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Does the direction of shapes and bodies influence the aesthetic perception of stage setups in dance?

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ABSTRACT
Purpose. Perceiving aesthetics in watching dance is a complex field of research, yet the component of space in general and stage setups, in particular in dance, is rarely studied. This study investigates the space on stage through the stage setups used in dance competitions. The main goal was to explore the aesthetic preferences of symmetry and the front-facing direction of shapes in a dance presentation. The investigation tries to determine how observers with differing dance experiences perceive the aesthetics of V-setups, diagonal lines, and their involved dancers by mirroring and turning shapes and bodies.
Methods. Categorised into three groups (modern dancers, other dancers, non-dancers), 72 active female participants from dance studios and college sports courses evaluated the perceived aesthetics of eight arranged stage setups through a video ranking. Nine motion-captured avatars performed the hip-hop bounce movement in each setup. The participant's task was to rank the presented stage setups based on their aesthetic perception. The ranking was illustrated with the means values, and the 5% significance criterion was tested with the Friedman-ANOVA.
Results. The stage setups are perceived differently by the observers. The V-setups reached higher aesthetic scores than the diagonal lines. Only the group of modern dancers showed no preference for the V versus the diagonals. There was a significant difference between the direction of the arranged dancers on stage. The setups with all dancers' bodies front-facing are aesthetically preferred. Furthermore, the regular V-setup with its top to the front and with all dancers' bodies facing the front achieved the highest score in the aesthetic evaluation.
Conclusions. The results provide evidence that the feature of symmetry is a driving factor in perceiving aesthetics in dance. The V-setup can be suggested for use in dance choreographies to improve the aesthetic value of observers. Also, the direction of the dancers facing the front is recommended and should be used in dance stage setups.
Key words: aesthetic perception, motion capturing, dance, stage, geometric shapes

Introduction

Dance choreographies result from a structured interplay of moving bodies on stage, telling a story, creating visual effects, and designing shapes. Designing a shape is possible with a dancer's body or by arranging more than one dancer's body on stage. Dance choreographies are located in the space on stage with all the dancers. The space on stage can be designed using particular stage setups. These stage setups are typically derived from geometric shapes and arranged with dancers [1–3].

Observers of dance perceive these stage setups as more or less aesthetic in choreography and are influenced by their preferences and aversions [4]. The aesthetic preferences of the geometric shapes are suitable for evaluating the stage setups in dance. The question yet arises which stage setups are more or less aesthetically preferred by observers with and without experience in dance. Different aspects of geometry may contribute to aesthetic perception, for example, aesthetic preferences of symmetry in dance [5] and the front-facing direction of dancers [6]. The current study explores how the observers perceive different stage setups used in dance competitions. Hip-hop dance was chosen as the dance style. The main goal is to determine how observers perceive the visual aesthetics of the selected stimuli, such as V-setups, diagonal lines, and their involved dancers by mirroring and turning shapes and bodies. In addition, the study investigates which setups

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are perceived as the most aesthetic by experienced and inexperienced observers in dance.

The space of the dancer's performance is a differentiated field of performing arts investigated by many choreographers and researchers [1, 6–8]. The used space can be considered as the frame of the performance, but it is not to be understood as a fixed boundary but rather as changeable and multi-layered. Gadelha [7] describes the dancer's space with the variables (1) direction of bodies, (2) direction of movements, (3) levels of space, (4) paths in space, (5) dimensions of space, and (6) shapes (of movements and stage setups). This study investigates the variable shapes of stage setups, dimensions of space (as the direction of stage setups), and the direction of the dancer's bodies. The shapes arranged with the dancers' positions on stage are called stage setups. Stage setups are parts of dance choreography and divide the space on stage into different areas [2, 9]. In these fixed areas, all actors on stage can be organised. Dance movements, poses, and ways are located in a defined place or in a limited way on stage. Choreographers use stage setups to create pictures with the dancer's bodies, for example, to establish scenes, empower a highlight, and set and distract a focus [2, 3, 9]. Stage setups can be created with and without the body transport of the dancers. On the one hand, all dancers can be arranged in a circle on stage and not move their bodies while holding a dance pose. On the other hand, all dancers can execute a dance movement, such as an aside step, while they are arranged and continue moving clockwise in a circle on stage [2,3]. In both situations, the observers perceive the geometric form of a circle as the stage setup arranged with dancers. Geometric shapes are the basis of stage setups. Postuwka [8] names the basic stage setups as the shapes bloc, alley, circle, lines, and combinations of these. Surprisingly, the space on stage and its perception are rarely studied, even though it is the frame for designing choreographies. This study thus investigates the space on stage through the stage setups used in dance competitions.

