



**Possibility Thinking: culminative studies of an evidence-based concept driving creativity?**

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### PT article Nov 2011: Figures

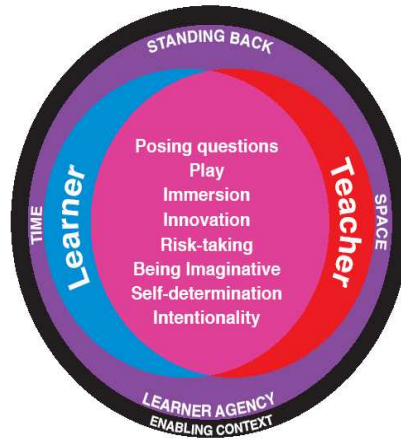
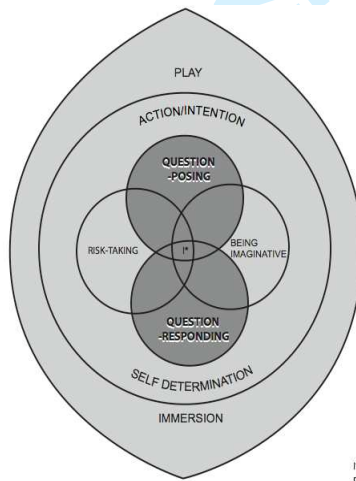


Figure 1: Stage 1 model of pedagogy and possibility thinking (Cremin, Craft & Burnard, 2006)



I\* Innovation as possible outcome of possibility thinking as the engine of creative learning

Figure 2: Stage 2 thematic focus (Chappell et al, 2008)

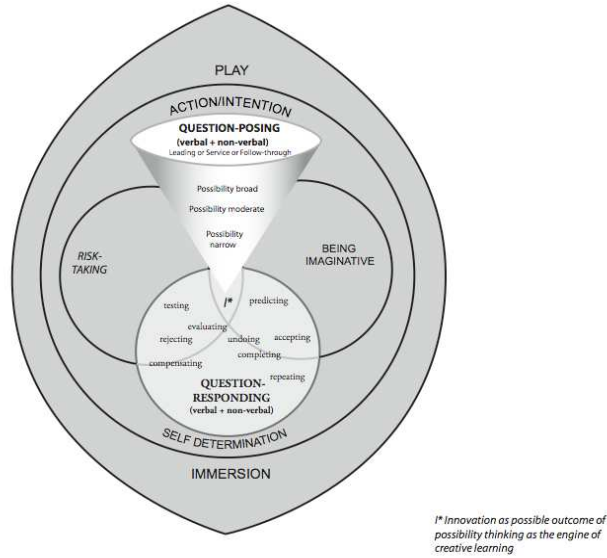
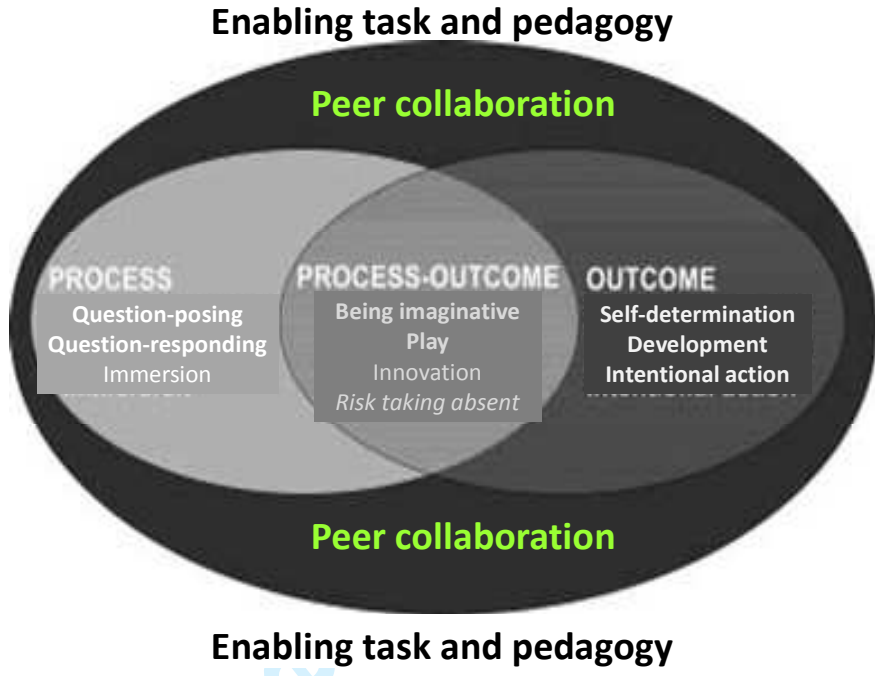


Figure 3: Stage 3 taxonomy of question-posing and question-responding within Possibility Thinking



Fig 4: Possibility Thinking in 3- to 5-year-olds from Burnard et al, 2006

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**Fig 5:** Possibility Thinking in 9-to 11-year-olds (the present study)

Peer Review Only

## PT article Nov 2011: Tables

**Table 1:** Range of evidence across the sites

Features	Site: South West	Site: East Anglia
Question-posing	Strong	Strong
Question-responding	Strong	Strong
Self-determination	Strong	Strong
Intentional action	Strong	Strong
Development	Strong	Strong
Being imaginative	Strong	Medium
Play/playfulness	Strong	Medium
Immersion	Medium/Strong	Medium/Strong
Innovation	Medium	Medium
Risk-taking	Absent	Absent

**Table 2:** Commonalities between sites

<b>Existing features in both sites</b>	<b>Existing features in neither site</b>	<b>New feature in both sites</b>
<b>Question-posing</b>	Risk-taking	Collaboration
<b>Question-responding</b>		
<b>Self-determination</b>		
<b>Intentional action</b>		
<b>Development</b>		
<b>Being imaginative</b>		
<b>Play/playfulness</b>		
<b>Immersion</b>		
<b>Innovation</b>		

# Possibility Thinking: culminative studies of an evidence-based concept driving creativity?

## Abstract

The authors have for some years studied the concept of 'possibility thinking', or 'what if' and as if thinking in children aged three to eleven, which generates novelty - and the pedagogical strategies which foster it. They have argued, on the basis of previous qualitative studies, that 'possibility thinking' (PT) is at the core of creativity in education.

