The Attraction of Movement

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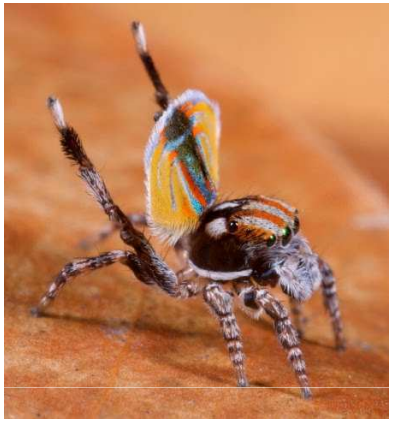
Movement in Animal Attraction

- **Charles Darwin argued that male sexual traits such as conspicuous ornamentation and courtship displays have evolved due to sexual selection by female mate choice.**
- **Males often gather at specific locations to display these traits (e.g. at leks).**
- **These traits are reliable indicators of male reproductive value.**
- **In animals that do not possess conspicuous plumage (i.e. mammals) females may have to rely upon an evaluation of their motor performance.**

What do the Movements Signal?

- **Evidence from birds, ungulates and crustaceans demonstrate that females detect subtle movement variations and select the 'best' movers as mates (Byers et al., 2010).**
- **One key aspect of motor performance is 'vigour' – the ability of the male to perform energetic movements repeatedly. This requires health, stamina and strength.**
- **Another aspect is skill– the ability to perform a challenging action with precision and coordination. This requires health, developmental stability and the coordination of muskuloskeletal, sensory and nervous systems.**



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Evidence from Primates.

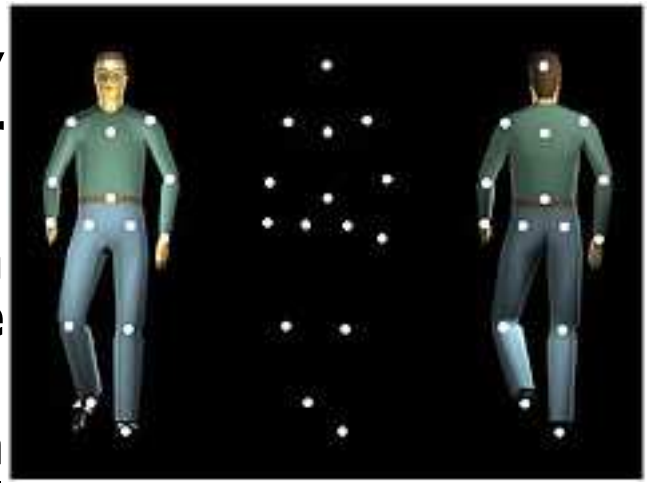
- Chimpanzees move their heads and bodies during courtship displays (Goodall, 1968).
- One component is the 'bipedal swagger' where the male approaches the female, extends his hands and then rocks forwards/backwards and side to side (Kano, 1992).
- Male chimpanzees do not 'dance' but this is possibly because they are not bipedal, human dance is unique and relates to the fact that we are bipeds, we thus have a greater range of movement possibilities.

Dance and Human Culture.

- **Researchers have established that dance forms a vital part of all human cultures, and appears to be particularly important in courtship rituals (Kaeppler, 1978).**
- **Women discriminate between males based on their dancing prowess (e.g. P'Bitek, 1966).**
- **Certain folk dances are designed for males to show off their physical prowess – strength, stamina etc.**
- **Hanna (1987) speculated that dance may act to display health and strength.**
- **Hagen & Bryant (2003) suggest that dance signals nutrition, proper development, endurance and creativity.**

Research on Human Movement.

- The pioneering work of Johansson (1973, 1976) enabled the first scientific assessments of human movement.
- He created 'point-light (PL) displays' by placing 10-12 lights on the major joints of the body.
- If static, observers cannot perceive a human form, but when the figure moves a person is perceived.
- Using PL displays it has been shown that humans can identify other animal species, the gender, age and emotional condition of the figure.
- Human infants can detect biological motion from 2-days old (Simion et al., 2008).



