

Thinking Strategically about Dance Making: An Analysis of the Structuring Stage and the Strategies Choreographers Use for Varying Dance Works

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This empirical study investigates how expert choreographers structure their dance pieces and vary their dance designs. Specifically, the methods choreographers apply for selecting, ordering, and refining movement material into a coherent whole were explored. Accordingly, the structuring process of two expert contemporary choreographers was isolated and examined separately from other stages of dance development. We have used observations, interviews and questionnaires to understand the choreographers' actions and thoughts as they worked on creating three dance pieces. In addition, a model from the field of design (Yilmaz et al 2011) was utilised as the main framework for analysing the quantitative and qualitative data that was extracted.

We found that choreographers transform their composition through the application of multiple strategies and particularly, 'Local' strategies. Still, each choreographer relies on a particular set of strategies based on the problems they identify in each process and their own personal preferences. Notably, real innovation was enabled through the application of 'Process Strategies'. These techniques guided the choreographers' overall approach through the solution space by forcing changes in a particular direction. As a result, new dance forms were discovered.

Keywords: choreography, structuring, choreographic cognition, problem solving, creativity, design.

INTRODUCTION

There are several models that describe the choreographic process and its phases. Some are more general and others more specific (Butterworth 2004; Lavender & Predock-Linnel, 2001; Mason, 2012; Abbs 1989 from Smith Autard 2000). The Butterworth (2009) model, in which the choreographic process is divided

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into eight stages is probably the most detailed. According to Butterworth (2009), during the first stage of the choreographic process, the aim, context, and concept of the piece become clear and initial starting points are determined (Stage 1: Stimulus/Conception/Intention). In the second stage, choreographers generate a movement language. This could involve working with improvisation or set material (Stage 2: Dance Content). Choreographers often determine who makes the decisions and how collaborative the process is. In a didactic process, the roles of the choreographer and dancers are hierarchical. The dancers are viewed as instruments and the choreographer makes most of the artistic decisions. However, in a democratic process, the creative responsibility is shared equally between group members, including the choreographers (Stage 3: Process).

Choreographers shape movement materials and expressive details, using choreographic devices such as making additions and/or manipulations that involve modifying the use of time and space (Stage 4: Dance Content Development). In the structuring stage (Stage 5), choreographers consider the structure of the piece both on a macro (how different parts relate to the whole) and micro level (the logical structure of smaller parts) (Stage 5: Structuring) and before the work is performed in front of an audience (Stage 7: Performance/s), choreographers ensure that all elements included in the choreography are coherent (Stage 6: Completion/Rehearsal), consciously evaluating the process and product (Stage 8: Evaluation/Reflection).

Butterworth (2009) argues that the order of the eight stages may change, depending on circumstances. It could differ from one choreographer to another and between different choreographic processes. For example, the piece's structure could be conceptualised towards the end of the creation in one project, or determined even before the creative process commences in another project. Choreographers engage in a continual dialogue with their work, and may go back and revisit earlier stages in order to explore more options. They may generate new movement material even if they have reached the stage where they are structuring their piece.

Acknowledging the fact that choreography entails many phases that do not occur chronologically called for a particular study design whereby the structuring phase could be explored in isolation from other phases. To do so, multiple experimental methods were considered. In the research method section below, we explain in detail how the task that was given to the participants and how the data collection procedures ensured that we could study the strategies choreographers use for structuring and varying their dance pieces.

CHOREOGRAPHY, PROBLEM SOLVING AND STRUCTURING

In most creative processes, the choreographer acts as an external eye and makes most of the decisions about both seemingly minor, but also bigger issues. Choreographers tend to see the concepts underlying a dance piece and set the tasks to engage the dancers' responses (Farrer 2013). Therefore, choreographers' practices and expertise are the main focus of this particular study.

Choreographers regularly assess their work, identify problems, and modify the composition in order to achieve their goals (Carlson 2011; Cvejic 2017). This means that the content and the structure of the dance piece continue to develop and evolve during the rehearsal period and sometimes even after the first performance. During the structuring stage, choreographers make important editorial decisions relating to the overall layout of the dance piece (Blom & Chaplin 1989; Butterworth 2012; Smith-Autard 2000). Choreographers consider which movement material should be incorporated into the dance piece, how it should be ordered and whether it should be further refined. During the structuring stage, choreographers often think of ways to balance the length, shape, and intensity of movement sections. They monitor the transitions between sections and decide which materials to repeat, manipulate or juxtapose (Smith-Autard 2000). Eventually, choreographers give the piece its final form and construct a structure that has a clear beginning, middle, and end (Smith-Autard 2000), allowing the audience to appreciate how all the pieces of the puzzle fit (Blom & Chaplin 1989).

In the process of creating a coherent dance composition, choreographers regularly consider many variables such as the originality, variety, contrast, unity, functionality and effectiveness of the dance piece, and also take into account different production elements such as music, lighting, stage design and costumes (Blom & Chaplin 1989; Butterworth 2012; Smith-Autard 2000).

Surprisingly, despite its important role in the creation process and high level of complexity, not much is known about the cognitive processes underlying the structuring process. Dance literature often discusses the same fixed structuring frameworks and mostly provides an analysis of the final 'product' or structure. However, what is lacking is a deeper understanding of the dynamic relationship choreographers have with their work or the understanding of how the final structure develops.

It is particularly challenging to pinpoint the structuring process within the context of western contemporary choreography, a practice that was developed on the tradition of breaking boundaries. First it pulled away from ballet technique, then it went beyond the narrative structures of 'modern' dance, and today it extends post-modern explorations through creative uses of new technologies (Carlson 2011). Western contemporary choreographers deliberately search for new structures and experiment with their functional possibilities. They look for new paths to dance making (Blom & Chaplin 1982) and new frameworks to support their dance piece's concept and artistic vision (Butterworth 2012). Still, the techniques choreographers use often remain unexplored and as a result, there are only a few codified methods for piecing a choreographic work together (Carlson 2011).