Having begun as a conceptual study for seven years this team has undertaken empirical studies of PT in classrooms. This paper discusses findings from the third phase of empirical work focusing on nine to eleven year olds. The particular research question addressed here is '*What characterises possibility thinking as manifest in the learning engagement of children aged 9-11?*'

A small-scale qualitative study, involving co-participation with teachers, the paper features episode analysis of naturalistic video data featuring children aged 9--11 in two schools. It focuses on possibility thinking evidenced by children engaged in a range of classroom activities, some established as individual activities and others as group work.

The study reveals some features of PT in both sites (question-posing, question-responding, self-determination, intentional action, development, being imaginative, play/playfulness, immersion and innovation) to differing degrees of strength. Risk-taking was absent in both and a new feature, collaboration, evident in both. Differences were documented in how question-posing and question-responding manifest, compared with earlier studies with younger children.

This study seeks to make an evidence-based contribution to the characterisation of PT as driving creativity in the classroom, with implications for research and practice.

*Key words:* possibility thinking, theorising everyday creativity in education

## Introduction: situating possibility thinking

For a period in the early 21<sup>st</sup> century, English education was characterised by efforts to re-ignite creativity in education as vital in cultural and economic development – alongside concern with raising standards of achievement in the traditional subjects. The impetus for creativity can be traced to the National Advisory Committee on Creative and Cultural Education (NACCCE, 1999), which recommended a core role for a democratic notion of creativity in learning and pedagogy. For a decade, increasing attention was paid to creativity in the curriculum (DCDF, 2006, 2007). Primary schools in particular were encouraged to innovate and offer a more integrated and creative curriculum (DfES, 2003). Policy developments encouraged integration of the arts, culture and education. Common across these policy documents was a commitment to ‘little c’ creativity (Craft, 2000, 2001, 2002), or everyday, lifewide creativity as well as creativity inherent within school subject domains. And thus, exploration of possibility – transformation from what is to what might be – was one way of exploring creativity in education (Jeffrey and Craft, 2006).

Whilst a change of government in 2010 signalled a change in perspective, a professional commitment to nurturing the creativity of students has continued to inform the development of pedagogy in the early years, primary and secondary education (eg Craft et al, 2011, Clack, 2011, Chappell et al, 2011).

The authors of this paper have collaborated over some years, theorising aspects of creativity in education, and focusing particularly on the concept of ‘possibility thinking’ at its core. Their focus has shifted from conceptual (Craft, 2000, 2001, 2002) to empirical work seeking to characterise ‘possibility thinking’ in children aged three to eleven.

This paper first outlines the theoretical background to the studies of ‘possibility thinking’ (PT), together with the previous two phases of empirical work. It then relates PT to the wider policy and research literature on creativity. Introducing Phase 3 of the PT studies, on which this paper focuses, the focus, research design and methodology are given and findings presented and discussed. Finally concluding



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3 thoughts are offered, relating the findings back to wider current and  
4 recent conceptualisations and empirical studies of everyday creativity  
5 in different parts of the world.  
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## 9 10 **Theoretical background**

