitative data vividly explained "why" such a connection occurred. The analysis revealed three core paths: the psychological empowerment of the attire, the functional guarantee, and its narrative value.

Participant Basic Information

According to the inclusion criteria of this study, the distribution of the best competition levels achieved by these athletes is shown in Table 1. The participants consisted of 41 men (46.6%) and 47 women (53.4%), with an average age of 22.4 years (SD = 2.1, range = 18–27). The average duration of professional dance training was 6.8 years (SD = 1.9), and all athletes had participated in no fewer than three provincial-level or higher competitions in the past two years. Among them, 26 athletes (29.5%) had experience in national-level competitions, and 12 athletes (13.6%) had competed at international events. These demographic data ensure the professional representativeness and diversity of the sample, providing a solid foundation for subsequent psychological and perceptual analyses.

Table 1. Statistics of participant basic information (N = 88)

Variable	Category/Value	N (%) or Mean ± SD
Gender	Male	41 (46.6%)
	Female	47 (53.4%)
Age (years)		22.4 ± 2.1 (range 18–27)
Dance Experience	(years of professional training)	6.8 ± 1.9
Best Competition Level	Provincial-level	50 (56.9%)
	National-level	26 (29.5%)
	International-level	12 (13.6%)

Descriptive Statistics of Key Variables

To provide a clearer understanding of the distribution of the main variables, Table 2 presents the descriptive statistics (mean and standard deviation) for all key perception dimensions and psychological measures. The mean values confirm that athletes generally rated "aesthetic experience" and "confidence boost" relatively high, while "functional comfort" showed greater variability, indicating diverse user experiences. In terms of psychological state, self-confidence and vigor were generally higher than anxiety-related indicators, suggesting an overall positive pre-competition mindset among the sample group.

Table 2. Descriptive statistics for key variables

Variable	Mean	SD
Perception of Competition costume		
Aesthetic Experience	4.21	0.57
Functional Comfort	3.46	0.79
Confidence Boost	4.08	0.63
Theme Alignment	4.02	0.55
Psychological State Variables		
Cognitive Anxiety	2.37	0.72
Somatic Anxiety	2.45	0.69
Confidence	3.88	0.61
Vigor	3.72	0.58
Tension	2.13	0.64

Psychological Empowerment of "Battle Robes": From Visual Identification to Confidence Building

Figure 1 shows that the "aesthetic experience" and "perception of confidence enhancement" of the athletes towards their competition costume have the highest scores across all dimensions. As illustrated in Table 1, "aesthetic experience" and "confidence boost" are significantly positively correlated with "confidence" (r = 0.315 and r=0.607, $p < 0.01$), and also significantly positively correlated with the positive emotion "vigor" (r = 0.466 and r=0.449, $p < 0.01$). This finding indicates that the more athletes believe that the competition costume are beautiful and can enhance their confidence, the higher their actual confidence level and energy before the competition will be.

During the interview, the athletes repeatedly compared their uniforms to "battle robes" or "armor," believing that they have a powerful psychological influence and empowerment effect. "When I put on that custom-made red dress studded with diamonds, as the lights came on, what I saw in the mirror was not just myself, but a character ready to conquer the stage. That moment, I felt like I was the Queen of Samba. Even before I started dancing, my aura had already been established. This feeling directly transformed into my confidence."

(Interviewee A) The qualitative interviews vividly explained why the correlation between the “sense of confidence enhancement” and the “actual self-confidence” was so high (r = 0.607). The athletes' experiences were not merely “feeling good” but a profound psychological transformation. They repeatedly used metaphors like “battle robes” and “armor” that convey a sense of power, and described themselves as “characters ready to conquer the stage.” This finding indicates that the clothing played a direct catalyst role in constructing their identity. This deep “psychological empowerment” effect explains why its impact on self-confidence is not only statistically significant but also extremely large in terms of effect size.

In conclusion, this phenomenon is highly consistent with the recent discussions in the field of sports psychology regarding "embodied cognition" [9]. This theory posits that the experience of the body (such as wearing specific clothing) is closely intertwined with psychological processes. A sports uniform that is imbued with symbolic meanings like "elite" or "champion" can, through the physical act of wearing it, enable athletes to internalize these positive traits, thereby activating the mental schemas associated with optimal performance [10]. The aesthetic design of the sports uniform is not merely a visual pleasure, but also a tool for constructing psychological identity. It helps athletes complete the psychological role transformation from their everyday selves to "field heroes", which directly explains its significant enhancing effect on self-confidence and energy.

