

# Bodystorming: effects of collaboration and familiarity on improvising contemporary dance

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**Abstract** In contemporary dance, cognitive events are not necessarily restricted “to the skin or skull of an individual” (Hutchins in *Int Encycl Soc Behav Sci* 2068–2072, 2001) but distributed across dancers during collaborative improvisation. There is some experimental evidence of greater output when people perform problem-solving tasks alone. However, when a task is challenging and paired participants are familiar with each other, pairwise and emergent outcomes are more plentiful than solo outcomes. We investigate these factors in the context of dance with the broad hypothesis that innovation is enhanced when dancers improvise together compared with when they improvise alone. Dancers ( $N = 10$ ) in a professional company improvised for 2 min alone and then with another dancer. Dancer familiarity (familiar, unfamiliar) and task (expressive, non-expressive) were crossed (within-subjects). The improvisations were video-recorded over 2 h in the dancers’ usual improvisation space. After each improvisation, the dancers: stated the number of movement ideas expressed and rated task ease, satisfaction, interest, novelty, originality and clarity. In both tasks, there was a tendency for self-report of a greater number of movement ideas expressed in familiar and unfamiliar pairs than alone.

Ratings of task ease, satisfaction, interest, clarity, etc. were slightly higher in the unfamiliar pair condition. In the non-expressive task, ratings of the task were higher in pairs ( $M = 3.02$ ,  $SD 0.82$ ) than in the solo ( $M = 2.67$ ,  $SD 0.96$ ) condition. Distributed creativity, relational cognition and social facilitation are used to interpret the results.

**Keywords** Brainstorming · Creativity · Dance · Distributed cognition · Group processes · Improvisation · Social facilitation

## Introduction

Exponents of contemporary dance epitomize cognition that is multimodal, embodied and distributed. Knowledge of contemporary dance is visual, spatial, motoric, auditory and kinesthetic. Rarely notated, the dancers’ embodied memories are the storehouse of previously performed works of art. And rather than such knowledge being restricted to the skull of an individual (Hutchins 2001), it is distributed across a dance ensemble (Kirsh et al. 2009; Stevens et al. 2003). The experiment to be reported here investigates concepts of distributed cognition, and social and relational processes through the medium of improvisation by a group of professional contemporary dance artists. More specifically, we investigate the effect of solo versus a collaborative dyad setting, and dancer familiarity, on the improvisation of new movement material.

Creativity involves problem finding and problem-solving, generativity and exploration (Finke et al. 1996) and divergent thinking (Guilford 1950). It works through combination, recombination or pattern generation producing novelty, and requiring recognition (Leach 2004). After decades of research and debate, creativity has been

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recognized as a combination of personal characteristics, cognitive abilities and the social environment. Creativity-relevant skills, for example, include breaking perceptual sets, exploring new cognitive pathways, keeping response options open, suspending judgment, using “wide” categories and seeing or forming relations between diverse bits of information, remembering accurately and breaking out of performance scripts (Amabile 1983; Coskun 2005). The emphasis in research into creativity has been increasingly on process as much as product or outcome (Dean et al. 2006). Creativity will be gauged here using the dancers’ self-report of the number of movement ideas generated in 2-min blocks as well as their self-report ratings of task ease, satisfaction, interest, originality and clarity.

In the present study, the assumption of creative cognition as social, relational and distributed will be investigated. We are interested in the way in which collaboration between dancers impacts the improvisation of new movement material (see also Sawyer and DeZutter 2009; Turner 2008). Theories and research from social and cognitive psychology lead to competing predictions. On the one hand, social facilitation is said to occur when simple tasks are performed—outcomes are better when performed with co-actors (Amabile 1983). The 1950s concept of “brainstorming” (Osborn 1957) is also informative—creative outcomes are achieved when there is diversity among group members such as varied knowledge or experience. Osborn (1957) stated that the “average person can think up twice as many ideas when working within a group than when working alone”. Positive elements of group participation include increased arousal, observational learning, cognitive stimulation, combining cognitive resources, prevention of duplication, division of work (Lamm and Trommsdorff 1973) and a feeling of safety in numbers (Vinarski-Peretz and Carmeli 2011).

