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VISUAL AESTHETICS OF HIP-HOP DANCE MOVEMENTS IN A V-SHAPED STAGE SETUP*

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Abstract

This study investigates the aesthetic perception of V-shaped stage setups with 11 dancers performing different Hip-hop movements. It aims to determine whether observers evaluate these setups differently in terms of aesthetic appeal and whether expertise influences judgments. Understanding these evaluations is essential for enhancing the impact of dance performances. The study recruited 182 participants, including experts and non-experts. All participants rated five video stimuli showing 11 dancing avatars in a V-shaped stage setup based on their aesthetic perception. Participants completed an online questionnaire, and data were analyzed using Friedman ANOVA. Significant differences were found in aesthetic ratings across the stage setups. The stage setup featuring the *Kick Ball Change Side* movement received the highest rating. No significant differences were found between experts and non-experts in their aesthetic evaluation of the stage setups. The results suggest that specific dance movements, particularly the *Kick Ball Change Side*, are universally perceived as aesthetically pleasing. These findings offer valuable insights for choreographers seeking to enhance the visual aesthetics of dance performances. Future research should explore additional stage setups and context factors.

Keywords: aesthetics, Hip-hop dance, visual perception, motion capture, stage setups

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1. THEORETICAL FRAMEWORK

1.1 Aesthetics

Dance is created to be watched and aesthetically evaluated by an audience (Bläsing & Zimmermann, 2021). The main goal of the present study is to explore

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the aesthetic perception of dance performances, with particular focusing on how different observers aesthetically evaluate different stage setups as part of a dance performance. Different approaches to aesthetic evaluation have been analyzed in research on visual aesthetic perception, with both philosophers and researchers attempting to define the term *aesthetics*.

Early philosophers such as Plato (427-347 BC) tried to interpret the term *aesthetics* by highlighting the notion of beauty. He described the aesthetic experience as pleasure derived through sight and hearing (Brielmann & Pelli, 2018; Woodruff, 1982). The philosopher Alexander Baumgarten later defined aesthetics as the science of sensual experience. He focused on sensation and imagination, proposing that a beautiful stimulus generates an aesthetic experience (Baumgarten, 1750). Similarly, Fechner (1876) and Berlyne (1974) defined aesthetic perception as the experience of feeling pleasure, attraction, and fascination in response to a stimulus. Jacobsen et al. (2004) equated the term "beauty" with aesthetics in their survey. In addition, Jäger and Kuckhermann (2004) identified perfection, beauty, harmony, and grace as essential elements of aesthetic perception. Chatterjee and Vartanian (2014) conceptualize aesthetic evaluation as a process of perceiving, processing, and responding to art, often evoking intense feelings such as pleasure.

In sum, philosophical approaches and empirical studies often rely on positively associated terms such as 'beauty' and 'pleasure' in their investigations of aesthetic perception without clearly defining meanings. This underscores the need for focused research on aesthetic perception in the art of dance. In research on aesthetics in dance performances, Vukadinović and Marković (2012) concluded that the perception of expression and power plays a central role. Dörnenburg et al. (2019) emphasized elegance, beauty, and the fluidity of movements as key components of aesthetic experience in dance. Other studies, such as Bläsing and Zimmermann (2021), investigated the role of enjoyment, while Kempe and Vinken (2023) highlighted the concept of "liking" as significant in aesthetic evaluations. Some authors have identified aesthetic preferences in regard to specific dance movements, shedding light on features a large range of motion and wide forms (Brown et al., 2021; Sato et al., 2016; Torrents et al., 2013; Vinken & Heinen, 2022; Vinken, 2022), high velocity movements (Deinzer et al., 2017; Orlandi et al., 2020), and whole body movements and displacements (Calvo-Merino et al., 2008; Joung & Kim, 2023). In contrast, research has also examined negatively associated stimuli in aesthetic perception. Marković (2010) and Silvia and Brown (2007) demonstrated that aspects such as horror, fear, and ugliness can also generate an aesthetic experience. Taken together, these findings suggest that positively and negatively associated stimuli can generate an aesthetic experience. Therefore, examining aesthetic perception in a specific domain, such as a dance performance, is essential for understanding the aesthetic preferences of dance observers.