11 The term, 'Possibility Thinking' (PT), was originally coined by Craft  
12 (1999) to represent a process which may be common across creativity  
13 in differing domains of enquiry and across life, as well as across  
14 differing levels of generative activity, from 'little c' to 'big c' creativity.  
15 Developed initially in conceptual work (Craft, 2000, 2001, 2002), it  
16 was encapsulated as the posing of the question 'what if?' in different  
17 ways and contexts, together with perspective taking, or 'as if'  
18 thinking. To this degree, it was argued that PT could be seen as  
19 involving the shift from 'what is this and what does it do?' to 'what  
20 can I or we do with this?'  
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27 In the early conceptual work, Craft suggested that this shift from what  
28 is to what might be involves questioning, imagination and  
29 combinatorial play (Craft, 1999, 2000). Using the concept in an  
30 ethnographic study in order to interpret the learning of primary  
31 children (aged 3-11), Jeffrey (2006) concluded that implicit within PT  
32 is engagement with problems. Working with Jeffrey's data, Craft and  
33 Jeffrey further suggested that it involves not only solving problems,  
34 but also finding and honing them (Jeffrey, 2006; Jeffrey and Craft;  
35 2004, Jeffrey and Craft, 2006).  
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41 Since 2004, additional qualitative empirical work to explore the  
42 nature of possibility thinking in classrooms in terms of both learning  
43 and pedagogy has been undertaken by an expanding group of  
44 researchers (e.g. Burnard, Craft and Grainger 2006; Cremin, Burnard  
45 and Craft, 2006). This examination of PT has involved several  
46 overlapping stages of naturalistic, qualitative co-participative enquiry.  
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51 Stage 1 (2002-2006) focused on PT and pedagogy with 3-7 year olds.  
52 The findings identified a number of distinct, but interlinked features  
53 of children's and teachers' engagement with PT, both valued and  
54 nurtured in the broader context of a playful enabling environment.  
55 These included the confirmation of posing questions as the driving  
56 process, alongside self-determination, play, immersion, innovation,  
57 being imaginative and risk-taking. Stage 1 also reported on  
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3 operational elements of pedagogy associated with nurturing PT.  
4 These included: standing back, placing high value on learner agency,  
5 and making time and space for creativity, as shown in Figure 1 (from  
6 Cremin *et al*, 2006).  
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11 **Insert Figure 1:** Stage 1 model of pedagogy and possibility thinking  
12 (Cremin, Craft & Burnard, 2006) here  
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15 Stage 2 (2006-7) focused on question-posing in Possibility Thinking  
16 with the narrower focus of 5-7 year olds, with additional data from  
17 the same settings. It led to the recognition that play and immersion  
18 provide the context for PT, as shown in Figure 2. Analysis also  
19 indicated that taking intentional action (coded action/intention) and  
20 autonomy and agency (coded self-determination) permeated the  
21 process. During Stage 2, being imaginative, risk-taking, question-  
22 posing and question-responding were identified as the core  
23 components of PT. *Innovation* was conceptualised as not only part of  
24 the process, but also a possible outcome of 'possibility thinking' and  
25 thus, potentially, a condition for attributing creative learning (Burnard  
26 et al., 2008).  
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34 **Insert Figure 2:** Stage 2 thematic focus here  
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37 The Stage 2 analysis also resulted in a *taxonomy* of children's  
38 question-posing and question-responding (Chappell et al, 2008a;  
39 Chappell et al, 2008b), revealing distinctive elements, and exploring  
40 the dynamic relationship between the two.  
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44 The fine-grained taxonomy of question-posing and question-  
45 responding was situated within the wider conceptual constellation of  
46 PT emergent from Stage 1, as summarized in Figure 3. This figure  
47 seeks to represent the dimensions at the heart of possibility thinking  
48 as evidenced from the empirical work thus far. The cone shape  
49 represents the degree of inherent possibility in what was possible  
50 regarding children's questions, from narrow to broad, with the choice  
51 of question frame type articulated at the centre of the cone. Within  
52 degrees of possibility there were three main types (or categories) of  
53 question: leading questions, service questions (which enabled the  
54 leading question to be followed) and follow-through questions  
55 (detailed questions enabling follow-through questions to be seen  
56 through). The variety of types (or categories) of question-responding  
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4 which might then be stimulated are represented (in no particular  
5 configuration) in the lower circle.  
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9 **Insert Figure 3:** Stage 3 taxonomy of question-posing and question-  
10 responding within Possibility Thinking here  
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13 By the end of Stages 1 and 2, the team was increasingly concerned to  
14 explore the extent to which the processes of PT and the pedagogic  
15 strategies identified might or might not be evidenced among older  
16 primary aged learners, particularly since in England the culture of  
17 performativity (Ball, 1999) was seen to be narrowing both curriculum  
18 and pedagogy (English et al., 2001; Jeffrey and Woods, 2009).  
19 Furthermore, stress among upper primary children appeared to be  
20 rising (as noted by Tymms & Merrell, 2007 in an independent review  
21 of primary education), and it was argued that curriculum overload  
22 and the backwash of high-stakes testing was limiting primary practice  
23 (Alexander, 2004; Grainger, 2004). A concern for the extent to which  
24 opportunities for nurturing children's creativity might be  
25 compromised in the upper end of the primary school led the team to  
26 begin a third stage of the study, this time with older learners.  
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35 This paper draws upon data from the resulting Stage 3, which  
36 involved research with 9-11 year olds in two new sites in England.  
37 Stage 3 returned to the original research questions and focused on  
38 **how PT is characterised in this age phase, and the nature of the**  
39 **related pedagogical strategies employed by teachers who foster PT.**  
40 Mirroring Stage 1, this third stage was also a collaborative,  
41 naturalistic qualitative enquiry. This paper reports on findings which  
42 address one of the two research questions of Phase 3 and focuses on  
43 characterising PT<sup>1</sup>. The particular research question, then, which is  
44 explored in this paper is **'What characterises possibility thinking as**  
45 **manifest in the learning engagement of children aged 9-11?'**  
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56 <sup>1</sup> A fourth stage of the study is under way with 3- to5-year-olds (Craft et al, 2011) and 5-to18-year-olds  
57 (Chappell and Craft, 2011). The latter is not discussed here; the former is referred to later. Neither does this  
58 paper refer in detail to other work on PT in other curriculum areas with 9-to11-year-olds such as drama (Lin,  
59 2010, 2011) and dance (Craft and Chappell, 2009, Chappell et al, 2009, Chappell et al, 2011) although work  
60 on PT in mathematics (Clack, 2011) is referred to later in the paper.

## **Situating Possibility Thinking in policy and wider literature**

The empirical work on PT is situated in a context in which creativity is increasingly valued by educational systems all over the developed and developing world. Whilst policy and research work in England, the location of the study reported here, had been at the forefront of such developments in the first decade of the 21<sup>st</sup> century, in 2010 a new government brought with it, as indicated above, a reverse in this trend. A White Paper for schools (DFE, 2010) and a consultation on the National Curriculum (DfE, 2011) promised a return to a narrower, knowledge-focused, core curriculum, without reference to skills, dispositions and attitudes and thus without reference to creativity. A performative, marketized school system was heralded, separating, as Fielding and Moss suggest (2010) government from society.