On the other hand, there are situations where fewer ideas are generated in groups than alone. Such social inhibition is said to occur because of group factors that impede creativity including apprehension on the part of group members, downward social comparison (Paulus and Dzindolet 2008), as well as social inhibition, distraction, cognitive interference, slower performance (Lamm and Trommsdorff 1973) and the tendency for convergence (so-called Groupthink) rather than divergence of ideas (Paulus and Brown 2007).

The more/less axis makes an assumption about the locus of idea generation. That is, the metric measures ideas within the individual person/mind/brain in solo and group conditions. Our question to some extent is what happens between, what the relationship elicits and generates, and thus we cannot assume the locus of idea formation as one or another person. For this reason, in addition to analysing the metrics about ideas generated, we use qualitative data

to investigate the locus of idea formation and creative agency.

The first variable to be manipulated will be the setting in which the dancer improvises alone or collaboratively. For experts and when the task is complex, social facilitation is said to occur (Amabile 1983). When dancers are improvising in a pair, the relatively more common or rare occurrence of a particular pair improvising together will likely interact with the creative process. Greater familiarity between dancers may enhance outcomes and process, or the novelty of working with another dancer may outweigh the effects of familiarity. Finally, the improvisation task will be manipulated with half of the improvisations to be non-expressive and entirely movement-based and the other half expressive or state-based.

### Aim, design and hypotheses

The aim was to investigate the effect of social and relational conditions on the improvisation of dance material. The independent variables were setting (solo, pair), task (expressive, non-expressive)—within-subjects; and, in the pair setting, dancer familiarity (familiar unfamiliar). The dependent variables were self-reported number of movement ideas, open-ended responses, and self-report ratings of task ease, satisfaction, interest, novelty, originality and clarity. The rating items were adapted from a multidimensional approach to measuring both quality and quantity during the creative process (Dean et al. 2006; Lamm and Trommsdorff 1973). It is hypothesized that if creative cognition is relational, social and distributed, then a greater number of movement ideas and more interesting, original and satisfying material are generated in the pair than in the solo setting. An open question is whether the nature of the task—state- or movement-based—interacts with dancer familiarity and/or the solo versus pair setting.

## Methods

### Participants, stimuli, equipment and procedure

Ten professional dancers from the Australian Dance Theatre (ADT) participated in the experiment (mean age = 25.6 years; SD 4.03; four females) with mean years of dance training 13.4 years, SD 5.87. The experimental task was developed in consultation with the Associate Artistic Director of ADT. For the setting variable, pairs of dancers who a) often improvised together and b) rarely improvised together were identified. Three choreographic tasks were chosen. These were to make choreographic material around the theme or idea of a cube/sphere/cylinder (Forsythe 1999) for 2 min.<sup>1</sup> Tasks were allocated randomly

to solo and paired dancers with care taken to distribute equally the different tasks across dancers and solo and pair combinations. Dancers performed the first block of trials according to non-expressive instructions. Within that first block of trials, solo improvisations were always conducted first before improvisation in pairs, and familiar pair trials performed before unfamiliar pair trials. The second block of trials was performed according to expressive instructions with solo improvisations performed before improvisation in pairs, and familiar pair trials performed before unfamiliar pair trials.

The experiment took place in the main studio at ADT in Adelaide. Dancers were given 2 min for each improvisation task, and each 2-min trial was recorded on digital video. At the end of each trial, the dancers completed a questionnaire with two open-ended items: (1) Please describe how it felt doing the task. (2) How many different movement ideas did you express? Ratings of the dancer's experience of doing the task were assigned using a Likert scale for each of eight statements: the task was easy; performing the task was satisfying; the outcomes produced were interesting; other dancers would find the material interesting; the material produced was rare; the material produced was original; the material produced could be used in a performance; the movement ideas were expressed clearly. The rating scales were labelled with five steps: 1 (not at all), 2 (slightly), 3 (moderately), 4 (very) and 5 (extremely). The experiment session lasted for 2 h and concluded with a debrief session and some further oral, open-ended questions about the process.

## Results

Given the sample size, descriptive statistics are reported. The hypothesis stated that a greater quantity of movement ideas would be expressed in the pair than in the solo setting. Table 1 shows the raw counts by participant and pair, and mean and mode values for the self-report of movement ideas as a function of task, dancer familiarity and setting. The mode is emphasized as the mean is influenced by outlying scores. The data indicate that pairs of dancers do not simply make twice the amount of movement material, and there is a slight but likely nonsignificant increase in the expressive task from a mode of 2 in the solo setting and 3 in the pair and in the non-expressive task from 3 in solo to 5 in the pair setting.