1.2 Dance Performance as a Research Object

Dance performances are watched in theatres, shows, and dance competitions by a diverse group of observers. A dance performance on stage synthesizes creative design components and is a complex interplay of design criteria (Klein, 2019;

Rosenberg, 1998; Sofras, 2020) and external features. The design criteria of dance are space, time, dynamics, and shape. The criteria *space* means the dancer's space around his body and includes layers, directions, and the space on stage for setups as well as their shapes and positions. *Time* involves aspects such as movement velocity, breaks, and durations of body movements and poses. *Dynamics* pertain to the use of force, while *shape* describes the form of the dancer's body–such as a pointed or flexed foot–or the geometric shape of a stage setup with arranged dancers. Dancers can be arranged in various shapes, including circles or lines. In addition, *external features* such as costumes (Barbieri, 2017; Kwakye-Opong & Adinku, 2013; Monks, 2009), stage lighting (Basa, 2023; Graham et al., 2023; Sampaio, 2020; Wu et al., 2023), stage type and stage design (Grösel, 2022; Lemasson et al., 2019; Sofras, 2020), and the influence of music or beats (Veit et al., 2022; Vukadinović, 2023; Woolhouse & Lai, 2014) also play an important role. Choreographers synthesize these components deliberately and creatively to produce a cohesive dance performance (Humphrey, 1986). Expanding the understanding of how design criteria and external features influence the perception of dance performances can support choreographers' work and improve the quality of dance performances.

Dance performances are observed by a range of individuals such as the audience, jury members, or critical observers (Bläsing & Zimmermann, 2021; Orgs et al., 2016). These observers attend dance performances for various reasons and possess different levels of expertise. Some observers watch dance for entertainment and engage with the performance in a more passive manner (Vukadinović & Marković, 2012), whereas others serve as critical competition judges or are experienced dancers. In the literature, observers are often categorized as experts (i.e., dancers or individuals with dance education) and novices (non-dancers and those without dance education).

1.3 Expert and Novice Perception of Dance Performances

The findings on aesthetic evaluation by experts and novices in dance differ and will be considered in the following section. Numerous studies have examined dance movements, body poses, choreographies, and stage setups with an expert group (dancers) and a novice group (non-dancers). Several studies have reported that significant differences between experts' and novices' aesthetic evaluations of dance movements (Casale et al., 2024; Jang & Pollick, 2011; Joung & Kim, 2023; Vinken & Heinen, 2022; Vukadinović & Marković, 2012), body poses (Vinken & Bernewitz, 2022), and stage setups (Kempe, 2024; Kempe & Hurek, 2024). In contrast, some research has found no significant differences between the two groups' perceptions of dance choreographies (Pálinkás-Molnár & Bernáth, 2022). Similarly, other studies have shown that experts and novices do not differ in the aesthetic evaluations of dance movements (Kempe & Vinken, 2023; Vinken, 2024), body poses (Vinken & Heinen, 2022), and stage setups (Kempe & Heinen, 2022).

In summary, the observer's aesthetic evaluation is essential in dance performances and warrants further investigation to understand audiences' aesthetic perceptions of dance. Given the complexity of dance performances, it is important to isolate individual stimuli such as specific movements and poses. Particularly lacking is

research on the aesthetic perception of individual dance movements within group performances. A small handful of studies have been carried out on how solo Hip-hop dance movements are aesthetically perceived. The Hip-hop movements *Side-Step* (Sato et al., 2015, 2016) and *Arm-Wave* (Brown et al., 2021; Sato et al., 2014) have been studied. Brown et al. (2021) found that both novices and competition judges prefer a smooth, constant propagation velocity combined with large joint amplitudes in the Arm-Wave movement (Sato et al., 2014). Sato et al. (2015, 2016) investigated the technical aspects of Hip-hop dance and their visual perception. In one study, Sato et al. (2015) observed that expert dancers employ a phase delay between head and body movements, contributing to a loop-like head motion, which was associated with higher evaluation scores from judges. In another study, Sato et al. (2016) showed that advanced dancers exhibit a time delay in neck motion and a more extensive range of motion during the Side-Step, both of which also significantly contributed to higher scores from judges. Building on these findings, it is important to investigate how movements are evaluated when performed by groups of dancers arranged on stage.