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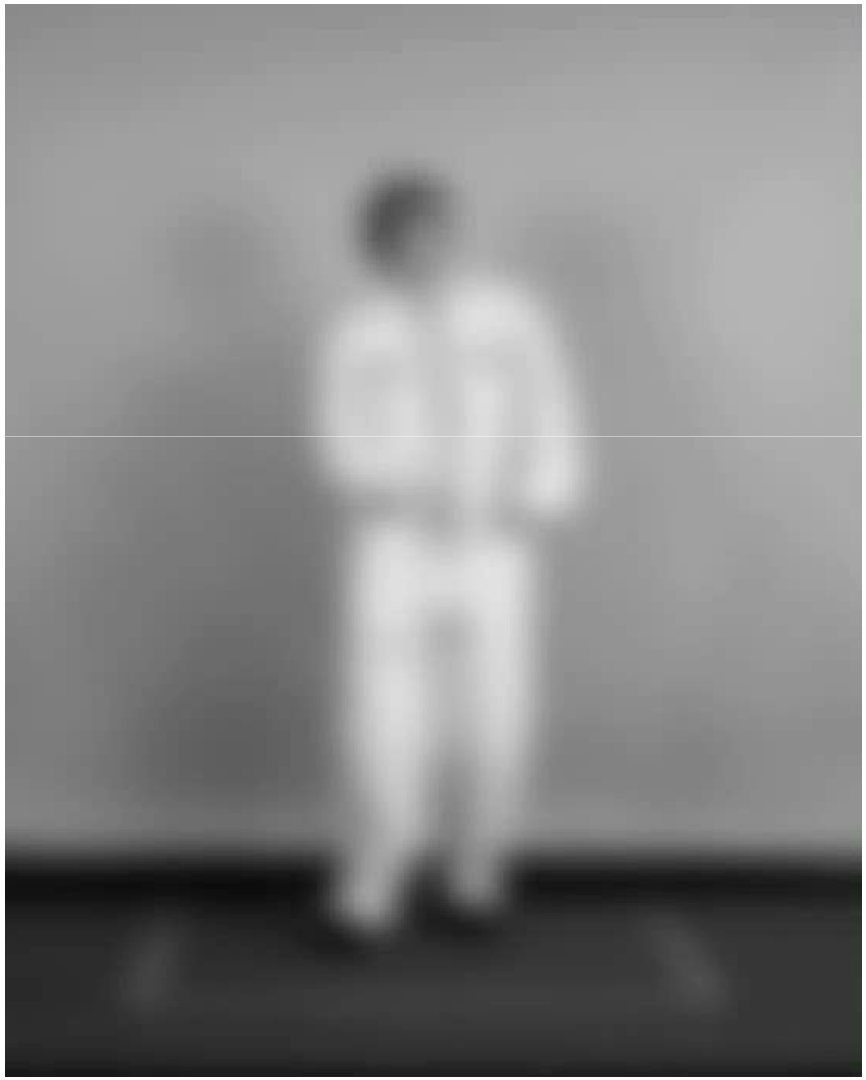
Previous Research on Human Dance

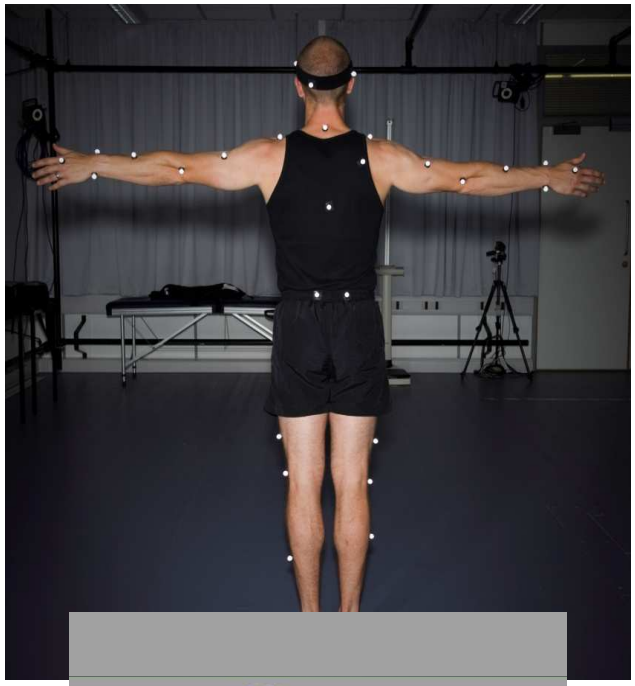
- **Males who display higher bodily symmetry were judged as being better dancers by female viewers (Brown et al., 2005).**
- **Prenatal testosterone exposure (as measured by finger length ratios) was associated with female perceptions of male dancing. The dances of males exposed to higher testosterone before birth were rated as being more 'attractive', 'dominant' and 'masculine' (Fink et al., 2007).**
- **Female perceptions of the attractiveness and assertiveness of male dancers was positively correlated with the physical strength of the males (measured via hand-grip). Stronger men were rated as being 'better' dancers (Hugill et al., 2009).**