The aesthetic can be described as a sensual perception, as something noble, a feeling about a stimulus that is complete [10] and beautiful [11]. Equally, investigations in the 20th century show that aesthetic preferences can be described as liking [12] and feeling pleasure [13]. In dance competitions, especially in hip-hop dance, a performance should also be entertaining and exciting for the audience and the jury members [14]. So, in this study on dance perception, the term 'aesthetically' is also interpreted as feeling pleasure and something preferred. This can be transferred to the aesthetic perception in hip-hop dance competitions. In the world championships in hip-hop dance, every participating dance group has three to five minutes for their dance performance on stage, which is aesthetically judged by jury members [15, 16]. The jury members rate the dance performances based on the competition criteria. These are dance technique and execution, synchronisation, show value, musicality, and choreography and images [14, 15]. Intending to complete the dance competition as winners, the groups must consciously choose their components of performances because of the limited time on stage. The components of performances (for example, dance movements, poses, stage setups, effects, and expressions) are a part of the competition criteria. One of these criteria is named choreography and images and includes using the space and ways through the stage and varying stage setups, such as lines, circles, and different shapes [14, 15]. It can be concluded that the stage setups of dance groups used in hip-hop can influence the evaluation of the jury members and may affect the place ranking in dance competitions [15, 16]. It is important to investigate the visual aesthetic perception of the stage setups in dance to improve dance choreographies and to study which stage setups experienced and inexperienced observers perceive as aesthetic in dance.

Visual perception in dance is complex and bounded by the rules of Gestalt Psychology. Gestalt psychology deals with the organisation of perceiving visual stimuli as shapes (the Gestalt) in the brain. Some shapes are easier to organise in the brain than others, and the observer perceives this as pleasant and has a preference for them. If the observer feels a preference for a shape, this can be named an aesthetic experience [19]. Watching a dance performance can also generate an aesthetic experience [12, 17] and is influenced by many factors. Heimann and Schütz [4] provide evidence in visual aesthetics that the attitude of persons influences their judgement of stimuli perception. The attitude is based on value accounts of known and familiar stimuli. The authors explain that the effect of attitude judgement is more substantial if the cognitive capacities are limited, for example, by time pressure. It can be transferred that the jury members in hip-hop dance competitions are under time pressure, while a three-minute dance performance should be influenced by their attitude. In addition, Ditzinger [18] highlighted bias (for example, preferences or aversions) when the observer is experienced with the stimulus. Further investigations show that humans like what they know, and familiar stimuli are preferred over unfamiliar stimuli [19, 20]. It can be argued that jury members are

experts in dance performances. So, it can be concluded that they are influenced by bias. In contrast, observers' preferences differ and can change over a certain period [6]. Some observers prefer surprising and chaotic stimuli, some prefer order and simplicity, and some prefer a harmonious balance of known and unknown stimuli [18, 21]. For instance, Kempe and Heinen [22] investigated the geometric shapes of stage setups and their aesthetic evaluation. In this study, the stimuli characteristics of oblique lines, symmetry, and wide shapes were aesthetically preferred by observers. The most aesthetically preferred stage setup in the named study was the V-setup. The V-setup is composed of two diagonal lines. Therefore, the following study concentrates on the aesthetic perception of the oblique lines as single diagonals and combined diagonals as different shapes of a V. In addition, the stimuli characteristics of simplicity, symmetry, well-spatial massing (e.g., wide shapes), and direction of shapes are on focus. The stimuli characteristics will be considered in the following.