In a study by Kempe and Vinken (2023), dancers and non-dancers aesthetically evaluated several Hip-hop movements presented by a solo dancer: the *Bounce Side*, *Kick Ball Change Side*, *Kick Ball Change Front*, and *Indian Step* (*Figure 1*). All of the observers ($N = 54$) rated the movements using a 5-point rating scale from *liking* to *disliking*. Analysis of variance revealed a significant main effect of Hip-hop movement type on liking ($F(3, 153) = 4.939$, $p < .01$, $eta^2 = .05$). Among the movements, *Bounce Side* received the lowest rating, while the *Kick Ball Change Side* received the highest. The *Indian Step* and *Kick Ball Change Front* movements maintained intermediate positions. There were no significant group effects between dancers and non-dancers in terms of their evaluations. While Kempe and Vinken's (2023) study provides insight into the aesthetic perceptions of solo Hip-hop movements, there remains a need to investigate the aesthetic perception of movements performed by a group of dancers. To analyze the movements in a group performance, it is important to define how the group should be positioned for analyzing. The number of dancers, their positions on stage, and the overall shape of the stage setup must be considered. Based on prior studies by Kempe and Heinen (2022), Kempe (2024), and Kempe (submitted), the highest aesthetic evaluations were given performances featuring groups of eleven dancers' positions at the front of the stage in a V-shaped stage setup (see *Figure 2*). The results provide the foundation for the present study, which expands on previous work by incorporating Hip-hop movements into group performances featuring eleven dancers in a V-shaped stage setup. Studying aesthetic perception in group dance performances is essential for supporting choreographers' work and improving the quality of dance performances. This study investigates what observers aesthetically prefer in dance performances. Accordingly, the following three main research questions arise:

1) *Are stage setups with different dance movements perceived aesthetically differently?* The existing literature suggests that stage setups featuring different movements may be perceived differently, as individual movements are perceived differently when performed as solo movements (Brown et al., 2021; Sato et al., 2014, 2015, 2016). *It is therefore hypothesized that the aesthetic evaluation of stage setups with different movements will vary.*

2) *Do the results differ from the movement evaluation of a solo dancer, as reported in Kempe and Vinken (2023)?* The literature has focused solely on the aesthetic perception of solo movements, with the aesthetic perception of movements performed in groups remaining unexplored. The assumption is that the aesthetic evaluation of stage setups is influenced by the performance of group movements in stage setups. *It is hypothesized that the aesthetic evaluation of group performances will differ from those of solo dancers.*
3) *Do experts and novices differ concerning their aesthetic evaluations? It is hypothesized that experts and novices will differ significantly in their aesthetic judgements*. This expectation aligns with results from previous studies on the perception of dance movements (Casale et al., 2024; Jang & Pollick, 2011; Joung & Kim, 2023; Vinken & Heinen, 2022; Vukadinović & Marković, 2012).

2. METHODS AND ANALYSIS

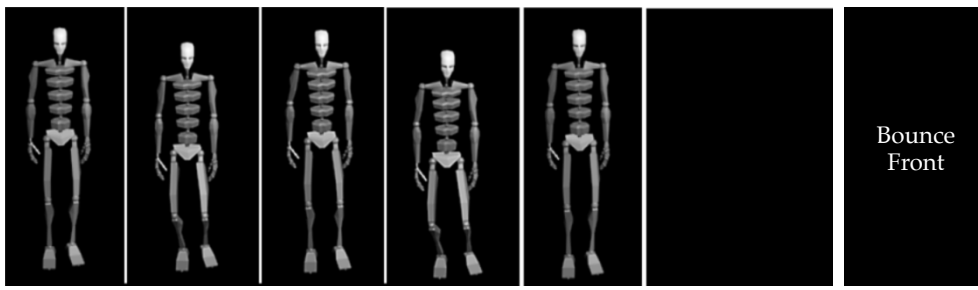
2.1 Participants

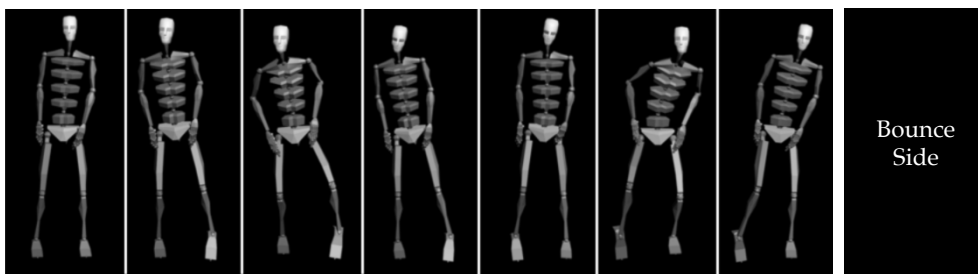
The present study recruited $N = 182$ participants through email invitations distributed via coaches and dance teachers at dance schools and college sports programs. The participants were assigned to one of two groups based on their reported involvement in dance or sports activities. The expert group included dancers, rhythmical gymnasts, and individuals active in aesthetic and compositional sports such as figure skating and capoeira ($n_1 = 91$, female = 80, male = 8, undefined = 3, age [$M \pm SD$] = 29.8 ± 9.7 years). The non-expert groups consisted of individuals engaged in non-compositional sports such as endurance, team, health, outdoor, or individual sports ($n_2 = 91$, female = 57, male =34, age [$M \pm SD$] = 26.5 ± 7.8 years). All participants completed an online questionnaire in which they watched five videos of dancing avatars performing different Hip-hop movements in a V-shaped stage setup. Participants were instructed to rank the videos from most to least aesthetically pleasing by assigning each videos a rank from one to five. Each rank could only be awarded once. Participation in the study was voluntarily, with each participant providing informed consent and completed a privacy form before participating. The study was conducted in accordance with the ethical guidelines of the local university and was approved by the ethics committee of the Ethics Advisory Board of Leipzig University, Germany.