While there has been a significant increase in the research of choreography and contemporary choreography, most prior studies focused on different aspects of the creative process and either overlooked or briefly touched upon the structuring stage (deLahunta et al. 2009; Kirsh 2009, 2011; Carlson 2011; Stevens et al. 2003). For instance, the PACT project (Process and Concept

Tracking) involved an analysis by the cognitive scientist, Phil Barnard, who examined the creative thinking of the British choreographer, Wayne McGregor, across six interviews spread between May 2012 and October 2013. The pathway of the choreographer's decisions during the creation of *'Atomos'* was highlighted, examining what has changed, as well as when, how and why. Consequently, 'the messy process of artistic creation was revealed' (Jordan 2013, p.3). Still, the PACT methodology explored the use of knowledge and decision making at a rather macroscopic level of analysis, and it relied solely on the choreographer's reports at certain moments in time.

This present study adopted methods such as observations, interviews and questionnaires, to thoroughly investigate choreographic cognition¹ and the structuring stage, focusing on strategies applied by choreographers for structuring and varying their dance compositions. We followed the construction of six dance pieces from beginning to end and interviewed the choreographers as well as the dancers on a daily basis.

CHOREOGRAPHY AND DESIGN: EXPERTISE AND PROBLEM SOLVING

From reviewing literature in cognition and creativity, it is evident that problem solving is often linked with strategic thinking and expertise with the skilful application of strategies (Cross 2004; Jonassen 2000; Kruger & Cross 2006; Yilmaz et al 2011; Lemaire and Siegler 1995). In fact, some studies have demonstrated that experts tend to approach problems in similar ways. For example, research has indicated that expert designers are inclined to prioritize certain constraints which limit their search space (Gelb, 1987), and take a solution-focused approach, generating many solutions as opposed to analysing the problem itself (Jonassen 2000; Kruger and Cross, 2006; Cross 2004). Experts keep switching their focus between the micro and the macro, thinking both about the depth and breadth of created concepts (Yilmaz et al. 2011).

Importantly, Yilmaz et al. (2011) pointed out that experts concurrently use multiple strategies in order to vary and improve their designs. The strategies they identified were divided into three groups: local, transitional and process. Local strategies involve modifying details within a single identified concept (e.g., use of a common base for different components or apply an existing mechanism in a new way). Transitional strategies involve complete transitions through designs (e.g., reversing components, attaching/detaching components, or extending certain elements) and process strategies reflect the designer's broader approach to force changes in a certain direction (Table 1).

All these strategies could potentially describe what choreographers do when they create a dance piece. Choreographers refine their composition, making minor changes and improvements without altering the general choreographic structure by applying local strategies. They may change the temporal, dynamical or spatial qualities of movements and add or remove features (e.g. dancers,

Table 1. Process Strategies as Defined by Yilmaz et al. (2011).

1	Assign form to each function	Giving form to each function separately, and creating a relationship between these forms by separating, attaching or merging them
2	Brain-write	Using brainstorming sessions and generating words describing the constraints and variables to suggest new concepts
3	Contextualise	Assigning a context or changing it if it exists
4	Evaluate	Giving value to the idea and then staying with or leaving it
5	Synthesise	Merging different concepts into one
6	Switch level of focus	Change from a general system-level design focus, to one of a specific concept element, and back
7	Propagate	Once a new concept element is identified, try to apply it to other existing concepts
8	Analyse morphology	Identifying different ways of achieving the same function and combining and substituting each way to generate a new concept
9	Prioritise certain constraints	Selecting and prioritising certain constraints and developing concepts satisfying those

props). In other incidents, choreographers may choose to make more radical changes to the piece's overall structure by applying transitional strategies. For instance, choreographers may completely remove a section if they find the piece to be too long or if does not integrate well with other sections. As contemporary choreographer Elizabeth Streb describes:

I get bored, and I cut sections out, or I make them shorter. I question why we are still doing this, or that. Right now there are about twenty moments in the show. Everything is getting shorter. (Morgenroth 2004)

In addition to applying local and transitional strategies, choreographers seem to use process strategies as a tool for varying their dance designs and extending their creativity. For example, they may synthesize two concepts or more to form a new structure. In the pieces, *Decadance (2000)* and *Project 5 (2008)* contemporary choreographer Ohad Naharin combined excerpts from his previous creations, reworking and reorganising them with the purpose of creating a new dance form. In *Decadance*, all the sections are part of his previous repertoire while in *Project 5*, he mixed old excerpts with a completely new section entitled 'Bolero'.

Notably, the practices of design and choreography share many similar features. In both design and choreography, concepts or ideas are realized into a configuration, model, pattern, plan, or specification that helps achieve a designated objective (Cross 2006; Heskett 2005; Merriam Webster 2018; Koskinen et al. 2011). It is also very common for design and dance practitioners

to consider the aesthetic, functional, economic, and socio-political dimensions of the design object and process, as well as to use considerable research, thought, modelling, interactive adjustment, and re-design (Brinkkemper 1996). In both design and choreography, practitioners must take into consideration the point of view of the user or audience, and ensure the outcome is original or at least adds value to existing works (Designing according to Yilmaz 2011, p.388).