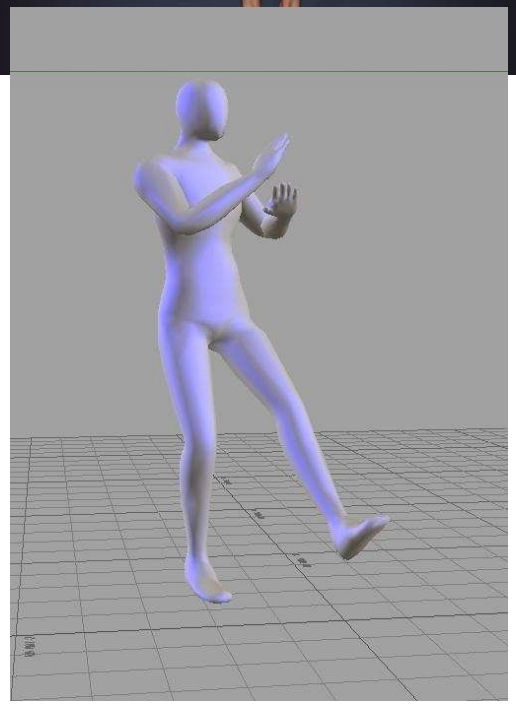
Previous Methodology



Our Research

- Identifying the characteristics of an 'attractive' dance is difficult because of confounds relating to body height, facial attractiveness, clothing, body size and shape etc.
- Previous studies have used blurred video clips or simple computer-generated figures.
- Using a cutting-edge, motion-capture 12-camera system (Vicon) we record male dance moves, and then using additional software (MotionBuilder) generate featureless avatars.
- Using these avatars we aimed to determine possible biomechanical differences between 'good' and 'bad' male dancers.





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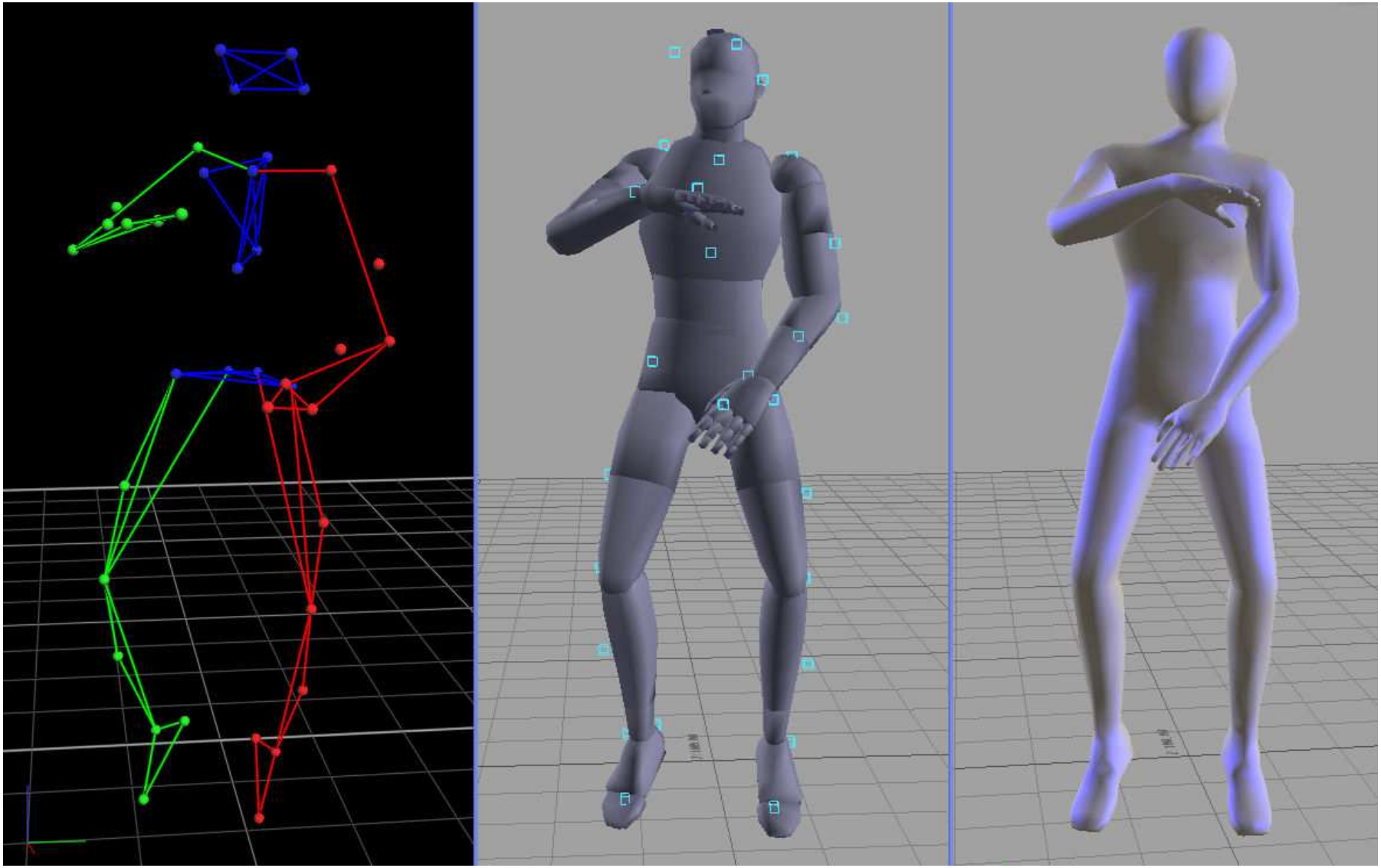