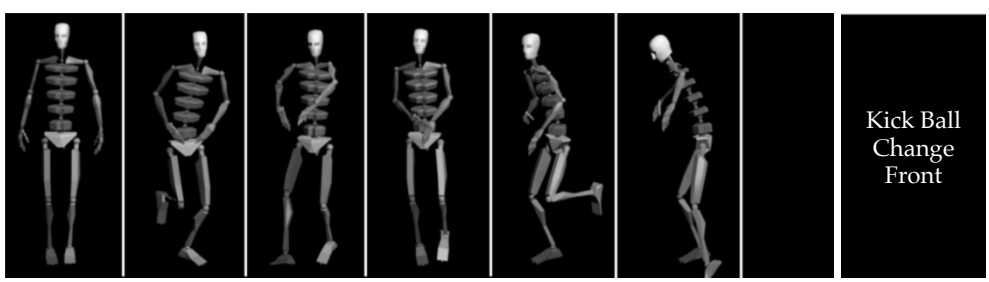
2.2 Dance movements

Based on the findings of Kempe and Vinken (2023), the following basic Hip-hop movements were selected for the present study: *Bounce (front), Bounce (side), Kick Ball Change Front, Kick Ball Change Side,* and *Indian Step* (*Figure 1*). Movement data were generated using a motion capture system (Perception Neuron®, Noitom Technology Co., Ltd, Miami, USA) from a 27-year-old female dancer with 15 years of experience in Hip-hop dance. The recorded movement data were mapped onto a human-like, gender-neutral avatar with default coloring. The avatar was designed a simplified skeletal figure without hair or gender-specific features.

No movement edits were applied after recording (e.g., correction of turnouts). The full video animations were created with *3dsMax Software* (Autodesk, Dublin, 2025). The final outcome was five videos featuring eleven dancing avatars arranged in a V-shaped stage setup.







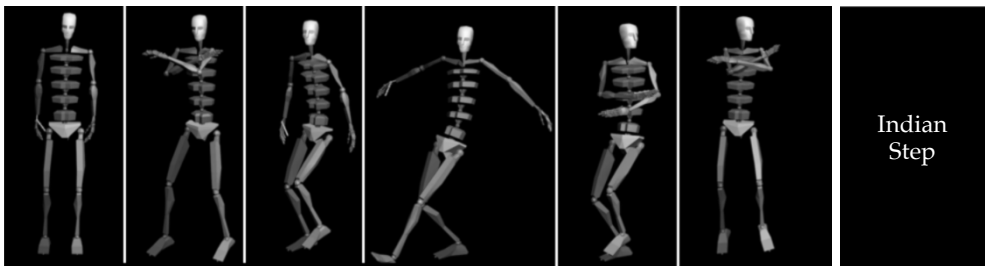


Figure 1. Selected Hip-hop movements performed by a solo dancer

2.3 Stage Setups

Based on the results of Kempe and Heinen (2022), Kempe and Hurek (2024), and Kempe (2024), a V-shaped stage setup was chosen. The V-setup is positioned at the front of the stage, centered, with the peak of the "V" pointing forward. The number of eleven arranged dancers was based on Kempe's study (submitted). In accordance with Kempe's findings (2024), all dancers maintained a front-facing position on stage (*Figure 2*).