It is true that there are some differences between the practices of dance and design. For example, designers design objects that have functional uses and choreographers do not; designers have a better idea what the outcome should be and choreographers do not; choreographers work with the dimension of time and designers often do not; choreographers work with animated objects (dancers and other artists) that contribute to the process with ideas and movement and designers do not. Nonetheless, it could still be argued that designers and choreographers are constantly engaged in an ongoing problem solving process. Both designers and choreographers modify and reshape their ideas and the object they are working on, ensuring that the final outcome is coherent. Therefore, due to the obvious similarities between choreography and design, theories and models of design strategies were found useful in providing an ideological foundation for the purposes of this study. Using the Yilmaz et al. (2011) model, we establish a research framework for exploring the choreographic process and particularly the structuring stage. Yilmaz et al. (2011) examined and compared the sketches of an expert designer over several years whilst working on a real-world project, noting the changes his designs have undergone. Thus, building on their methodology, we decided to observe and interview two choreographers as they work on creating three dance pieces, tracking any change they make to their compositions once they start to structure their pieces.

FROM DESIGN HEURISTIC TO STRUCTURING STRATEGIES

Choreographers and designers seem to operate in a similar fashion. They apply multiple strategies with the intention of resolving a variety of problems, refining and diversifying their designs, and extending their creativity. Still, as it was mentioned previously, choreographers employ strategies that are domain-specific. Therefore, in order to explain how expert choreographers structure and vary their dance pieces (Table 2), we integrated common choreographic strategies with Yilmaz et. al., 2011 design model. This model was used during the analysis stage of the study which allowed to systematically code and sort out information that was extracted from interviews and observations, providing a clearer view of the structuring process.

Overall, structuring strategies were split into three main groups which were further divided into several sub-categories. The first category, local strategies, reflects choreographers' tendency to modify their composition at the detail level without changing the overall dance structure. This category involves manipulating the temporal, spatial, and dynamical qualities of movements

Table 2. Domain-specific/choreographic strategies used during the structuring stage.

Local Strategies (changes within a single design)	Structuring Strategies Transitional Strategies (changes between designs)	Process Strategies
<ul style="list-style-type: none"> ■ Apply changes that relate to time/space/dynamics 	<ul style="list-style-type: none"> ■ Add/remove sections ■ Lengthen/shorten sections 	<ul style="list-style-type: none"> ■ Brain-write ■ Contextualize ■ Assign form to each function
<ul style="list-style-type: none"> ■ Add/remove/replace features/dancers 	<ul style="list-style-type: none"> ■ Repeat sections ■ Replace sections ■ Change the order of sections ■ Attach/detach ■ Overlap 	<ul style="list-style-type: none"> ■ Evaluate ■ Synthesize ■ Change focus ■ Propagate ■ Analyze morphology ■ Prioritize constraints

as well as adding (e.g. adding an arm movement to a spin), replacing (e.g. replacing a line formation with a circular formation), or removing features (e.g. a movement/a dancer/ a prop). The second category, transitional strategies, reflects choreographers’ inclination to make changes that affect large movement sections and consequently, the piece’s overall structure. These strategies were divided into seven groups including add/remove, lengthen/shorten, repeat, replace, change the order, attach/detach, and overlap sections. The third category, process strategies, reflects choreographers’ tendency to rely on particular methods for creating a completely novel design, a design that has its own unique essence and characteristics. These encompass the exact nine groups which are described in the study of Yilmaz et al. (2011).

Yilmaz et al. (2011) demonstrate that the application of design strategies can be quantitatively documented. Their use of archival data to analyze transformation in design and their quantification of strategy use have inspired the analysis approach of the present study. Video footage of the choreographers’ creation process was used to extract, notate, classify and quantify the strategies that were employed during the creation process, exposing the frequency of strategy use and the proportions of strategy use per piece.

Importantly, there are some limitations in analysing the data through the lens of a single model and there is always the potential that it will not include all the details of complex phenomena (Sciencing 2018). Still, it was necessary to adopt a conceptual framework suitable for exploring the structuring stage and the choreographers’ creative tendencies. Indeed, the model of Yilmaz et al. (2011) model was constructed for design research yet, it involves categories that are sufficiently broad and inclusive. To avoid any loss of information, in this study, strategies that could not match the model’s categories were noted and added as a new subcategory. However, this only happened once.

STUDY DESIGN

Two Australian contemporary choreographers with over 30 years of experience in dance making were recruited for this study. One is Gideon Obarzanek (former artistic director and founder of the Melbourne based company Chunky Move) and the other is Sue Healey (well-acclaimed Sydney based independent choreographer and film maker). Aside from their vast knowledge and experience, the two contemporary choreographers were chosen based on their different dance lineage, ensuring that structuring could be examined through diverse practices. Particularly, our goal was to investigate how the choreographers differ or resemble in their structuring approach. However, comparing their creative processes required that they work under similar conditions and so, elements that may have affected their decision making were controlled. The two choreographers worked on the same task and in the same space with the same amount of dancers. They created movement to the same soundtrack and theme and had the same rehearsal time.

Each choreographer worked with a group of five dancers. Most of the dancers were part of the Sydney Dance Company Pre-Professional Program. They were of a similar age bracket (21 in average) and had a similar level of dance experience (about 14 years of training in ballet, contemporary dance).

The task the choreographers were given was designed in a way that enabled to isolate the structuring stage and repeat it multiple times in a relatively short time period (a week). Generally, the choreographers had only one day to generate movement material and four days to reuse this movement material in order to form three different dance pieces of ten minutes long, based on the theme polarities². During the first day, the choreographers explored a variety of movement ideas (e.g., shaking, balancing on the balls of the feet) and created a variety of movement phrases and throughout the following days (days 2–5); they decided which of these phrases will be included in Pieces 1, 2 & 3, how they should be organised and which elements should be refined further.

Once the choreographers started to attach movement sections and structure their pieces, we extracted information about the techniques they applied, noting any change that was made to their compositions. Eventually, at the end of Day 5, the three works were presented in front of an audience to ensure the choreographers have a goal in mind and to make the whole process more 'real'. Importantly, we made sure that the choreographers' creative freedom was not jeopardised by too many restrictions imposed by the study design. Therefore, we conducted a pilot study and tested the study design prior to performing the full scale project. After we ran the pilot and analysed the choreographers' feedback, the original plan was altered slightly. For example, the length of each piece was extended from 3 to 10 minutes and the amount of dance pieces the choreographers created during the week was limited to three.