<sup>1</sup> The instructions and tasks had been piloted earlier with choreographer Sue Healey and dancers. The three tasks were chosen to be comparable but also have some variety to minimize boredom for the participants and constrain practice effects.

Dancer familiarity, whether performing an expressive or non-expressive task, makes little difference to the number of movement ideas generated. In the expressive task, self-report ratings of task ease, satisfaction, interest, clarity, etc. were slightly higher in the unfamiliar pair condition. In the non-expressive task, ratings of the task were slightly higher in pairs ( $M = 3.02$ ,  $SD 0.82$ ) than in the solo ( $M = 2.67$ ,  $SD 0.96$ ) condition.

## Discussion

The results do show a marginal but likely insignificant statistical difference between the number of movement ideas generated solo and in the pair. They are not consistent however. There is a slight increase in the rating of the task with the unfamiliar pair. It is in the ratings and the commentary that the results are interesting. Instead of more, the dancers reported the material produced had different qualities with the level of interest and quality higher in pair and then unfamiliar pairs. Here, the addition of anthropological methods of an open-ended series of engagements with the participants including semi- and unstructured interviews allows for the development of an interpretation and commentary in relation to the original hypothesis.

One significant theme of commentary and reporting was a difference between movement made through following internal image formation and movement generated in response to, and eliciting movement from, the other person. While the latter did not exclude image formation and exploration, there was another aspect to that process. The reporting describes the presence of another body. The form of movement made is conditioned by that presence. The dancers articulation was of concerns not just with filling space, or getting in each other's ways. Commentary focused on responsiveness to the other's intentions and understanding those intentions through their movement. Responsibility to the other for their safety, and for either facilitating or contradicting their intention figured prominently. There was an interest in the dynamics of domination, or of co-operation, or even of consciously deciding to go against convention through, for example, using the other as an object.

The space of exploration then, the experimental engagement in making the material, is partly with conventional and not so conventional aspects of how we relate to others and their bodies. The duos explored the space of the interpersonal, and that was also exploring the parameters and constraints, expectations and understandings we share as part of a wider social group. In fact, what was suggested by the responses is that body is more than just a fleshy carrier for mind—it is the vehicle in which the social is made present. That presence is obvious as a series of

**Table 1** Raw values, mean and mode of self-reported movement ideas

	Expressive task			Non-expressive task		
	Unfamiliar pair	Familiar pair	Solo	Unfamiliar pair	Familiar pair	Solo
	3	3	4	1	3	4
	5	5	2	5	25	3
	1	2	25	5	5	3
	1	7	2	4	5	3
	3	3	2	2	5	25
	3		2	6		4
	4		5	6		6
	2			6		3
	4			3		
	3			5		
Mean	2.9	4.0	6.0	4.3	8.4	6.4
Mode	3	3	2	5	5	3

feelings, inhibitions and possibilities that are explored and experimented around, ignored or challenged. The quality difference highlighted by the self-reporting (between solo and pair) can be understood to be partly on account of this. What that might indicate is that there is a quality to relationships themselves that is emergent from movement and interaction. This is made visible in the quality difference reported on.

The original Durkheimian notion of the social in “The Division of Labour in Society” (1893) is of the social as a realm of moral injunction (1947: 22). People’s behaviours and actions as human beings of a particular society are structured by and facilitated in certain directions by the collective. That collective exists as a presence that is above and beyond the individual.

As a preliminary interpretation, we suggest that the making of this material, so focused on the body, and on an intelligent and imaginative approach to moving in space with others, makes the social present as a kind of material in itself, something that is pivotal in giving form and interest to the dancers and audience. It is part of what makes bodies, and thus provides a realm in which dancers experiment to generate new ideas, or find new sensations and movement forms. Neither one body nor the other, there is a quality to the relationship that emerges as a creative aspect of improvisation with others.

Building from this mixed methods paradigm and set of results, future experiments can include a perception task where the movement material produced here is presented and appraised by a new sample of observers. The improvisation time in future versions can also be extended to simulate further the conditions under which material for a new art work is created.

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