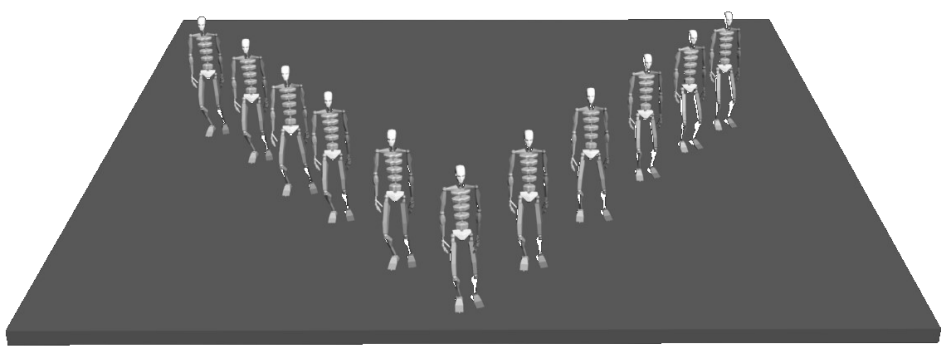


Figure 2. Eleven dancers arranged in a V-shaped stage setup with the peak at the front

2.4 Procedure and Evaluation

The participants received an online questionnaire that included (1) a privacy statement and declaration of consent form, (2) demographic questions regarding gender, age, and the type of sport or dance style practiced, (3) years of experience, and (4) the aesthetic evaluation of the video stimuli, accompanied by a standardized introduction to the procedure. Participants were tasked with ranking the videos based on their perceived aesthetic quality from first place (most aesthetic) to fifth place (least aesthetic). Every ranking position could only be assigned once.

The videos were presented in randomized order. Participants were advised to view the videos on a screen of at least 13 inches and were allowed to repeat the video stimuli as many times as they wanted. The online questionnaire took five minutes to complete. Data collection took place over a period of four weeks. Upon completion, all participants were thanked for participating in the study.

2.5 Data Analyses

A significance level of $\alpha = .05$was defined as a priori. The participants' data were analyzed in Microsoft Excel to calculate mean scores and standard deviations for age and years of sports or dance experience. A Friedman ANOVA was calculated to test the study's main hypotheses regarding aesthetic perception of stage setups. Kendall's *W* was calculated as a measure of effect size. The variable *Group* (n_1 = dancers; n_2 = non-dancers) was treated as the between-subject factor, while five different stage setups were treated as within-subject factors. A post hoc test (Holm's procedure) was calculated to determine which specific stage setups differed significantly. For the second question regarding the comparison between solo and group movements, the results of Kempe and Vinken (2023) were compared with those of the present study. For the third question examining whether the aesthetic evaluations of dancers and non-dancers differ significantly, the Friedman ANOVA was used to analyze interaction effects and assess whether the main effects varied by group (Knudson, 2009). Mean scores were recoded and visualized in a bar chart to provide descriptive statistics.

3. RESULTS

This investigation explores the aesthetic perception of stage setups and seeks to address three main research questions regarding the evaluation of aesthetics in dance.

The first research question was:
Are stage setups with different dance movements perceived aesthetically differently?

The first question examined whether the aesthetic evaluation of stage setups varied significantly depending on the movement performed. The results of the Friedman ANOVA revealed a significant main effect of stage setups on aesthetic ratings (χ^1_2= 227.538; $p < .001$; $W = .313$). Among the five conditions, the stage setup featuring the *Kick Ball Change Side* movement received the highest aesthetic rating ($M \pm SD$ = 3.76 ±1.11*)*. This was followed by *Indian Step* (3.58 ± 1.2), *Kick Ball Change Front* (3.41 ± 1.28), and *Bounce Side* (2.63 ± 1.16). The *Bounce Front* setup received the lowest aesthetic evaluation (1.62 ± 1.11). These rankings are illustrated in *Figure 3*, which also presents the results of the post-hoc test (Holm's procedure), which are indicated by lines and asterisks above the bars in *Figure 3*. When shedding light on the mean scores across the dancers and non-dancer groups revealed consistent ranking patterns. In both groups, the *Kick Ball Change Side* was evaluated as the most aesthetically pleasing, while *Bounce Front* received the lowest evaluation.