Three video cameras were placed in three corners of the dance studio and a fourth camera was used during interviews with the choreographer.

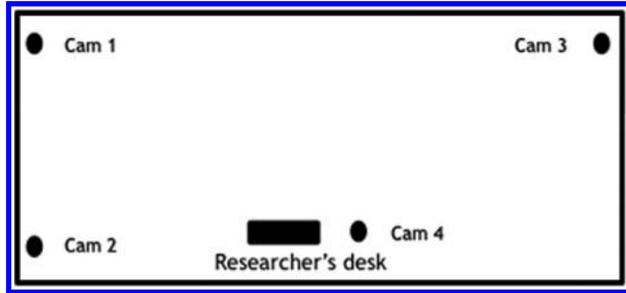


Fig. 1. A sketch of the study's space and equipment.

The video footage captured the creative process in full and once the study was completed, we referred back to it as a mean for recording structuring strategies. Additional information about the structuring process was extracted through observations, interviews, and questionnaires.

We observed the whole process and tracked the changes of the compositions once an initial structure was formed (i.e. once different movement sections were combined). We also interviewed the choreographers at the end of each day with the intention of exposing the rationale underlying their decisions, motivations and goals. Furthermore, at the end of each day, the dancers filled questionnaires in which they shared their own perception of the creative process, the construction of the pieces, the differences between them, the types of alterations the compositions underwent, the problems that arose along the way and how they were resolved.

The use of mixed-method approach for collecting information offered a few advantages. It established a triangulation system that sought to build trust in the congruence of data whilst reducing the risk of biases (Miles & Huberman 1984). It allowed for explanation of the structuring phenomena by relating to 'more than one standpoint' (Cohen & Manion 2000, p.254), and it provided well-validated and substantiated findings which clarified how the pieces were structured and how they were varied.

DATA SORTING

At the completion of the study, we observed the structuring process of each dance piece, starting with the three pieces Healey created³. Once we realised that two or more movement sections/themes were combined, we kept following this structure, noting any change that was made to it in a particular table (Table 3)⁴.

In the sixth column of the table (Table 3: description), we described the type of alteration that occurred and in the fifth, the movement section/theme it involved (e.g. pairs, floor section, circular phrase). In the fourth column, we registered when the event occurred based on the video's timer and then, we assessed whether the change involved local or transitional transformation. If the composition was altered in the detail level, the number 1 was marked in the L

Table 3. An example of how changes to the composition were recorded.

Strategy type	L	T	Time	Material	Description
Temporal manipulation	1	0	19:08	Rollers	Add stillness for both the active person and followers

column (Local) and if it was a major structural alteration then, 1 was marked under the T column (Transitional).

Lastly, in the first column, we matched each transformation with one of the subcategories that are mentioned in Table 2. For instance, local changes that involved replacing one element with another were tagged as replace and local changes that encompassed the patterning or juxtaposing of short movement phrases were tagged as layer. Changes that were associated with movement alterations were tagged as manipulate and they were matched with a particular type of manipulation (temporal/ spatial/ qualitative). For example, if the dancers' movement was modified to be performed faster, it was tagged as temporal manipulation.

This way of sorting data offered a clear advantage as after the table was completed (Table 3), we could group similar strategies and reveal their distribution frequency (Australian Bureau of Statistics 2013). This allowed us to calculate how many times each strategy was used and how frequently it was applied. Consequently, we could compare strategy use between processes as well as between choreographers, identifying the choreographers' particular structuring style and tendencies and pinpointing how they resemble or differ.

To ensure the reliability of the coding system, it was independently tested by an external examiner, a doctorate student from Macquarie University (Sydney), who was trained by the researcher over one day. The examiner mapped eight hours of footage⁵ which is equivalent to 12.5% of the overall data. After comparing their coding results and scores with that of the authors of this study, the level of agreement was 70%. This percentage shows a substantial level of agreement based on the Cohen Kappa Inter-Rater Reliability Testing (McHugh 2012).

PROCESS STRATEGIES

While pointing out local and transitional strategies was a straightforward task, identifying process strategies was more complex as it required a broader perspective and interpretation skills. It was necessary to become aware of the choreographers' behavioural patterns as they unfold and make sense of their specific dispositions. For example, once we realised that Healey has repeatedly

made changes that enhanced contrast and opposition, we could argue that she deliberately placed value on one particular constraint and we could then associate her actions with the Yilmaz et al.'s Evaluate strategy.

The interviews with the choreographers had also shed light on the use of process strategies. The choreographers were asked to explain how they differentiated between dance compositions and what were the principles that guided the creation of each piece. Their accounts were compared and matched with Yilmaz et al.'s categories and there was only one incident where we identified a strategy that was not mentioned in their model. This specific strategy (establish different departure points for the creation of each piece) was added to their list of process strategies.

CODING OF QUALITATIVE DATA

All the information from interviews, questionnaires, and observations was transcribed. Then, each choreographer was studied separately, analysing one process at a time. In order to handle all the content that was pulled out from the study effectively, it was reduced to a manageable amount by taking a deductive approach (Coffey et al. 1996). This means that preconceived frames or themes were used to guide the analysis process and selection of relevant materials (Crabtree & Miller 1999). Specifically, we only extracted information that relates to the structuring process (Data related to movement generation was disregarded) as well as use of local, transitional and process strategies. This content was highlighted in different colors based on the preconceived themes (e.g. comments about local strategies were highlighted in blue). This way it was possible to expose the choreographers' motives, actions and choices as well as explain the quantitative findings (e.g., why a particular strategy was applied more often).