One of the laws of Gestalt psychology is the law of simplicity [18]. The visual system prefers simple and known patterns. The visual system divides complex stimuli into simple and known parts if a seen pattern is complex and detailed. Shapes that align with the law of simplicity are circles, lines, and right angles [18]. Humphrey [6] suggests in her framework for choreographers that dance groups should use clear and simple shapes on stage. Simple shapes are aesthetically preferred in dance. According to aesthetic visual perception, this study investigates two single diagonal lines as simple stimuli and connected diagonal lines as a V as the shapes of stage setups. In addition, in a dance context, Humphrey [6] highlighted the direction of the stimuli. If a dancer goes through diagonally, from the right corner behind to the left facing the front, he or she uses the most expressive way on the stage. According to this, the question arises of how the observers perceive the direction of the diagonal lines aesthetically. And is the direction from the right corner behind to the left facing the front aesthetically rated higher than the opposite direction?

The human visual perception strives for order and consciousness [18]. Symmetry is a strong law of Gestalt psychology and also deals with a feature that makes the observer feel order, balance, and stability [18]. There are already results that observers prefer visual symmetry over asymmetry in shapes, patterns, and paintings [23, 24]. Also, in dance, the observers of a dance performance strive for visual balance and stability [6]. Orgs et al. [5] and Humphrey [6] confirm these results in dance. Symmetrical movement sequences were preferred to the other choreographical sequences by observers. Kent [25] investigated the relationship between perceiving aesthetic stimuli as beautiful and the properties of symmetry and spatial massing. She considered that the observers feel attracted if the stimuli are symmetrical and the spatial mass is well-balanced. The wide shape created by the large amplitude is also aesthetically preferred in dance movements [26–28]. It is important to mention that the aesthetic preference for symmetry depends on the context and the individual preferences or expertise [32]. The majority of the studies highlight the appeal of symmetry, but fewer show contrary results [31, 32]. Vinken and Heinen [27, 32] mentioned in their studies of body poses and dance movements that the missing preference for symmetry could be expertise-specific. In both investigations, the dancers and non-dancers differ in their aesthetic evaluation. In this study, the component of expertise, represented by the groups of dancers and non-dancers, could indicate if the expertise of dancers or lack of expertise in non-dancers differs in their aesthetics evaluation.

Concluding, symmetry is a powerful feature that offers order and pleasure to the observer. It can be determined that the V stage setup, as a wide form, fulfils the features of symmetry and well spatial massing. This leads to the question of how the observers perceive the symmetrical V stage setup aesthetically. And is the feature combination of symmetry and wide form an influencing factor in perceiving aesthetics?

Furthermore, the direction and the position of stage setups influence the aesthetic perception of the observers [6]. Therefore, the suggestions of Humphrey [6] include using contrasts in a dance performance. One of the named contrasts uses identical stage setups but with a different approach. The question arises: How will the stage setups be aesthetically perceived if the shapes are turned and mirrored in the opposite direction?

Humphrey [6] argued that the direction of the dancer's body on stage influences the perception of the performance. If the dancer has a front-facing position, their whole body is visible. Now it has the strongest effect on expression and the best connection to the observer. In this study, the direction of dancers' bodies is manipulated to be front-facing and, in contrast, oblique, to determine if the observers' aesthetic perception aligns with Humphrey's theory. So, the question can be derived: How do the observers aesthetically perceive the V and diagonal stage setups with all dancers' bodies facing the front and if all dancers' bodies are

turned oblique? According to Humphrey [6], it is assumed that there is an aesthetic preference for all setups with the body's direction facing the front.

In summary, the study's main goal is to investigate how the observers perceive the stage setups aesthetically. The investigation focuses on three main questions. First, how do observers perceive the shapes of the two 'V' stage setups (regular and mirrored to inverse) versus two diagonals (to the left and the right) aesthetically? The second question is: How will the stage setups be aesthetically perceived if their shapes are turned and mirrored? The third question is: How will the observers aesthetically perceive the V and diagonal stage setups with all dancers' bodies facing the front, and if all dancers' bodies are turned oblique? In addition, the question arises if experienced dancers and non-dancers differ in their aesthetic evaluation of perceiving the stage setups.