This work on PT seeks to contribute insights into the nurturing of creativity in the classroom. It acknowledges the distinction between 'big c creativity' which focuses on the work of the genius (such as the work of Gardner, 1993; Simonton, 1994) and 'little c' or 'everyday' creativity (such as the work of Craft, 2000; 2001, Kaufman and Baer, 2006; Plucker, Beghetto, and Dow, 2004; Sternberg, Grigorenko, and Singer, 2004). The PT work also seeks to explore what Beghetto & Kaufman (2007) call 'mini-c' creativity, in other words the processes involved in personal meaning-construction at an everyday level. Whereas for Beghetto and Kaufman, mini-c creativity provides a transformative foundation for later little c and big c creativity, the conceptual and empirical examination of PT, as will be shown, asserts the presence of mini-c meaning-making inherent in little c creativity.

In common with other creativity scholars (Moran and John-Steiner, 2003; Eteläpelto & Lahti, 2008; Rojas-Drummond et al, 2008), the PT work emphasises the influence of the social and cultural context in the construction of meaning and of creative endeavour. This contextual sensitivity encompasses the wider English cultural context in which this body of research has been located.

In England, since the late 1990s creativity in education has developed an increasingly high profile both in policy and research. A key policy landmark was the report from the National Advisory Committee on Creative and Cultural Education (NACCCE, 1999), (later reinforced by

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4 the Roberts Review 2006), which set an agenda and unlocked  
5 resource for schools and other agencies to begin to develop creativity  
6 in education more extensively. A 'democratic' approach to creativity  
7 was tabled in this report which saw the role of imagination harnessed  
8 purposefully to produce original and valuable outcomes. This was  
9 developed by the Qualifications and Curriculum Authority (QCA,  
10 2004; 2005) to produce an operational definition and application of  
11 creativity in the classroom which recognised imagining what might be  
12 as a key element.  
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18 The role of imagination in creativity appears undisputed. It is in  
19 understanding how the seed of imagination is manifest in classroom  
20 practice that the PT research seeks to make a contribution. It does so  
21 by examining how this seed comes to fruition through engagement  
22 (as discussed above), with increasing attention over time to the social  
23 context. For Beghetto (2007), what enables children to shift from  
24 internalised, mini-c creativity (making sense of the world), to manifest  
25 a new idea or possibility, which is recognised as such by others (and  
26 which he and Kaufman name 'little c' creativity, 2007), is the capacity  
27 he calls 'ideational code switching'. He proposes this concept as a  
28 metaphor to help teachers understand the capacity of learners to  
29 shift from intra-personal creativity (i.e. generating new ideas which  
30 are personally meaningful) to inter-personal creative expression (i.e.  
31 generating novel ideas which are interpersonally meaningful). For  
32 Beghetto (ibid), ideational code-switching involves moving from mini-  
33 c to little-c creativity with ease – akin to the ways in which multi-  
34 lingual speakers move between languages as appropriate.  
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45 Although Beghetto's theory was developing in the United States in  
46 parallel with the Stage 3 PT study, similar paths were being travelled.  
47 Whilst the early conceptual work on PT (Craft, 1997, 1999, 2000,  
48 2001, 2002) and some of the later work (e.g. Jeffrey and Craft, 2006)  
49 focused on the individual, the team's empirical work described here  
50 had increasingly moved, through the micro-analysis of Stage 2  
51 exploring question-posing and question-responding, to a focus on  
52 social context and engagement (Chappell et al., 2008). The Stage 3  
53 work was therefore particularly sensitised to the social context of the  
54 classrooms in which the data were collected, mindful of the  
55 arguments that everyday creativity is a social phenomenon (e.g. Miell  
56 and Littleton, 2004; Vass, 2007).  
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Conceived in these terms, the focus of the Stage 3 study as a whole, was *what characterises possibility thinking as manifest in the learning engagement of children aged 9-11 in the classroom setting, together with the pedagogy associated with it.*

In the light of this, the research outlined in this paper sought to:

- identify and compare commonalities and differences across sites in relation to dimensions of PT (question-posing and question-responding ranging from possibility narrow to possibility broad)
- clarify how strongly other categories of question-posing and question-responding (i.e. self-determination, intentional action, development, being imaginative, play/playfulness, immersion, innovation and risk-taking) are manifest and the strength and range of dimensions of PT.

The focus of this particular paper is thus on *categorising PT*. A separate strand of Phase 3 analysis has focused on pedagogical strategies which are associated with PT.

### **Research design and methodology**

A qualitative methodology was adopted as part of a naturalistic, collaborative inquiry using a case study approach in which the case was bound as classroom interaction **using purposive sampling using specific criteria discussed below**. Data collection was carried out in two state primary schools, one in East Anglia and one in the South West region of England. The South-West site involved two classes (children aged 9-10 years), and the East Anglia site involved just one class (children aged 10-11 years).

Selection of the research sites involved two sets of sampling criteria. First, schools were selected on the following contextual characteristics and criteria. Schools:

- with longstanding university partnerships
- who were serving comparable communities to one another
- with comparable pupil intake to one another
- who were facilitating high attainment among children
- with distinctive reputations for outstandingly creative and personal approach to teaching and learning.



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4 The second sampling and key feature of the criteria of classrooms  
5 selected involved teachers, focusing on those who:

- 6 - exercised formal or de facto leadership in the pursuit of  
7 creative learning and teaching in the school
- 8 - were identified by colleagues within and beyond the school as  
9 experienced
- 10 - were recognised (through professional organisations – for  
11 example local authority, national projects such as Creative  
12 Partnerships, or national organisations such as the  
13 Qualifications and Curriculum Authority as it was then known -  
14 and university partnerships with Cambridge, Exeter University  
15 or the Open University) as creative professionals
- 16 - were encouraging collaboration between children in distinctive  
17 ways (contrasts between the sites are discussed below).