MIXED-METHOD ANALYSIS

While the quantitative data that was collected illustrated how many strategies were used per piece and what was their frequency, the qualitative information explained these figures, showing why a particular strategy was applied more often than others. By using this method, we could draw a fuller picture of the choreographers' structuring process and their choices.

RESULTS

In this section, the main findings of the study are presented. First, the concept of multiple strategy use is demonstrated and afterwards, the choreographers' application of local, transitional and process strategies is explained in more detail through the interpretation of the quantitative data.

Table 4. A comparison between the use of multiple strategies by two choreographers during the structuring of three dance pieces.

		Sue Healey	Gideon Obarzanek
Local	n	129	121
	%	83%	90%
Transitional	n	26	13
	%	17%	10%
Total	n	155	134
	%	100%	100%

Multiple strategy use

Table 4 compares the use of local and transitional strategies by two expert choreographers during the structuring of three dance pieces. The numbers in the table reflect the amount, percentage, and frequency of strategy use by each choreographer. Overall, the data indicates that both choreographers applied a similar amount of strategies overall (155 & 134) with a strong inclination towards local changes (local changes were used 83% & 90% of the time). Still, Healey tended to perform major structural changes more frequently than Obarzanek (17% of the time as opposed to 10%).

Table 4 shows that arriving at a satisfying outcome (according to the choreographers' own standards) depends on the use of multiple strategies, which allow choreographers to transform their compositions and explore a variety of dance designs. Still, choreographers seem to rely particularly on local strategies. Meaning that, they change their compositions more at the micro rather than macro level.

Local strategies

Table 5 compares the use of local strategies by two expert choreographers during the creation of three dance pieces. Three groups of local strategies were applied: manipulations, replacements and layering. Both choreographers applied a very similar amount of local strategies (129 & 121) with manipulation of elements being their most favoured option (~66%, ~79%), replacing second (~18%, ~12%) and layering third (~16%, ~9%).

Local manipulations (changing a movements temporal, spatial, qualitative attributes) were utilised as tools for refining and developing the compositions. For instance, by changing the movement quality (e.g. making it softer), the performance integrity, precision and clarity were enhanced. On the other hand, by layering short sequences, often by patterning or juxtaposing them, the choreographers could increase the level of sophistication and complexity of the work as well as create a more meaningful performance. For example, by having

Table 5. A comparison between the use of local strategies by two choreographers during the structuring of three dance pieces.

		Sue Healey	Gideon Obarzanek
Manipulate	n	85	96
	%	66%	79%
Replace	n	23	14
	%	18%	12%
Layer	n	21	11
	%	16%	9%
Total	n	129	121
	%	100%	100%

two groups perform contrasting phrases at the same time, the choreography became more intricate and better reflected the theme ‘Polarities’.

Local Manipulations

Table 6 shows that although the manipulation of elements was the choreographers’ most favourite technique for altering dance compositions, their use of spatial, temporal and dynamical manipulations was quite different. Healey, mainly modified spatial elements (~61%) and Obarzanek mostly applied temporal adjustments (~50%). These differences could be related to their initial artistic intention. Healey was interested in finding multiple forms of spatial oppositions and therefore, kept modifying the movement’s shape, level, formations, directions or pathways more often, and Obarzanek focused more on extreme temporalities (moving very fast versus very slow) and constantly searched for ways to shift between them or juxtapose them. Accordingly, throughout the study, it became evident that the choreographers’ different points of departure, led to enforcing particular changes based on the aspect that were important to them.

Interestingly, when it came to other forms of manipulations, the results show that dynamical changes were only rarely used (~17% or ~18% of the time). The explanation for that could be that spatial and temporal modifications could have changed the quality of movements and that is why there was no need to attend to these aspects as much. For instance, asking the dancers to move slower affected the way they performed their movements (i.e. more calmly or attentively) and that is why the choreographer did not need to alter their performance quality.

Table 6. A comparison between the use of local manipulations by two choreographers during the structuring of three dance pieces.

		Sue Healey	Gideon Obarzanek
Temporal	n	19	48
	%	22.5%	50%
Spatial	n	52	31
	%	61%	32%
Dynamical	n	14	17
	%	16.5%	18%
Total	n	85	96
	%	100%	100%

Transitional Strategies

Table 7 compares the use of transitional strategies by the two choreographers during the structuring of three dance pieces. While both choreographers used the same techniques (Overlap / Separate, Add/ Remove, Shorten/ Extend, Repeat, and Replace), there were some differences in their frequency of use. Healey tended to shorten or extend sections more frequently (about a third of the time) while Obarzanek tended to add or remove sections more often (more than half of the time). Their choice was dependent upon the type of compositional problems that arose along the way. Extending sections meant ideas could be developed further as opposed to jumping abruptly from one thing to the next and adding sections allowed for finding new ways to progress especially in situations of blockage.

Process Strategies

Throughout the study, the participants used a variety of process strategies. These enabled the creation of three distinct dance compositions whilst allowing the choreographers to overcome the limitations that were imposed on them in this particular study (e.g. using the same movement materials, theme and soundtrack).

First, we found that the choreographers had set specific intentions and goals for each process. These goals defined the nature of each piece which eventually led to different outcomes. Healey constantly related to the theme 'Polarities' and was continuously thinking of ways to enhance contrast within and between sections. Still, what allowed her to vary the dance pieces was the reliance on the 'analyse morphology' strategy by which she could explore multiple forms of contrast (e.g. switching between different formations, juxtaposing contrasting actions, creating unpredictable rhythmic and qualitative patterns). In comparison, Obarzanek assumed that qualities such as contrast and opposition

Table 7. A comparison between the use of transitional strategies by two choreographers during the structuring of three dance pieces.