Material and methods

Participants

Dancers and non-dancers took part in this study. All participants were recruited from dance studios and college sports courses. The e-mail invitations for the study were distributed by the local teachers. In total, 72 participants were assigned to one of three groups: (1) modern dancers (n_1 = 24, all female, age [mean ± standard deviation] = 23 ± 6 years), (2) other dancers (n_2 = 24, all female, age = 25 ± 7 years), and (3) non-dancers (n_3 = 24, all female, age = 24 ± 7 years). There was no influence on the response rate and only women participated in the online questionnaire.

All participants reported practicing dancing or doing other sports for over a year. The participants had to choose one dance style or sport in which they were the most active or experienced. The style of modern dance included the dance styles of jazz, modern, and contemporary dance. The reported types of other dancers were hip hop, breakdance, show dance, and mixed dance styles. The activities of non-dancers consisted of the following types of sports: team sports, individual sports, fitness, and health sports. In this study, all participants practiced at least one sports activity. Physical inactivity was an exclusion criterion in the online questionnaire. The participant's task was to watch eight videos of human avatars performing the hip-hop bounce dance movement arranged in different stage setups. They had the task of evaluating the stage setups concerning the perceived aesthetics by ranking positions. Each rank could only be awarded once. All persons participated voluntarily and were unpaid in this study. They signed a privacy statement and declaration of consent before participating. The study was conducted according to the ethical guidelines of the local university.

Instruments

Stage setups

The chosen stage setups were based on a study by Kempe and Heinen [22], who found that the V shape is the most aesthetic setup in the named study. This led to the choice of investigating the V setup and the diagonal lines as parts of the V setup. Based on these findings, the V setup was on focus and would be manipulated regarding 1) the direction of the shape, and 2)

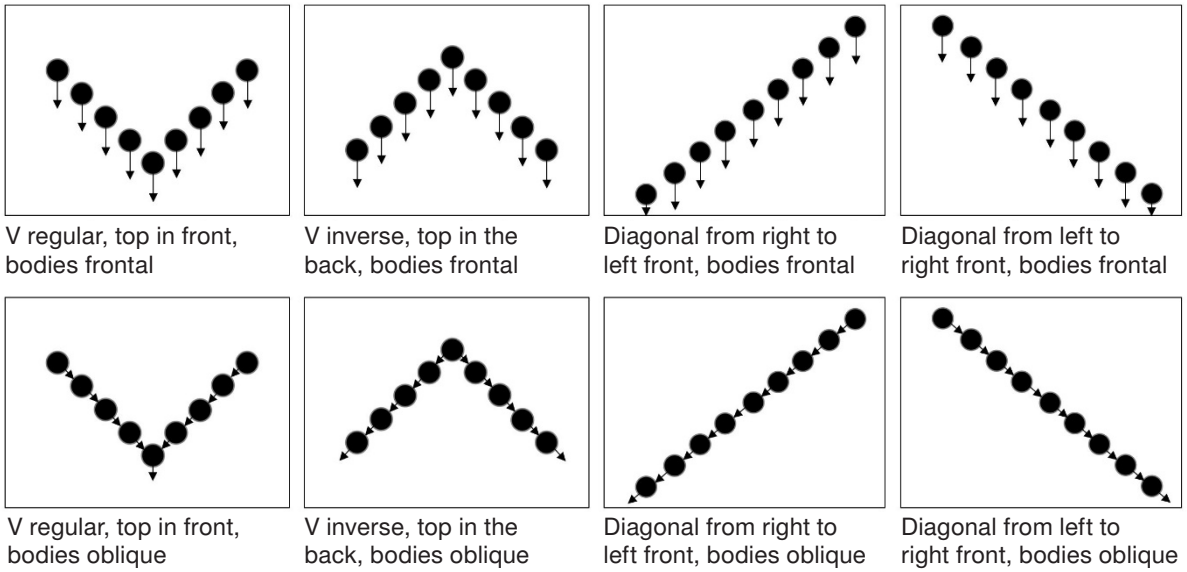

Figure 1. Geometric shapes of the stage setups and direction of the bodies

the direction of the arranged bodies (see Figure 1). All stage setups consisted of nine avatars and were performed with hip-hop bounce movements.