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26 Building on research in which teachers introduce group work to  
27 investigate what happens when students are given more opportunity  
28 to engage in dialogue (Mercer, 2000, Mercer and Littleton, 2007,  
29 Wells 1999), data were obtained by collecting video records to  
30 develop deeper accounts of single groups of pupils working together  
31 on a problem-based learning engagement and activity which featured  
32 opportunities for creativity in learning.

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37 Video records of classroom interactions were a crucial component of  
38 the research plan. Video records of groups of children working on  
39 tasks were made and analysed to characterise the dimensions of  
40 possibility thinking as manifest in a range of learning engagement.

#### 41 42 43 44 **Ethics and data collection**

45 Informed consent was gained from children, their parents and from  
46 school staff, with the right to withdraw together with assurance of  
47 the anonymity of data, and secure storage of data. The two research  
48 assistants (Chappell and Dragovic) acted as non-participant observers.  
49 The study adopted strategic research principles for non-participant  
50 observation.

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56 Data elicitation methods included video observation, interviewing  
57 and the collection of documents. Around twelve lessons were  
58 observed in each site, across a range of curriculum areas including  
59 mathematics, English, geography, science and art. Each class lasted  
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3 approximately 1 hour, resulting in a total of 24 hours of video data in  
4 all. Teachers were interviewed (along with several introductory  
5 conversations) and documents such as students' work, photographs,  
6 curriculum guidelines and data on class planning as prompts during  
7 the interview were used.  
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12 It was, however, mainly through the content analysis, episodic  
13 indexing, coding, segmentation, analysis and comparison of videos of  
14 concrete circumstances (classroom activity, time, space, events,  
15 situations) that the theoretical and conceptual tracing/framing of PT  
16 was developed and refined. It is therefore on the video data that this  
17 paper draws.  
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### 21 22 **Data reduction**

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24 The data reduction involved the researchers narrowing in on four  
25 selected episodes (one from each of the classes visited in the South-  
26 West site and two episodes from the class visited in East Anglia). The  
27 episodes selected were considered by the team to be a  
28 representative corpus for descriptive codification. These were then  
29 subjected to extensive and focused analysis by all five researchers  
30 and analytic codes were developed through an iterative inductive and  
31 deductive process as discussed later in this paper.  
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### 37 38 **Contextualising the episodes**

39 The activities within which the episodes drawn upon in this paper  
40 were located are of relevance to note.  
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43 In the first episode, chosen from the South-West site (and undertaken  
44 with children aged 9-10), the curriculum focus was science and  
45 focused on investigating the melting of ice. The teacher introduced  
46 the activity through sharing a story which involved St Francis Drake, a  
47 dream and a living ice bird that cried tears which turned into ice-eggs.  
48 He then produced a large number of actual ice-eggs about the size of  
49 a large melon and handed them out the children, inviting them to  
50 work in groups for the day to design an experiment to investigate  
51 something about their ice egg, with a focus on melting. The episode  
52 chosen for closer analysis, comes from the early part of the day when  
53 the groups received their ice egg and began to think about what their  
54 experiment might encompass.  
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4 The second episode, also chosen from the South West site (and  
5 undertaken on the same day with children in the parallel class and so  
6 also aged 9-10), the teacher invited the children to explore the  
7 properties of magnets. There were five stations around the room  
8 with different magnets and accompanying activities, and groups of  
9 five rotated around these stations for around ten minutes at a time.  
10 A teacher or teaching assistant was on hand to offer assistance for  
11 the more complex tasks (the classification of objects in relation to  
12 their magnetic nature and an iron filings task exploring polarity). The  
13 remaining tasks ranged from completely open exploration of  
14 magnets, to using magnets on either side of a piece of paper to trace  
15 lines. The segment of the episode drawn upon for closer analysis,  
16 involved two boys exploring a box of different shaped magnets on the  
17 table top. What both episodes in the South West had in common was  
18 that they were set up to encourage collaboration.  
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27 The third and fourth episodes were both drawn from the East Anglian  
28 site (involving children aged 10-11 years olds), independently  
29 exploring a mathematics and an arts-based task respectively. Unlike  
30 the South West site, these tasks were set up as individual ones. In the  
31 former their teacher shared with them a few simple mathematics  
32 tasks and then asked them to solve more complex mathematics tasks  
33 on the worksheet with their 'talking partner'. The episode drawn on  
34 here comes from the early part of that task and shows children  
35 collaboratively working and helping each other towards increased  
36 understanding. In the arts task, children were working to create  
37 small-scale, layered clay houses, which would each eventually  
38 become a tile in a wall display. The teacher set an open-ended task of  
39 each child creating their own representation of an important local  
40 area houses/buildings and gave them time and space to explore how  
41 to do that. Video data collected shows the children first working on  
42 their own and then choosing to help each other and to co-operate.  
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### 51 **Data analysis and emergent coding**

52 Initially, two of these four video sequences were coded by the two  
53 researchers. Taking these key codes a further four video sequences  
54 were coded individually. A final two sampled videos were then coded  
55 and again this produced more codes. The final process was to recode  
56 all the video material by three independent researchers to ensure the  
57 validity of the coding system.  
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The analysis involved both inductive and deductive processes, the latter drawing on categories derived from the existing PT theoretical framework using the following definitions:

- i. question-posing: investigative behaviour, verbal and non-verbal
- ii. question-responding: behaviour responding to investigations by self and others, both verbal and non-verbal
- iii. self-determination: self-directed actions, self-chosen
- iv. intentional action: activity/behaviour having a clear goal
- v. development: thinking moving forwards
- vi. being imaginative: "as if" thinking
- vii. play/playness: being in an 'as if' space, improvising
- viii. immersion: concentration, absorption, orientation
- ix. innovation: original /unique outcome/behaviour
- x. risk taking: danger, failure, fear, 'going to the edge'

As will be seen in the next section, these categories, or features, are listed here in order of degrees of strong, medium to weak evidence strength, meaning depth and range of data.