		Sue Healey	Gideon Obarzanek
Overlap / Separate	n	4	1
	%	15%	8%
Add/ Remove	n	7	7
	%	27%	54%
Shorten/ Extend	n	8	2-extend
	%	31%	15%
Repeat	n	1	1
	%	4%	8%
Replace	n	6	2
	%	23%	15%
Total	n	26	13
	%	100%	100%

are inherent to any choreography. Therefore, he did not consciously look for ways to represent them in his pieces. His way of overcoming limitations and varying his dance compositions involved prioritizing a new set of constraints and variables for each process. He deliberately restricted his choices and gave each piece a particular focus and tone. In his first piece, he worked with concepts such as movement extremities and particular group relations. His second dance piece revolved around evolution and audience participation and the third around symmetry, contact and audience participation. Consequently, in Piece 1, the group of dancers kept shifting between fast and large movements to small and slow, taking cues from one dancer which they observed and followed intensely. His second piece was more of a psychological journey whereby a single dancer sheds layers of movements as she gradually sets herself free from inhibitions. She shakes, retracts and pauses however, with time, her movements start to flow more smoothly and the original phrase is revealed in its pure form. The other dancers frame the piece as they go on and off the stage at the beginning and at the end, respectively. At different times during the piece, one dancer sits up on an elevated chair and guides the movements of the audience. The gestures they perform are quite pedestrian and they often suggest an expression of concern (e.g. holding the head in various ways). In his third piece, Obarzanek explored how the same circular phrase which he has already utilised in the other two pieces could be readapted to form yet, another new dance work. He had two dancers perform the same movement sequence as they were standing in close proximity, holding hands. At the same time, the other dancers guided the audience's movements. Yet, this time, the movements were more of an imitation of the dancers' actions.

Notably, working with just one or two constraints did not seem to be enough for creating a well-rounded and original work and therefore, the choreographers had to consider other ideas. This was especially evident in the choices Healey made. While she mainly prioritised contrast and opposition as tools to represent the theme 'Polarities' she has synthesised these constraints with others. In her second piece, it was the concept of weaving/passing through space, and in her third, rotating around an axis. This way, she could restructure her original movement materials into new configurations each time while establishing consistent pieces which have their own particular characteristics.

Another tool the choreographers used for creating novel dance compositions was propagating ideas from previous pieces and combining them with new ideas. Healey kept propagating the concept of contrasting the odd dancer to the group and Obarzanek propagated the element of audience participation. Both reworked these ideas into new forms each time. For example, in one piece, Healey had the group of dancers surround the odd dancer while performing movements of contrast to his. Yet, in other pieces, the odd dancer was performing expansive movements front stage while the other dancers were leaning on the back wall.

Finally, from observing the choreographers in action, it was clear that structuring dance pieces and varying them require a constant shift of focus between small details and the overall structure, and between the current process to previous processes. The choreographers switched between working on a certain movement quality or the execution of a particular sequence to the overall structure and focused on how it felt as a whole in terms of the piece's flow, consistency, contrast, originality and development. The choreographers also looked at past choices (choices they took in previous works) as a point of reference and either avoided, embraced or transformed them. Through shifting their focus, the choreographers could develop and refine each of their pieces whilst accomplishing a real difference between them.

GENERAL DISCUSSION

The objective of this present study was to investigate how expert choreographers structure and vary their dance designs. During the structuring process choreographers use multiple strategies involving local, transitional and process strategies. By applying these methods, the choreographers could gradually transform and refine their composition to the point where their objectives were met while overcoming time pressures and other restrictions.

In this section, we discuss the study's findings in relation to current literature and research in design, cognition and choreography. Any consistencies or inconsistencies concerning the choreographers' use of strategies will be drawn out and the reasons behind the choreographers' structuring decisions will be further explained. Furthermore, the structuring tendencies of expert choreographers will

be articulated, demonstrating how the context in which they work affects their decision making.



Structuring and multiple strategy use

During the creative process, choreographers shift between different modes of cognitive activity. They create a dance piece, observe and analyse it, focusing on small details or the overall structure. Interestingly, experts in other fields (i.e. design) were also found to be doing the same. Yilmaz et al. (2011) argue that by switching their focus, designers can think about both the depth and breadth of created concepts; they can overcome fixation and elaborate further details within their work. Choreographers and designers alike have a dynamic relation with their work. They go through cycles of ‘seeing-moving-seeing’. They interpret shapes and relationships and transform these in different ways (Schon and Wiggins 1992).

The findings provide evidence that choreographers constantly view their work with a critical eye. They repeatedly identify problems that need to be resolved and look for ways to improve the piece’s continuity, variety and consistency as well as its functionality, readability and originality. Attending to these factors result in making micro and macro changes to the composition which transforms its structure. These modifications continue to occur until the choreographers’ goals and standards are met.

The high number and variety of strategies choreographers use indicates that strategic thinking and knowledge are a key component of expertise. The repetitive use of strategies points out that choreographers deliberately and consciously chose to use them as means for exploring ‘the problem space thoroughly’ (Yilmaz et al. 2011, p.407). Multiple strategy use demonstrates choreographers’ ability to envision other possibilities and reflects their willingness to remain flexible and not conform to one design too early. It seems as though their non-compromising approach to dance making and their strive for perfection, motivate them to constantly refine and develop their work in the search for better alternatives. Still, as similar to expert designers, choreographers solve problems in a very personalised way (Jonassen 2000). They limit their search for solutions by selecting particular constraints and contexts.

Local, transitional and process strategies

The findings show some variances and similarities in the choreographers’ use of strategies during the structuring stage. Overall, it seems that their choice of strategies was affected by a number of factors: the nature of the problem, the elements it involves and their own personal preferences (Yilmaz et al. 2011).