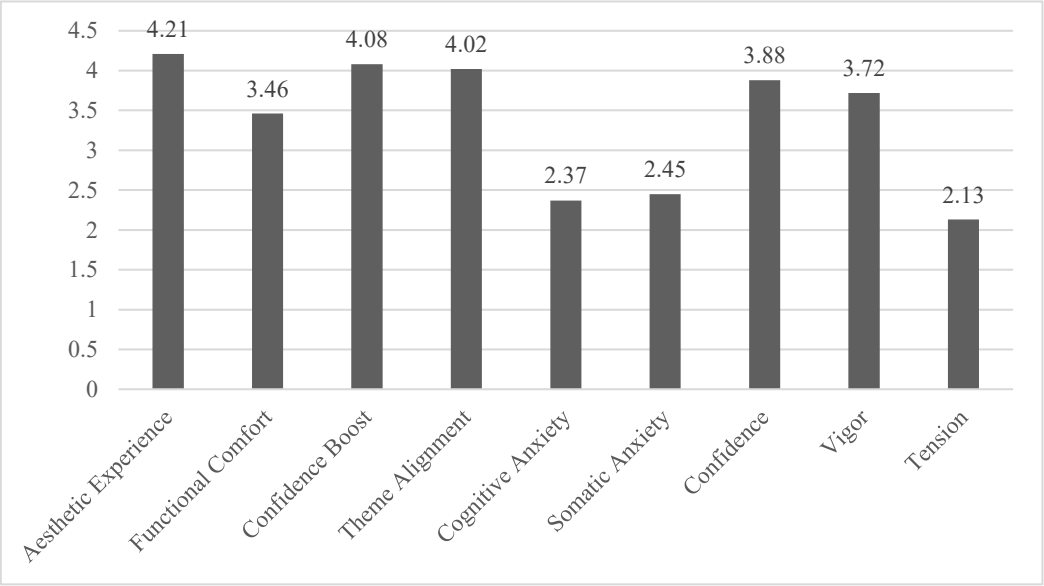

Figure 1. The mean values of each dimension of the perception and psychological state of the sports dance athletes' competition costume

In Table 3, "Cognitive–Somatic Anxiety" was presented as a composite index by averaging the scores of the Cognitive Anxiety and Somatic Anxiety subscales from the CSAI-2. This compositing was done to simplify the analysis and reflect the overall anxiety level in a unified measure. The scoring method for this combined variable was as follows:

Cognitive-Somatic Anxiety = (Cognitive Anxiety score + Somatic Anxiety score)/2

Separate scores for each subscale were retained for descriptive statistics and additional exploratory analyses, while the composite was used for correlation analysis to highlight general anxiety patterns.

Table 3. Correlation between the key dimensions of competition costume perception and psychological state

	Cognitive-Somatic Anxiety	Confidence	Tension	Vigor
Aesthetic Exp	-0.177	0.315**	-0.043	0.466**
Functional Comfort	-0.219*	0.223	-0.111	0.149
Confidence Boost	-0.152	0.607**	0.063	0.449**

** $p < 0.01$, * $p < 0.05$.

"Body and Clothing as One": Functionality is the Foundation of Free Expression

Figure 1 highlights the significance of the functionality of the competition costume. The mean value of "functional comfort" is relatively low among all the dimensions of the perception of the competition costume, and the standard deviation is also large, indicating significant differences in the experience of athletes in this aspect. More importantly, Table 3 shows that "functional comfort" is significantly negatively correlated with "cognitive–somatic anxiety" ($r = -0.219$, $p < 0.05$). This means that the worse the functionality and comfort perceived by the athletes in the competition costume, the more anxiety they have in their pre-competition thoughts.

The qualitative interviews clearly explained the psychological mechanism behind this negative correlation. The respondents generally believed that any functional flaw would become an unshakable "mental burden" in the competition. The worst thing is worrying about potential problems with one’s clothes during the

competition. For instance, if one feels that the shoulder straps are a bit loose, or that the skirt might catch on one's shoe heels, one's mind would allocate some of its energy to thinking about this issue, and as a result, one would not be able to perform at one's best, completely affecting your performance. A piece of clothing that allows you to move freely and does not distract at all is the foundation for expressing oneself freely on the field. (Interviewee F)

These qualitative descriptions also helped us understand the intensity of this effect. Compared with the powerful positive effect brought by the "confidence boost," the correlation between "functional comfort" and "anxiety" was significant, but the effect size was more moderate ($r = -0.219$). This is reflected in the athletes' language: they describe functional issues as a "mental burden" or "distraction" that needs to be eliminated, rather than a source that can actively build positive emotions. The core role of functionality is "to reduce distractions and avoid mistakes," rather than "to directly enhance strength." This explains why poor functionality consistently triggers anxiety, but the intensity of its impact is less than the shaping effect of the aesthetics and symbolic meaning of clothing on self-confidence.