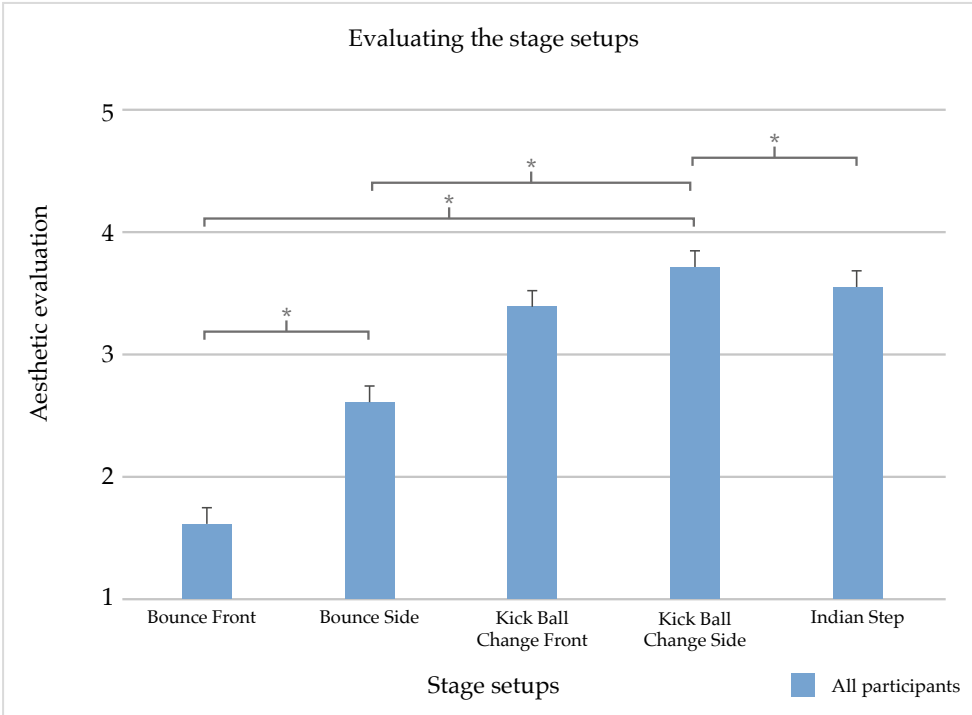


Figure 3. Aesthetic evaluation of movements in the V-stage setup among all observers

The second research question aimed to compare the evaluation of solo movements (Kempe & Vinken, 2023) and the same movements performed by dancers in the stage setup:

Do the results differ from the movement evaluation of a solo dancer, as reported in Kempe and Vinken (2023)?

Both studies show a significant main effect in the aesthetic evaluation of video stimuli. In evaluating solo movements, the *Kick Ball Change Side* was rated as the most aesthetically preferred, while *Bounce Side* received the lowest ratings. The data from the present study shows that these ranking results do not differ when evaluating Hip-hop movements in stage setups with a group of eleven dancers. The mean scores for both studies are presented in *Table 1*.

Movement	Evaluation on solo movements (Kempe & Vinken, 2023)	Evaluation on 11 dancers in a V setup (present study)
	M ± *SD*	*M* ± *SD*
Bounce Front	-	1.62 ±1.11
Bounce Side	3.39 ± 0.15	2.63 ±1.16
Kick Ball Change Front	3.85 ± 0.14	3.41 ±1.28
Kick Ball Change Side	3.94 ± 0.13	3.76 ±1.11
Indian Step	3.57 ± 0.13	3.58 ±1.2

Table 1. Recoded mean scores and standard deviations of solo movements and movements in a stage setup

The third research question was as follows: *Do experts and novices differ concerning their aesthetic evaluations?*

The analyses showed no significant differences in aesthetic evaluations between the dancer and non-dancer groups ($p = 1$). Additionally, the results do not show a significant interaction effect based on the group membership ($p = .057$), indicating that dance expertise does not influence aesthetic evaluation in this study.

This study demonstrates a clear association between the aesthetic evaluation of dance movements performed by one dancer and the same movements performed in a stage setup with eleven dancers. Although effects on the groups differed between the two studies. The present findings highlight that all observers aesthetically preferred the stage setup with the *Kick Ball Change Side* movement. However, the grouping results between experts and novices differ depending on whether the movement was performed by one or eleven dancers.

4. DISCUSSION

This study was conducted to investigate how dance movements arranged in a stage setup are perceived aesthetically. The main aim of the study was to examine how different observers evaluated the V-shaped stage setup. The study focused on three main research questions:

1) *Are stage setups with different dance movements perceived aesthetically differently?* It was hypothesized that the perception of stage setups would vary depending on the movements performed, as previous research has shown that individual movements are perceived differently (Brown et al., 2021; Sato et al., 2014, 2015, 2016).
2) *Do the results differ from the movement evaluation of a solo dancer, as reported in Kempe and Vinken (2023)?* The existing literature has not explored the aesthetic perception of dances performed by groups, with studies solely carried out

on solo movements. It was assumed that the aesthetic perception of stage setups is also influenced by the performance of those dance movements in a group.