Although the choreographers were given the same task and restrictions, the elements the task involved and their own inclinations led them on different pathways. In other words, working with a different group of dancers, movement materials, aesthetic preferences and interests influenced their creative process, outcomes and choice of strategies. The choreographers framed the task and each process in a personal way and therefore, relied on particular modes of creation. This meant that every process encompassed specific issues that required a particular combination of solutions. For instance, the decision Obarzanek made to explore the relationship between the audience and the dancers in the second and third dance pieces required looking for suitable ways to include the spectators in the piece. As a result, the sitting arrangement of the audience changed a few times as did the positioning and movements of the dancers.

The choreographers' particular way of working also affected their choice of strategies. Obarzanek progressed in a linear fashion most of the time. He created a certain section and then considered what could come next. In contrast, Healey worked on action units separately. She kept jumping between them whilst developing them further, and only later considered which could work together and how. Her way of working required more experimentation which could be the reason why she relied on transitional strategies more often than Obarzanek.

Generally, it is expected to find variances in strategy use between choreographers, yet, it was surprising to find that despite contextual differences, expert choreographers show some similar tendencies in their use of strategies. Both participants used local strategies more frequently and in particular, local manipulations (space, time and dynamics). By applying local manipulations, the choreography could be refined and tightened up quickly and almost effortlessly without disrupting the creative flow. Mostly, they were implemented 'on the go', even while the dancers performed the piece. The dancers were able to embody these alterations quickly and the choreographer could rapidly evaluate whether these adaptations worked or not.

In contrast, transitional changes seemed to involve more mental effort and processing as they required a broader perspective and higher level of problem solving skills. This could be the reason why they were used less frequently. It often appeared much more complex to replace a section than to change a movement's speed, quality or level. Yet, when the choreographers encountered a problem that could not be resolved locally (i.e. the piece was too long), they shifted their attention to the overall structure and rearranged it to reach their goal efficiently. Shifting the attention to the most dominant and important element is what experts do (Schiphorst 2011). Experts seem to identify the main problems and then, transform or rearrange what needs fixings to reach their goals (Sobel 2001).

Noticeably, even within the range of local strategies, some modifications appeared to be more challenging than others. It took more effort, experimentation and time to replace or layer elements and this could be the reason why these specific strategies were used less often. In fact, the choreographers only used these options when certain obstacles emerged.

For example, when a transition failed, Obarzanek looked for a movement replacement and tested a few options so that a sense of flow could be restored, and Healey layered a phrase that was danced in unison by opposing the dancers' actions in order to make it more interesting, relevant and intricate.

Overall, it seems as though once choreographers find a structure that works, they keep refining it mainly through local alterations. Cross (2004) has also recognised a similar pattern with designers. Cross (2004) argues that highly skilled designers produce good early concepts that do not require radical alterations. Expert designers can modify their model fluently and easily as difficulties surface, without recourse to exploring alternative concepts. Cross (2004) mentions that *'designers are reluctant to abandon early concepts, and to generate ranges of alternatives'* (p.8). Similarly, the choreographers in the present study, continued to develop their initial design as opposed to searching for new options. Still, in this study, they were deliberately asked to generate three different dance pieces and while it appeared to be counterintuitive to their usual process, they managed to do so through the application of process strategies. The choreographers tackled the problem and overcame some of the imposed constraints by taking a broad viewpoint (Cross 2003; Yilmaz et al. 2011, p.408) which enabled a real 'creative leap' (Cross 2004).

Process strategies allowed for the discovery of new variables and contexts which led to generating a wider range of dance compositions each with a specific structure and character. By framing their work under a few principles, the choreographers could restrict their search space whilst generating new forms. Healey experimented with multiple ways for generating contrast and opposition and Obarzanek managed to restructure the very few movement phrases he had over and over again under new frameworks. And so, by prioritizing certain constraints, inventive and novel solutions were discovered (Gelb, 1987).

Yilmaz et al. (2011) state that the 'general nature' of process strategies and their 'optional or conscious invocation' especially 'when the flow of ideas had reached a stopping point' suggest these are 'important tools to learn' (p.410). Indeed, in incidents where the choreographers ran out of ideas, they relied on process strategies. The most obvious one was the brain-writing strategy, whereby the whole group used brainstorming sessions in an attempt to find new constraints and variables to work with. Obarzanek only started his last process after discussing different possibilities with the dancers. Together, they tried to work out how else the material could be utilised to form a new dance piece. Ideas such as symmetry and physical contact were suggested. These concepts were synthesised with audience participation (an element that was propagated from the second version) and together they formed the general framework of the third dance piece. The last example shows that by combining new constraints and variables with old ideas or interests, it was possible to expand the search for new designs (Yilmaz et al. 2011).

Cross (2003) explains that expert designers address issues at several levels of generality, developing a particular perspective from which they identify relevant first principles of design to embody the concept. The study's findings

illustrate that expert choreographers operate in a similar way through the use of process strategies. The choreographers find generic frameworks, constraints and contexts and then use common choreographic devices which allow them to bring their ideas to life. For example, Healey decided to build her work around the idea of polarities and evaluated that constraint more than any other. She thought of ways to represent the theme through contrast and opposition and looked for numerous forms of spatial organization that are polarised. She experimented with the following: contrasting traveling patterns, various directions and levels, juxtaposing different phrases, shifting the dancers' formation, alternating between small and expansive movement, angular and curved.

Another helpful process strategy the choreographers applied for varying their dance compositions involved having a different starting point each time. This strategy was not mentioned in Yilmaz et al.'s (2011) list of process strategies. However, it seemed to stimulate the discovery of new ideas and directions. Healey began constructing piece 1 by shifting the dancers' formations as they move toward the centre and out of it repeatedly. Then she worked her way backwards and forwards filling up the missing gaps. Her second piece began with a unison and the third with the dancers following the movement of foam rollers as they are pushed on the ground. In comparison, Obarzanek, worked his way into the first piece with the group of dancers spread out around the space, performing a dance phrase that builds toward a juggernaut. The second piece began with a solo, and the third piece with a duet. Having these different departure points influenced the development of each work, form and character.