Stimuli generation

The stimuli were generated from one dancer's recorded hip-hop dance bounce movement (female, 24 years, 12 years of experience in hip-hop dance). The bounce movement is a common rhythmic all-over-body movement in hip-hop dance. It can be described as a repetitive slight and fast knee bending and straightening. The arms were relaxed and held next to the body. The dancer's body swung rhythmically up and down while bending the knees. The dance performance of the bounce movement was recorded with a motion capture system (Perception Neuron®, Noitom Technology Co., Ltd, Miami, USA). The recorded data were transformed into a human, gender-neutral computer animation (avatar). The avatar has a height of a usual adult of 1.70 metres, and default colours of blue and green. The avatar consists of a skeleton without body fat, hair, and gender features such as hip shapes. The movement capabilities were the same as the recorded dancer. It resembles the possibilities of complex skills like a healthy human. There was no editing after recording (e.g. correct joints). The animation was created with the 3DSmax software (Autodesk, Dublin, 2021). The outcome consisted of nine dancing avatars, which were arranged in eight stage setups (see Figure 1) through videos. At the end of the stimuli generation, eight video stimuli were created. To hold the observer's attention, each video lasted nine seconds.

Stimuli evaluation

The participants were asked to evaluate the perceived aesthetics of the eight video stimuli via an online questionnaire. The stimuli videos were presented to the participants in randomised order. The participant's task was to rank the stimuli based on their perceived aesthetics from one (most aesthetic) to eight (least aesthetic). Every position could be assigned just once.

Procedure

First, all participants were personally invited via e-mail to participate in this study and were informed about the purpose of the investigation. The mailing list was compiled by dance teachers and college sport trainers. Second, after a confirmation, the participants received a link to the online questionnaire. The online questionnaire included (1) a privacy statement and declaration of consent, (2) a short questionnaire about personal data, the kind of sport or dance style practiced, and (3) years of experience or being active. Third, after a short introduction to the procedure, the participants evaluated the video stimuli presented in randomised order and rated the perceived aesthetics by ranking positions from one to eight. They were suggested to watch the videos on a PC or laptop screen of at least 13 inches. They were permitted to repeat the video stimuli as often as they wanted and to take breaks. The online questionnaire took six minutes to complete. In the end, all participants were thanked for participating in the study.

Data analysis

A significance level of alpha = 5% was defined a priori for all results reported. To test the main hypotheses of this study, a Friedman ANOVA was calculated in the statistical program JASP (Jeffreys's Amazing Statistics Program, 2023). Kendall's W was calculated as the effect size.

Ethical approval

The online questionnaire was conducted according to the guidelines of the Leipzig University Faculty of Sport Sciences. It was unpaid and voluntary.

Informed consent

Informed consent was obtained from all individuals included in this study.

Results

First, it was investigated how aesthetically the observers perceive the stage setups V regular, V inverse, and the diagonals to the right and to the left. Second, the study tried to determine if the two setups V (regular and inverse) are perceived as more or less aesthetic than the two diagonal lines. Third, it was hypothesised that there is a difference in perceiving aesthetics between the direction of the dancers' bodies facing the front and oblique. The setups with the dancers' bodies facing the front should be perceived as more aesthetic than those with oblique bodies facing the next forward person. Finally, the assumption that the V setup, with the top to the front and dancer bodies facing the front, is perceived as the most aesthetic stage setup, will be verified.