3) *Do experts and novices differ concerning their aesthetic evaluations?* It was hypothesized that experts and novices would differ significantly in their aesthetic evaluations; the results are in line with previous studies on the perception of dance movement (Casale et al., 2024; Jang & Pollick, 2011; Joung & Kim, 2023; Vinken & Heinen, 2022; Vukadinović & Marković, 2012).

4.1 Main results and interpretation

The results indicated significant differences in the aesthetic evaluation of the stage setups. Among the five movements, the stage setup featuring the *Kick Ball Change Side* movement received the highest aesthetic rating, while the *Bounce Front* received the lowest. Based on the findings, choreographers may consider using the V-shaped stage setup with eleven dancers performing the *Kick Ball Change Side* to maximize aesthetic appeal. Higher aesthetic evaluations can improve rankings given by jury members in dance competitions and enhance audience feedback in dance shows and theatres. Improving the perceived aesthetic quality of dance performance can strengthen the relevance of dance in society and increase its importance in scientific contexts.

In this study, neither the main effects of group nor interaction effects between group and stage setups were found for aesthetic evaluation. Dance expertise did not influence aesthetic evaluation in this study. These findings align with previous research (Kempe & Heinen, 2022; Kempe, 2024; Pálinkás-Molnár & Bernáth, 2022; Vinken & Heinen, 2022; Vinken, 2024), suggesting that aesthetic preferences are shared by both experts and novices. Notably, the combination of the *Kick Ball Change Side* with eleven dancers in a V-shaped stage setup appears to be broadly appealing, regardless of the viewer's level of expertise. This combination could be used by choreographers to engage a wide range of observers. However, when compared to the results of Kempe and Vinken (2023), the influence of expertise should be considered critically. The group results differ significantly in Kempe and Vinken's (2023) study, whereas the present study did not find significant group-based variation in aesthetic evaluation. These contrastive findings are in line with those of Casale et al. (2024), who reported that individual differences in experience with art and movement-based activities do not always generate significant group-level differences. Interestingly, the data on the evaluation of solo movements (Kempe & Vinken, 2023) revealed an expertise-based variation. When analyzing Hip-hop movements with a solo dancer, the groups differed regarding their evaluation. In the present study, there were neither main group effects nor interaction effects between group and stage setups on aesthetic evaluation. This suggests that, at least in regard to the sample examined in the present study, dance expertise does not influence aesthetic evaluation in this study. This raises the possibility that factors such as embodiment may have a stronger influence on aesthetic perceptions than expertise alone. In addition, contextual factors may also play a role in shaping observers' evaluations. Future studies could aim to identify and explore how such contextual factors, such as cultural influences, may affect the aesthetic judgement of dance performances.

4.2 Limitations

While this study provides valuable insights into the aesthetic evaluation of dance performances, several limitations should be acknowledged. Regarding objectivity, the study was designed to minimize researcher bias through the use of a standardized questionnaire as a data collection method and clear participant instructions. However, the reliance on self-reported data also introduced certain biases; as such, incomplete or irrational responses were excluded from the final analysis. Moreover, participants' evaluations may have been influenced by their environment or other external factors, such as an unstable Wi-Fi connection. Although participants were recommended to watch the videos on a laptop screen, adherence to this suggestion could not be enforced. As a result, some participants may have viewed the videos on smaller devices, such as smartphones, which could have influenced their aesthetic perception. The videos were measured using a ranking system ranging from one to five, with one being the most aesthetically pleasing and five being the least. This method is advantageous in that each place can only be awarded once, thus promoting clear rankings between the videos and a differentiated evaluation. Additionally, combining qualitative interviews with the quantitative measures used in the present study could provide more detailed information about the aesthetic perception of dance performances.

Concerning validity, the present study clearly and successfully captured key findings related to the aesthetic evaluation of dance performances. Nevertheless, potential concerns about ecological validity must be acknowledged. While the motion-captured video presentations provided a controlled environment for ranking each stimulus, they may not fully replicate the dynamic nature of live dance performances. The absence of real-time experience and direct human interaction could influence the participants' aesthetic perception and evaluation. Splitting the participants into two groups, specifically experts (dancers and athletes from aesthetic-based sports) and novices (non-dancers and athletes from non-aesthetic sports), was done to study differences in aesthetic evaluation based on prior experience in aesthetics. This grouping supported the construct validity of the study by ensuring the measured aesthetic perception across participants from different backgrounds in aesthetic and non-aesthetic sports. However, athletes from non-aesthetic sports may still have experience with spatial grouping. Those involved in a team may also use formations on the field, though their focus is tactical rather than aesthetically appealing. The use of a five-point rating scale for ranking provided a consistent means of evaluating participants' aesthetic judgments, thus supporting the reliability of this study. Additionally, the Friedman ANOVA allowed for the statistical analysis of repeated measures, strengthening the reliability of the results and enabling the detection of significant differences across the two groups. Given the sample size of 182 participants, ANOVA was a fitting statistical tool. However, the sample size may not have been large enough to draw generalized conclusions about a broader population, prompting future studies that can be expanded to other countries. Despite these limitations, the present study provides important findings in the research of aesthetic evaluation and contributes to an understanding of the aesthetic evaluation of dance performances. Future research could address these