LIMITATIONS

To date, very few studies have used empirical evidence to explain the structuring process. The aim of this present study was to fill this gap through its specific research method. However, it is important to acknowledge some of its limitations. For instance, the choice to examine the work of choreographers in a relatively condensed experimental setting may have generated different results when compared to examining their structuring process in a 'real-life' situation where a single work is developed over many days or even weeks. While there is no doubt that most, if not all, structuring processes involve the use of multiple strategies, the patterns of strategy use may differ from the patterns presented in this study. This is because different variables, such as rehearsal time, theme, collaborators, movement material, and various production elements (e.g., lighting, music, set design, and costumes), could potentially affect choreographers' structuring decisions as well as their use of strategies. Nonetheless, this more 'condensed' study provides a space for reflection which is not often afforded when preparing for a performance. With such reflection, a heightened awareness of oneself is granted as well as a form of insight developed through the practice itself (from Butterworth & Wildschut 2012).

The current study design allowed for 'speeding up' the initial stages of the composition process, keeping the focus on structuring and generating multiple dance compositions. The project's particular setting enabled to document and examine the creative process of two choreographers in full, and compare the findings without the interference of too many biases. This would not be possible in a more natural setting, as choreographers tend to work in different spaces over different periods of times and with different people, soundtracks, and themes.

Indeed, observing the creative process of a small sample allowed for a profound examination of the structuring process. However, the larger question of the use of strategies by expert choreographers in general cannot be fully addressed. Therefore, the patterns of strategy use presented in this study should be verified in relation to other projects and choreographers before general conclusions can be made. For instance, it is probably the case that all expert choreographers continuously shift their attention between the micro and macro aspects of their work yet, future work should examine whether they choose to attend to micro issues more often.

Furthermore, while the choreographic methods discussed in this paper are broadly applicable, it is important to remember that not all are used universally by all choreographers (e.g., African choreographers). This study is situated within a very specific context and relates to a distinct part of the contemporary dance family tree. It refers to western contemporary dance and investigates two Australian contemporary choreographers who have their own particular practices. Therefore, future studies may examine how the findings which we presented here relate to the practices of other contemporary choreographers in Australia and around the world as well as how they relate to non-contemporary dance practices (e.g. cultural dance, jazz, ballet).

Finally, by combining quantitative and qualitative methods for collecting, sorting, and coding data, we ensured a more holistic view of the research topic. Yet, both methods had their own limitations. In terms of our quantitative methods, we realised that the coding system we created for identifying and grouping strategies was not perfect. In fact, when we compared our coding to that of the external examiner who was trained to use our particular system, the level of agreement was only 70%. Still, as mentioned before this percentage shows a substantial level of agreement based on the Cohen Kappa Inter-Rater Reliability Testing (McHugh, 2012)

When it comes to qualitative methods, it is generally known that qualitative research is dependent on the individual skills and experience of the researcher and could be influenced by the researcher's personal biases and idiosyncrasies. In qualitative research, the researcher's presence during data gathering is unavoidable and can affect the participants' responses. Still, without the researcher's presence, as often seen in more positivistic enquiries, subtleties and complexities are often missed. We believe that learning about the structuring phenomena could only be done through close observations and analysis by external researchers.

CONCLUSION

This present study demonstrates the value of expanding choreography research by relating to other branches of knowledge. By incorporating theories and studies from other fields such as cognitive psychology and design, the understanding of the structuring phenomena was enhanced and it was possible to identify commonalities in the way experts from different fields think and operate. The information about experts' practices and problem solving presented in this paper, may assist those who are interested in enhancing the productivity and efficiency of their own working process as well as the level of creativity and novelty of their outcomes. The research methods that were used in the present study offered new techniques for recording and coding transformation in dance design, allowing for the choreographic process to be analysed more objectively and rigorously.

In sum, the findings show that by thinking strategically, innovation and productivity are increased. Therefore, practitioners who are interested in developing their practice and improving their problem solving skills, may find value in the approaches that were discussed here. Structuring strategies offer a range of solutions to the many facets and complexities involved in dance making and were found particularly useful in situations of fixation and blockage, and in scenarios where the pressure to innovate and create quickly is high.

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NOTES

1. "Choreographic cognition refers to the cognitive and mental processes involved in constructing and refining movement material with the intention of creating a work of art" (Stevens & Glass 2005).

2. The theme ‘polarities’ was chosen by the researcher. The aim was to find a theme that is general enough and which could be interpreted in many ways, so that the artists’ creative freedom is not jeopardised.
3. Annotated videos of the three pieces created by each choreographer can be observed on Vimeo:

P1 – <https://vimeo.com/272165105> (p.w sue1)
 P2 – <https://vimeo.com/272165261> (p.w sue2)
 P3 – <https://vimeo.com/272165358> (p.w sue3)
 P1 – <https://vimeo.com/271568394> (p.w gideon 1)
 P2 – <https://vimeo.com/271581961> (p.w gideon 2)
 P3 – <https://vimeo.com/271579540> (p.w gideon 3).

4. The sorting and coding of the quantitative data can be viewed at: Healey- <https://www.dropbox.com/s/6dikwgqmf071dnq/coding%252C%2520sue%2520healey%2520video.pdf?dl=0>
<https://www.dropbox.com/s/6dikwgqmf071dnq/coding%2C%20sue%20healey%20video.pdf?dl=0>
 Obarzanek- <https://www.dropbox.com/s/t7s7txjqk41uaia/gideon%2520quantitaive%2520info%2520table.pdf?dl=0>
<https://www.dropbox.com/s/t7s7txjqk41uaia/gideon%20quantitaive%20info%20table.pdf?dl=0>
5. The examiner’s coding can be viewed at: https://www.dropbox.com/s/i3wtskej00h0ma/coding_SP.pdf?dl=0

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