First, when averaging over all participants, the regular V setup with dancers' bodies facing the front was

Table 1. Mean scores and standard deviation (*SD*) of perceiving the aesthetics of stage setups

Stage setup, bodies	All groups mean ± *SD*	Modern dancers mean ± *SD*	Other dancers mean ± *SD*	Non-dancers mean ± *SD*
Diagonal to left, front-facing	4.324 ± 2.153	5.167 ± 2.278	3.708 ± 1.9	4.083 ± 2.125
Diagonal to right, front-facing	4.211 ± 1.831	4.5 ± 1.842	4 ± 1.96	4.083 ± 1.767
Diagonal to left, oblique	3.324 ± 1.975	3.958 ± 1.967	3.292 ± 2.136	2.625 ± 1.583
Diagonal to right, oblique	3.183 ± 1.952	3.708 ± 1.967	2.958 ± 2.116	2.833 ± 1.685
V inverse, front-facing	5.831 ± 1.974	5.333 ± 2.2	6.292 ± 1.654	5.875 ± 2.028
V inverse, oblique	4.296 ± 2.146	3.375 ± 1.974	4.292 ± 2.074	4.833 ± 2.01
V, bodies front-facing	6.690 ± 1.719	6.667 ± 1.736	4.708 ± 1.663	6.833 ± 1.857
V, oblique	4.141 ± 2.233	3.29 ± 2.422	4.417 ± 2.125	4.833 ± 2.014

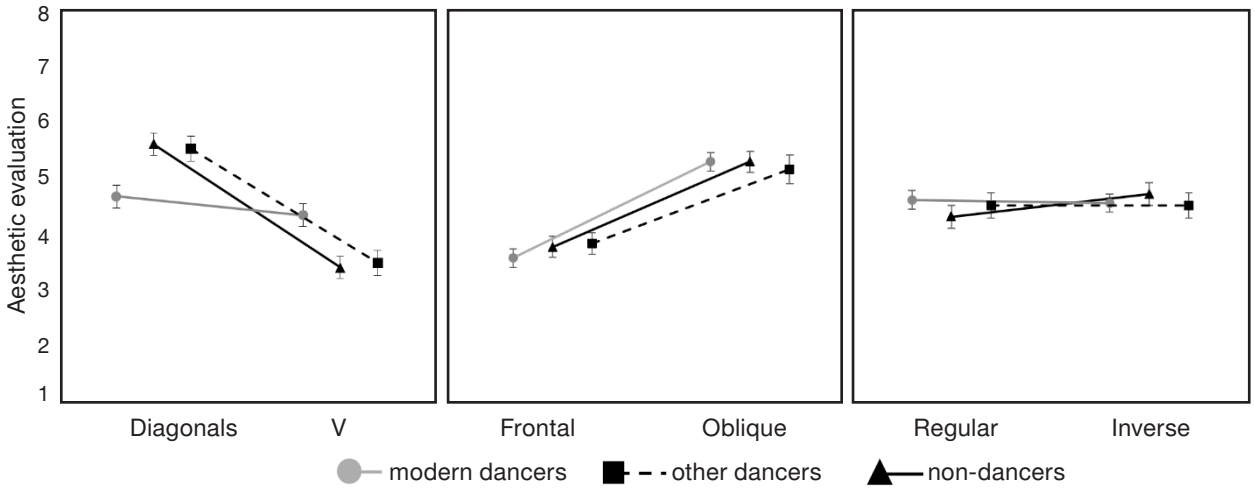

Figure 2. Illustration of the aesthetic evaluation of the shapes of setups and the direction of bodies

evaluated as the most aesthetic (means ± standard deviation, 6.690 ± 1.719), followed by the V inverse with dancers' bodies facing the front (5.831 ± 1.974). The setup diagonal from left in the back to the right at the front with bodies oblique reached the lowest aesthetic score (3.183 ± 1.952) (Table 1).