In addition to the deductive analysis, through the inductive analysis the team remained open to the identification of new features of the concept of PT.

### **Findings and discussion**

The data analysis revealed key features (reflecting previous research on possibility thinking; definitions in previous section) in relation to the research question ***'What characterises possibility thinking as manifest in the learning engagement of children aged 9-11?'***

The features varied in depth and range and were interpreted in relation to degrees of strong, medium to weak evidence strength. This enabled the researchers to identify similarities and differences between sites, as shown in Table 1.

**Insert Table 1: Range of evidence across the sites here**

As can be seen from Table 1, some features of PT were evidenced consistently strongly across sites, and the feature least evidenced was risk-taking. Three elements struck the team as particularly interesting

among these 9- to 11-year olds; two extending previous studies and one introducing a new feature as follows.

**Element 1: The ways in which question-posing (Q-P) and question responding (Q-R) manifested**, as distinct from findings in Phase 2 with younger children (Chappell et al, 2008)

**Element 2: The reinforcement of some features of PT and the continuing absence of risk**, reflecting findings from Phase 2 with younger children (Burnard et al, 2006) though contrasting with later work with younger children (Craft et al, 2011).

**Element 3: The emergence of collaboration as a feature**, later also identified in a further study of younger children (Craft et al, 2011).

Findings in relation to each of these three elements are now presented and discussed in turn.

#### **Element 1:**

##### ***Ways in which question-posing and question-responding manifested***

Question-posing we defined as both verbal (V-Q-P, i.e. verbalisations using question words such as what, how, etc and verbalised questions where the question itself was inherent within the child's intonation) and non-verbal (N-V Q-P, i.e. where questions were inherent in behaviour). All of the focus episodes for this study offered evidence of verbal question-posing but non-verbal question posing was not consistently present at the East Anglian site. Yet, whilst it was not evident in a collaborative mathematics activity which focused on small group problem-solving using the concept of compound area, what was evident was a *questioning stance*.

The following vignettes offer brief examples of verbal and non-verbal question-posing.

In the South West site, as the ice-eggs are placed on the children's work-tables, a babble of excited questions can be heard from all of the children in the room. At a table close to the camera, the children exclaim as they notice details about the egg, for example: "Look at it, it's got all these little bubbles in it". They wonder how to begin their investigation formally, and

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4 use 'leading questions' (Chappell, 2008b), for example: "What  
5 do we do for our experiment?" Other questions are also  
6 recorded, which enter the realm of 'as if' or the imagination, for  
7 example, "What shall we call it?" Their non-verbal questions are  
8 implied in their body language as they crane in, frowning,  
9 focusing, pointing, leaning in squinting close to the ice-egg their  
10 group is investigating.  
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15 In the East Anglia site, during the episode involving the  
16 construction of the clay houses, direct questions can be heard,  
17 such as "Can I borrow this"? Using the taxonomy developed  
18 from the earlier study of younger children (Chappell et al, 2006),  
19 such questions can be seen as 'service questions' enabling an  
20 already-defined job to be done. Many non-verbal questions  
21 can be observed as children consider their own clay tiles, and  
22 develop the designs on them, appraising their work as they  
23 further embellish it.  
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30 During the mathematics investigation episode in the East Anglia  
31 site, we hear other service questions which support the thinking  
32 necessary to develop a response to the task set. For example,  
33 we hear one partner say to the other, "what you're doing is you  
34 are adding this little side to that side here and that means that  
35 inside here has to be a box but there is no box?" It is notable  
36 that there is little *non-verbal* questioning in this mathematics  
37 episode, which may be reflect the children's intellectual or  
38 conceptual interaction rather than the physical interaction  
39 undertaken with the clay houses.  
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46 What the analysis revealed, then, was that the children's questioning  
47 stance evident in each of these classroom activities, was evidenced  
48 both verbally and non-verbally (through expression, gesture and body  
49 language). The absence of non-verbal questioning in one of the  
50 activities (the mathematics one) may have reflected the degree of  
51 conceptual vs practical engagement inherent in the domain and  
52 activity.  
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57 Question-responding (Q-R) we defined as verbal or non-verbal activity  
58 responding to a question by testing, predicting, undoing, accepting,  
59 rejecting, evaluating, compensating, completing, repeating. The  
60 analysis showed evidence of both accepting and rejecting across all