issues using larger samples gathered from other countries and cultures, comparing new dance-related stimuli, and investigating live performances.

4.3 Practical Implications and Future Studies

Future studies should investigate additional factors that influence the aesthetic perception of dance performances. Future research could expand on the observers' perspectives investigated in this study by examining the jury's perspectives (Plessner & Schallies, 2005). This research could explore how the positioning of the observer influences the aesthetic perception of stage setups from various vantage points in the audience. Additionally, exploring various dance styles performed as formation dances could offer valuable comparisons into the aesthetic perception of movement and stage setups. Competition groups from national and international championships represent a rich source of research stimulus. Furthermore, investigating the impact of different musical elements, such as beats or other sounds (Veit et al., 2021, 2022; Woolhouse & Lai, 2014), could be included in research on dance performances. Understanding how auditory stimuli interact with dance movements in a stage setup will provide further insight into aesthetic evaluation. Future studies could also investigate the influence of the various angles and geometric shapes used in stage setups. As range of motion is important in aesthetic evaluation (Brown et al., 2021; Torrents et al., 2013), future studies could vary the angle of the V-shape from that used in the current study. Results from studies such as Vukadinović and Marković (2017) should be expanded, especially in regard to the differences between video-based stimuli and live dance performances. It is crucial to determine whether the results of aesthetic evaluation would change in the conditions of live dance performances on stage.

Research on dance performance has many gaps which offer potential for further aesthetic studies. In future research, each design criterion (i.e., space, time, dynamics, and shape) and each external component of a dance performance should be explored. Combining the results of these studies can offer a more comprehensive understanding of aesthetic perception in dance performances. While the present study takes a meaningful step toward ecological validity in dance by combining movement stimuli and stage setup for the first time, further research could expand on these results. The more components of dance performance that are studied and the results integrated, the closer the gap between empirical laboratory research and ecological validation in dance will be. It is essential not to lose sight of the ecological validation of the art of dance, as it forms the foundation for studies in the empirical research of aesthetics.

5. CONCLUSION

The main goal of the present study was to investigate the aesthetic perception of dance performances. As a component of dance performances, stage setups were chosen as the main object of the research. The central question addressed how observers evaluate different stage setups aesthetically. The stage setups were arranged with eleven dancers in a V-shaped formation and performing Hip-hop movements.

Results revealed significant differences in the aesthetic evaluation of the stage setups. The observers aesthetically rated the V-shaped stage setup with the *Kick Ball Change Side* movement the highest and the stage setup with the *Bounce Front* movement the lowest. The results showed no significant differences between the dancer and non-dancer groups, suggesting that specific dance movements and stage setups may be generally perceived as aesthetically pleasing, regardless of the observer's expertise. As a result, choreographers might consider stage setups featuring the *Kick Ball Change Side* movement when designing dance performances aimed at a broad audience. These results were compared to an investigation by Kempe and Vinken (2023) involving the perception of solo Hip-hop movements. While the aesthetic evaluation results aligned with those of Kempe and Vinken, the two experience-based groups did not significantly differ in their aesthetic evaluation as they did in the above-mentioned study. It was assumed that the expertise of the observers is not the only influencing factor in evaluating aesthetics in dance. In sum, this study highlights the general aesthetic preference for V-shaped stage setups featuring the *Kick Ball Change Side* movement and the importance of contextual factors in shaping the aesthetic evaluation of dance. Future studies should further explore different dance styles, musical elements, geometric angles of stage setups, and the context of live performances to strengthen the results of aesthetic evaluation in dance performances. This study has combined two components of dance performances (i.e., dance movements and stage setups) for the first time in aesthetic dance research. Combined, the results from future studies exploring other components will extend the understanding of aesthetic evaluation in dance and enhance the impact of dance performances on observers. In this way, the findings of aesthetic evaluation research can improve dance performances and support the future work of choreographers.

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