Vicon mo-cap data

MotionBuilder Figure

Final Avatar

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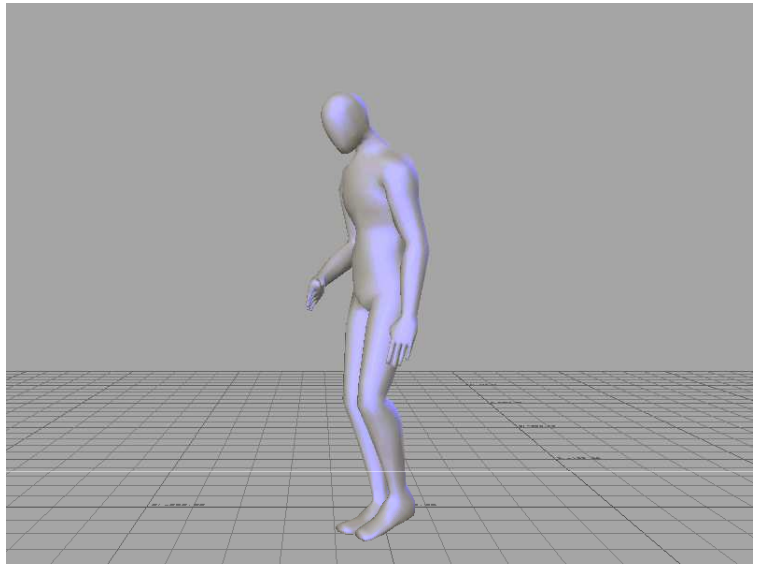
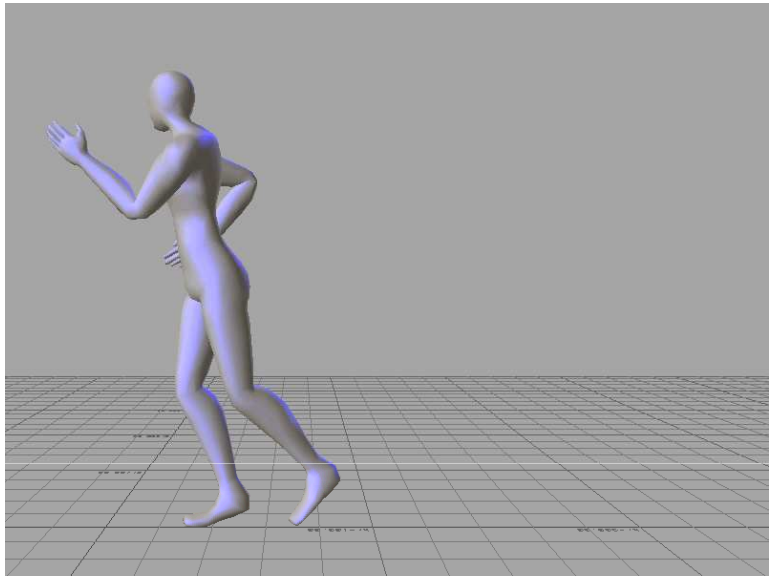
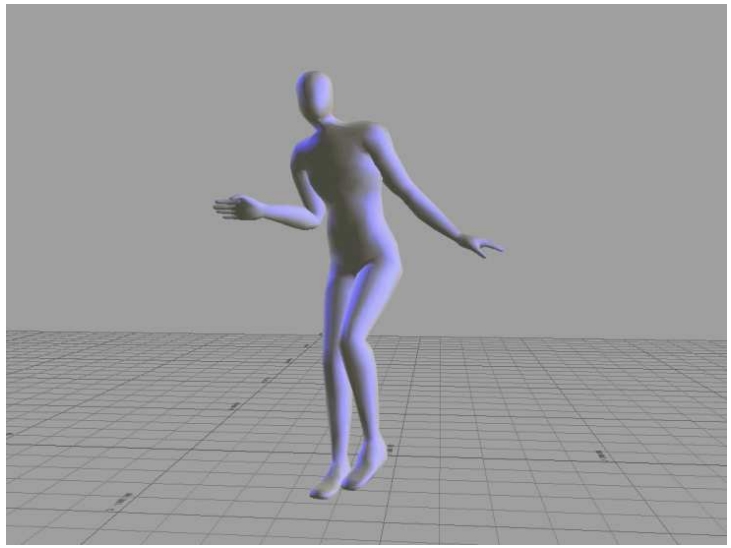
Examples of our Avatars