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3 episodes, suggesting that these processes may be dynamics of  
4 question-responding.  
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8 The following vignettes offer brief examples of verbal and non-verbal  
9 *accepting* and *rejecting*.  
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12 In the South-West site, Joel and Kit<sup>2</sup> were engaged in making a  
13 model of a man out of magnets. The video sequence shows  
14 the boys both verbally and non-verbally *accepting and*  
15 *rejecting* one another's ideas of where the magnets should go  
16 – to make eyeballs, a 'mini me, and a sun – exploring as part of  
17 this how the magnets connect and hold together.  
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22 In the East Anglia site, in the clay houses episode, the  
23 researcher's fieldnotes document the apprenticeship of one  
24 child by another: "The girl looks and listens to Chris<sup>3</sup>  
25 attentively for a few seconds, while Chris is demonstrating  
26 what to do then she starts rolling clay into a sausage" –  
27 *accepting* the suggestion of using this technique.  
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32 Also in the East Anglia site, in the maths investigation episode,  
33 the *question-responding is verbal*, as with the question-posing.  
34 In this example, first Rhiannon<sup>4</sup> says: "You can't do it because  
35 you don't know what that is and you don't know what that is  
36 because you need to work out what that is". Mae<sup>5</sup> rejects her  
37 idea by saying: "I know it's 10 metres... If you do that and then  
38 you do that..." - thus using the statement to springboard her  
39 own suggestions in.  
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46 Whilst accepting and rejecting were found in all episodes whether  
47 expressed verbally or not, other aspects of question-responding were  
48 also found though not as consistently. Thus, in the ice-egg episode,  
49 predicting, testing and evaluating were all evidenced. In the magnet  
50 man, clay houses and mathematics investigation episode, these were  
51 evidenced in a more exploratory way alongside completing,  
52 repeating, compensating, undoing.  
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59 <sup>2</sup> All names have been changed

60 <sup>3</sup> All names have been changed.

<sup>4</sup> ditto

<sup>5</sup> ditto

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4 The analysis of these episodes suggests, then, that *accepting* and  
5 *rejecting* – expressed verbally and non-verbally - may be core  
6 components in question-responding, whilst other elements of  
7 question-responding are evidenced according to the activity involved.  
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11 Although there were similarities with what had been found  
12 previously, the question-posing and question-responding utterances  
13 and gestures evident in these episodes with older children were  
14 distinct from those we had previously witnessed with younger  
15 children (Chappell et al, 2008) in the breadth of possibility inherent in  
16 the task children were engaging in. Rather than investigations being  
17 driven by child-initiated exploration, each learning activity in this  
18 analysis was framed by a very clear boundary by the teachers and  
19 thus was inherently perhaps narrower in terms of possibilities that  
20 could emerge.  
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27 Thus for example the ice-egg at the South-West school was set up as  
28 a scientific investigation and whilst several children are documented  
29 in the video material as immersed in awe and wonder, and in the  
30 imagination of the story which led to (and could come from) these  
31 'eggs' appearing in the classroom, their focused work was actually on  
32 devising a scientific investigation, which narrowed their possibility  
33 thinking. Similarly, the making of clay houses was set up with clear  
34 parameters by the teacher: the house had to be complete within one  
35 class session, it must not be too three-dimensional because it would  
36 sit on a wall (and thus must not protrude too far), it was to be a  
37 standard size, it was to fit within a historical theme. The children  
38 were therefore working with a task which had inherently narrower  
39 possibility than it might have had.  
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47 In addition, then, to the revealing of accepting and rejecting as core  
48 elements in these episodes, the *breadth of inherent possibility was*  
49 *framed much more tightly by teachers' framing of the tasks* in which  
50 these children were engaging. This contrasted with earlier studies  
51 where children had initiated more of their own activity. **There are**  
52 **implications here for how teachers frame creative activities for**  
53 **children.**  
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### ***Element 2:***



### ***Reinforcement of some features of PT and continuing absence of risk***

It was notable that, other than the question posing and question responding, three other key features previously identified in episodes of PT with younger learners, were also identified strongly here:

self-determination: self-directed actions, self-chosen

intentional action: activity/behaviour having a clear goal

development: thinking moving forwards

Two further features were strongly evidenced in the South West site:

being imaginative: “as if” thinking

Play/playfulness: being in an ‘as if’ space, improvising

These two features were however only evidenced to a ‘medium’ degree in the East Anglian site. When the wider context of each of the episodes is considered, it can be seen that the two South West episodes were highly playful in nature, one of them (the ice-eggs) involving the suspension of disbelief, and the other (the magnets) involving playful exploration. In the East Anglian site, the two episodes were less inherently playful, involving mathematical problem-solving using shape formulae in one episode, and involving the construction of a clay tile representing a house. In the two East Anglian sites there is thus less inherent opportunity to play or to operate ‘as if’. This may in part be explained by the fact that in this classroom the children are a year older, and in their final year of primary school. One of the features of this final year of school is the final assessments undertaken by all children in core subjects which include mathematics. Schools are under pressure to maintain high pupil achievement due to performative pressures that judge not only children’s own worth but the performance of schools and teachers by these results.<sup>1</sup> **There may perhaps therefore be implications here for teachers in considering, in the face of performative pressures, how to offer older primary children opportunities for immersive, playful activity that may nurture their creativity by enabling them to engage in ‘as if thinking’ and encouraging self-determination, intentional action and forward-thinking.**

Interestingly, informed by strength of evidence (analytic mechanism as discussed prior to Table 1), there seemed to be an equal degree of medium to strong immersion by children (i.e. concentration,