From the perspective of cognitive neuroscience, ill-fitting sports uniforms constitute a continuous task-irrelevant distraction. According to the latest research in attention control theory, in high-pressure competitive environments, this distraction continuously occupies the valuable cognitive resources that athletes should use for technical execution and artistic perception [11]. The distraction of attention not only hinders the achievement of optimal athletic performance but is itself the core source of cognitive anxiety [12]. Therefore, excellent functional design, by achieving "clothing integration with the person", liberates athletes from the "worries" about clothing, ensures the optimal allocation of their limited attention, and effectively reduces anxiety levels. From the perspective of embodied cognition, this is a kind of "negative embodiment experience". If a perfect competition costume can build a positive cycle of confidence and identity, then a poorly functioning costume creates a state of "dis-embodiment". At this point, the athlete's consciousness is forced to be withdrawn from the dance performance and instead deal with the distracting physical sensations from the costume. This cognitive resource occupation resulting from negative body experience directly translates into the high anxiety reported by the athlete.

Designing Narratives: The Costume as an Extension of the Dance Work

The athletes also gave high ratings to the "degree of alignment with the dance theme" (Figure 1), indicating

that they attach great importance to the unity of the competition costume and the dance content.

Qualitative interviews elevated this need to the level of artistic narrative. High-level athletes believed that the competition costume should not exist independently but should be part of the storyline of their dance works. "The competition uniform for my rumba dance is dark blue and has many flowing lines. Because my choreographic theme is ‘Flowing Moonlight,’ when I dance, the dynamic movement of that dress is like the flowing moonlight on my body. It helps me express the artistic conception of the work. It is not just a piece of clothing; it is helping me tell the story and enabling the judges and the audience to more easily enter my world." (Interviewee J)

This "design narrative" function can be regarded as an amplifier, which significantly deepens and elaborates on the strong correlations observed in quantitative data. When the aesthetic design of a set of clothing is not only visually appealing but also conveys a narrative consistent with a dance piece (such as “Flowing Moonlight”), it greatly enhances the "aesthetic experience" of the athletes and the final "sense of confidence boost". This deeply artistic integration driven by stories provides us with richer answers for understanding "how clothing design transforms into a powerful psychological effect", and it might also be one of the intrinsic reasons for the high correlation between aesthetics and self-confidence.

This finding highlights that in highly artistic sports dance events, the competition costume goes beyond its physical functions and assumes the role of a narrative medium. The latest research in sports aesthetics indicates that the scoring of such events is essentially a holistic evaluation [13,14]. Judges and spectators do not evaluate the techniques, music, and attire independently; instead, they view them as a unified artistic whole. The narrative function of the competition costume is therefore a crucial link in achieving the aesthetic realm of "human, clothing, dance, and music" integration and improving the final competitive performance. Within the framework of embodied cognition theory, the narrative function of costumes promotes a higher level of 'embodiment'. As the most intuitive physical carrier of the dance theme, costumes help athletes not only complete technical movements but also “become” the characters they play and “embody” the stories they tell (as mentioned in the interview, “Flowing Moonlight”). This cognitive and emotional integration triggered by the physical experience of wearing “stories” ultimately leads to a more realistic and more infectious artistic expression, achieving the unity of heart, body, and clothing.

CONCLUSIONS

The comprehensive analysis of this study confirms that sports dance uniforms are a powerful carrier of embodied cognition theory. They profoundly influence the psychological state and artistic performance of athletes through three interrelated paths: the psychological empowerment brought about by the symbolic meaning of the uniforms, the functional guarantee provided by the physical experience, and the design narrative achieved through artistic integration. For athletes and coaches, the selection and design of uniforms should be regarded as an integral part of psychological preparation and artistic creation. Early intervention is necessary to ensure that the uniforms are not only aesthetically pleasing but also empowering, undisturbing, and in harmony with the theme of the work. For competition uniform designers, they must go beyond traditional aesthetic frameworks and adopt an "athlete-centered" design thinking. They must deeply understand the biomechanical requirements of the dance project and the artistic connotations of specific works to achieve a deep integration of technology, art, and humanistic care.

Although this study has revealed a significant connection between the perception of the competition costume and the psychological state of the athletes, acknowledging its limitations is equally important. The correlational design of this study cannot establish a causal relationship, nor can it conduct statistical control for potential confounding variables. For instance, factors such as the athlete's past competition results, recent training intensity, the quality of their relationship with the coach, or personal expectations could all simultaneously affect their pre-competition confidence and anxiety, thereby influencing their subjective evaluation of the competition costume. An athlete who is fully prepared and confident may be more inclined to view their "battle suit" positively. Future research should therefore adopt a longitudinal design or employ statistical methods such as multiple regression analysis, after controlling for these variables, to more precisely isolate the independent influence of the competition costume design on the athletes' psychological state, thereby more clearly revealing its unique effect.

Availability of Data and Materials

The datasets used and/or analysed during the current study were available from the corresponding author on reasonable request.

Author Contributions

Shun Gao designed, collected and analyzed the data, and drafted the manuscript. Shun Gao conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Shun Gao participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Conflict of Interest

The author declares no conflict of interest.

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Ethics Approval and Consent to Participate

This survey was conducted in compliance with Ethics Committee of Hubei University of Arts and Sciences. Participants were informed of the study's purpose and data usage prior to participation, and responses were collected anonymously. No personally identifiable information was stored.

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Not applicable.

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