Bad male dancer



Good male dancer



Good female dancer

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METHODS

30 males (non-professional dancers) aged 18-35 danced for 30sec to a standard drum rhythm.

19 of the males were converted into avatars for ratings of 'dance ability' by 35 females aged 18-35.

A kinematic model was used to generate 3-D joint angles for knees, hips, trunk, neck, shoulders and wrists.

Movement amplitude, duration, speed and variability were calculated.

Three body regions were focused on:

Legs (ankles, knees and hips).

Arms (shoulders, elbows and wrists)

Central body (trunk and head/neck)

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Results

Movement amplitude: Significant positive correlations were found for dance rating and the central body region, specifically head nodding, bending of the trunk forwards/backwards and sideways.

Bigger movements = higher ratings.

Movement variability: Significant positive correlations were found for dance rating and the central body region, specifically head shaking, head tilting, trunk bending (forwards/backwards and sideways) and twisting.

More variable movements = higher ratings.

Movement speed: Significant positive correlations were found for dance rating and the speed of the legs, specifically the speed of right knee bending and twisting.

Faster movement = higher ratings.

Media Interest in our Study.

Key dance moves to attract a female

The Journal

Moves that will make you king of the dance floor

Daily Telegraph

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Ongoing Studies.

- **Male strength/physical fitness and dancing – preliminary data suggests that females can assess male physical strength and fitness via dance.**
- **Male health and dancing – does male physical and psychological health relate to their dance movements?**
- **Male age and dancing - males aged 45+ are being compared with males aged 18-25.**
- **Symmetry – are more symmetrical males rated as being batter dancers?**
- **Is facial attractiveness associated with dance ability? Preliminary results suggest that better looking males are judged as being better dancers.**
- **High heels – Do females walk more 'attractively' when wearing high heels compared to no shoes?**
- **Personality – Is personality linked to dancing?**
- **What makes a good female dancer? Is it all in the hips?**

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Future Studies.

- **Can you tell the sexual orientation of a person from how they dance?**
- **Can you tell the ethnic background of someone by how they dance?**
- **Is female fertility signalled by movements such as walking or dancing?**
- **Is female age signalled by movements?**
- **Is female health and physical fitness signalled by movement?**

THE END!

ANY QUESTIONS?