Second, ther Friedman ANOVA revealed a significant main effect of perceiving the V setups versus the diagonals $\chi_1^2 = 31.431$; $p < 0.001$; $W = 0.174$. The main effect is differentiated by group (modern dancers $\chi_1^2 = 0.508$, $p = 0.476$, $W = 0.0011$, other dancers $\chi_1^2 = 18.669$, $p < 0.001$, $W = 0.250$, non-dancers $\chi_1^2 = 21.875$, $p < 0.001$, $W = 0.417$). The groups of other dancers and non-dancers differ in the perception of aesthetics regarding the Vs and diagonal shapes, and the V is aesthetically preferred. The group of modern dancers does not differ significantly by perceiving the Vs versus diagonals, and the group has no aesthetic preference (see Figure 2).

Third, there is a significant difference between perceiving the direction of dancers' bodies facing the front versus oblique $\chi_1^2 = 32.011$; $p < 0.001$; $W = 0.236$. The setups with the body's direction facing the front are perceived aesthetically higher than setups with oblique bodies (see Figure 2). This significant effect also depends on the group (modern dancer $\chi_1^2 = 15.365$; $p < 0.001$; $W = 0.191$, other dancers $\chi_1^2 = 7.875$; $p = 0.005$; $W = 0.210$, non-dancers $\chi_1^2 = 9.446$; $p = 0.002$; $W = 0.316$). There is a strong aesthetic preference for front-facing bodies. In addition, the results show a non-significance for perceiving the regular (top to the front) and inverse (top in the back) stage setups over all groups. The groups have no aesthetic preference for perceiving the regular or inverse stage setups. Finally, regarding descriptives, the V stage setup with the top to the front and with all dancers facing the front reached the highest aesthetic score overall (6.690 ± 1.719).

Discussion

The main goal of this study was to find out how the observers perceive the stage setups in dance aesthetically. The results show that the setups are perceived differently by the observers. Following the theory of Reber et al. [20], which mentioned the experience and familiarity with the stimuli as influencing factors of

the aesthetic evaluation, it can be suspected that these factors influence the evaluation of the groups of dancers and non-dancers. It is assumed that the groups of dancers should be experienced in observing dance; whether the non-dancers have experience beyond their own sport was not asked.

There was a significant main effect of perceiving the V setups versus the diagonals. The V setups are perceived as more aesthetic than the diagonals. The V setups are described with symmetry and the diagonal lines with simplicity. Both are driving features for visual aesthetics [4, 5, 18, 21]. However, it seems to be that the preference for symmetry is stronger than for simplicity in the present study. The appeal of symmetry in visual perception is in line with the authors [18, 23–25]. In foreign studies, symmetry, especially in dance, was preferred in movements, poses, and choreographies [5, 6], and with the results of this study, stage setups can be added in the field of dance. In addition, there is the presumption that a combination of unknown features leads to this aesthetic preference. The video stimuli do not include the different perspectives of the observers or the distance to the stage. Concluding, there is a need to investigate more combinations of features in further studies.

Humphrey [6] highlighted the strong preference for perceiving a diagonal line by observers, but in this study, the results do not align with her theory. The observers do not prefer the diagonal lines over other stage setups. Interestingly, the group of modern dancers does not differ significantly in perceiving the Vs versus diagonals. This group has no aesthetic preference. It can be argued that, on one hand, the dance experience or, on the other hand, the dance style influenced the aesthetic evaluation. Humphrey [6], who put forward the thesis of preferring diagonal lines, was also a modern dancer. To substantiate these findings, more studies in other dance styles are needed. The stage setups were animated with the hip-hop bounce movement in this study, but it should be investigated with other movements of different dance styles.

There was a main effect between the direction of dancers' bodies facing the front versus turned oblique on aesthetically perceiving the stimuli. The setups with all dancers' bodies facing the front had higher aesthetic scores than setups with all bodies oblique. This finding is in line with Humphreys's [6] thesis that a dancer has the strongest effect on the auditorium with a front-facing body position. This effect also depends on the group. The group of modern dancers preferred the front-facing bodies the most, but it is not clear why all groups differ significantly. The two dancer groups showed both experience in dance, and further studies are needed to clarify why both dancer groups do not differ from non-dancers. It seems to be that modern dancers are considered unique.

Reasoning, the regular V setup (top to the front, dancers' bodies facing the front) with the feature of symmetry and body direction facing the front reached the highest score in the aesthetic evaluation. The results reveal that the regular V setup was rated as the most aesthetic and should be aesthetically preferred by the observers. It can be concluded that the auditorium and the jury members in dance would prefer a combination of these features. Humphrey [6] also determined that symmetry and clarity on stage let the observer feel safety, calmness, and pleasure. But in contrast, in the performing arts, novelty, surprise, and asymmetry are also needed for a successful performance [6]. In addition, Song et al. [21] highlight the features of novelty and surprise as visual preferences in paintings by observers. It can be concluded that the feature of novelty imbues aesthetic pleasure, whether a static or a dynamic stimulus is received.

In light of these findings, it can be suggested that dance groups should use the regular V setup with front-facing dancers in their choreography for a dance competition. Nevertheless, dance groups may use contrasts and surprises as components of a choreography. Humphrey [6] highlights that dealing with contrasts, for example, symmetry and asymmetry, clarity and chaos, entertain the observers and generate aesthetic experiences throughout the whole dance performance. Therefore, dance groups should also use different approaches to stage setups, for example, new shapes and new directions. To investigate the aesthetic evaluation of new combinations of different shapes and directions, further studies are needed.

Regarding the practical implications, some limitations should be argued in the following. The results are based on investigating video stimuli outside of a real dance performance situation. In dance performances, music is a part of the choreography. Music has a psychological effect on perception, and auditory information can increase the aesthetic evaluation with matched beats [29]. In dance practice, competitions are seen live by the jury members. In a study by Vukadinović and Marković [30], the observers rated the aesthetic experience in a live performance higher than in a video presentation. So, the results of this investigation with video stimuli should be compared with further studies in live competitions.

However, the aesthetic perception of the used space in dance has rarely been studied. For the investigation

of perceiving stage setups aesthetically in dance, only two experiments were conducted ([22], the present study). To substantiate what observers perceive as being the most aesthetic in dance, more studies with different groups of dance styles and different dance stimuli are needed. Additionally, a short text feedback from the participants' understanding of aesthetics in dance or in general could be asked in further studies.

To sum up, numerous factors have an effect on the aesthetic perception of stage setups [9]. However, the features of symmetry and a front-facing direction are very powerful and should be used in dance choreographies to raise the observer's aesthetic evaluation.

Conclusions

Perceiving aesthetics in dance is a complex field of research, but the component of space in dance is rarely studied. This study addresses the less explored aspect of space in dance, contributing to the existing research gap. Stage setups involving dancers forming geometric shapes can effectively occupy the stage space. The study's results provide evidence that the observers aesthetically prefer geometric shapes with symmetrical features and a front-facing direction of the shape. The V stage setups (regular and inverse) fulfil these features and are preferred over the setups of diagonal lines. The investigation shows that the factors of bias and experience can influence the aesthetic perception of watching dance. In this study, the perception of V versus diagonal lines shows that experienced modern dancers perceive the shapes differently than other dancers and non-dancers. Only the results of the aesthetic evaluation of the modern dance group align with the theory of the modern dancer Doris Humphrey. The direction of the dancers on stage is also an influencing factor in perceiving aesthetics in dance. Front-facing bodies are preferred over oblique bodies by the observers. The V setup with front-facing arranged dancers can be suggested for use in a dance competition choreography to improve the place ranking. The high aesthetic evaluation of the V setup in this study could be related to higher scores given by jury members in dance. These findings can support the future work of choreographers and improve the results of hip-hop dance competitions. In choreographies, it is suggested that not only the aesthetically preferred stimuli (such as symmetry) should be used, but also contrasts, novelty, and surprise are additional components of a successful dance performance. It is suggested that more dance stimuli (for example, dance movements) with different dance styles must be investigated to provide a deeper understanding of the aesthetic perception in dance. To extend the practical implications for dance choreographies, the present results of video stimuli should be compared with live performances.

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Disclosure statement

The author has any financial interest or received any financial benefit from this research.

Conflict of interest

The author states no conflict of interest.

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