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4 absorption) in the two sites, despite the difference in the inherent  
5 playfulness, and in each site it seemed to the research team that  
6 there was an equivalent degree (medium) of pupil innovation (i.e.  
7 generating original or unique outcomes). This suggests that, although  
8 the episodes in one site were inherently more imaginative than those  
9 in the other, this may not have been important in relation to  
10 children's capacity to be deeply involved in their learning and to  
11 generate creative work.  
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16 Intriguingly, in both the South West and the East Anglian sites  
17 however, *risk-taking by pupils seemed to be absent*. This reflected  
18 the earlier empirical work with younger children in PT Phases 1 and 2,  
19 although a later study of younger children (Craft et al, 2011) has  
20 identified risk-taking in child-initiated play. **In the case of these**  
21 **children aged 9-11 the absence of risk-taking may reflect the teacher**  
22 **control over the nature of the task in each case; as this was the**  
23 **teacher's agenda, the children were undertaking their creative work**  
24 **on the teacher's terms**. It may also possibly say something about the  
25 code of accepted conduct within these classrooms where the  
26 teacher's framing of creative work was not challenged by the  
27 children. Equally it could be that risk-taking was occurring but our  
28 approach to the research did not detect it. The fact that risk-taking  
29 was absent however does raise the question of whether it is actually  
30 necessary to possibility thinking.  
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### 40 ***Element 3: Collaboration as an emergent feature***

41 An emergent feature which became apparent from the analysis in  
42 both of these sites, was much greater opportunity for and success in  
43 collaboration in groups. This we defined as PT happening so as to  
44 build ideas together – rather than individuals working in relation to  
45 one another. There was evidence in most episodes of collaboration in  
46 groups as important. Apprenticeship (children showing one another  
47 ways of approaching their work through their behaviour, and  
48 modelling actions on the behaviours of others) was seen occurring  
49 between peers during collaborative work – as shown in the small  
50 vignette regarding the clay houses given earlier.  
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57 The emergence of collaborative creativity in the classroom is  
58 increasingly documented in a range of contexts. These include, for  
59 example, collaborative creativity in the upper primary age group in  
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dance (Chappell, 2006), in creative writing (Vass et al, 2008) and in mathematics (Clack, 2011). Some of this research is specifically focused on possibility thinking; Clack's work, which explored possibility thinking in children aged 9-11 in the mathematics classroom, identified co-operating and collaborating as one of four features of children's mathematical PT behaviour.

More recent possibility thinking research (Craft et al, 2011) has also revealed collaboration in possibility thinking enacted by much younger children, too. **There may be implications for teachers in considering how collaborative creativity can be acknowledged and encouraged in older primary learners.**

### **Discussion and conclusion**

Overall, the analysis brought out commonalities across the two sites, in terms of both presence and absence, and one new feature. Features more strongly present are given in bold, as shown in Table 2.

**Insert Table 2: commonalities between sites** here

In Phase 1 of the earlier PT work, with younger children (Burnard et al, 2006), the characteristics of PT had been characterised in terms of process, outcome and a mix of both, as follows in Fig 4.

**Insert Figure 4: Possibility Thinking in 3- to 5-year-olds from Burnard et al, 2006** here

What the current study reveals is the relative strength (or in the case of risk-taking, absence) of these features, and introduces the new context of peer collaboration, as represented in Fig 5, which also acknowledges the enabling task and associated pedagogy (the latter of which is only briefly discussed in this paper). **Peer collaboration perhaps warrants greater attention by practitioners keen to nurture children's creativity in this pivotal phase of childhood.**

**Insert Figure 5: Possibility Thinking in 9-to 11-year-olds (the present study)** here

As will be seen, in Fig 5, 'Play' has been moved into 'process-outcome' close to 'Imagination' reflecting overlap, in this study,

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4 between imaginative and playful behaviour which was particularly  
5 striking given the older age group of 9-11 year olds. **Again there are**  
6 **implications here for practitioners in nurturing playful potential**  
7 **through immersive and imaginative contexts, in the learning of**  
8 **children who are in the upper part of the primary school.** It could be  
9 that the distinctions and synergies between imaginative behaviours  
10 and playfulness in PT could be fruitfully explored in future studies.  
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15 Further areas for investigation in new studies **and thus in the**  
16 **development of practice**, would be the weaker presence of both  
17 immersion and innovation, and the complete absence of student risk-  
18 taking. The strongly performative environment of the wider national  
19 schools context in England where this study was undertaken, means  
20 that schools need to balance the fostering of student creativity with  
21 ensuring high attainment. This latter in turn reflects on **how creative**  
22 **potential is framed by** teachers and on the school as a whole. It is  
23 possible that, in such a context, teachers retain greater control over  
24 the curriculum and learning than they might otherwise do, because  
25 encouraging risk-taking by students may be seen as a potential threat  
26 to high attainment (or even to creativity). It may be that the lower  
27 degree of student immersion and the weaker evidence of student  
28 innovation reflect this greater teacher control. Given the more recent  
29 study of possibility thinking in child-initiated play (Craft et al, 2011)  
30 which revealed children highly immersed, innovating and indeed  
31 taking risks, further studies could help deepen understanding and  
32 characterisation of what opportunities for PT children experience,  
33 and the degree to which risk-taking is necessary to PT.  
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45 Finally, the nature of peer to peer collaboration between pupils in  
46 possibility thinking episodes could be further investigated **not only by**  
47 **practitioners but also by researchers**, in particular exploring the  
48 nature and dynamic of apprenticeship relationships between  
49 children.  
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### 53 **Concluding thoughts**

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56 This study has sought to generate further evidence-based analysis of  
57 PT and to explore further, how PT drives creativity in the classroom.  
58 Drawing upon situated creative learning perspectives, the researchers  
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3 sought to identify in these new classroom contexts the range of  
4 dimensions and categories of PT and what role PT plays in creativity.  
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8 The research reported in this paper revealed children working with  
9 ideas collaboratively, recognising one another's ideas and building  
10 these into personal and collective responses to tasks spanning the  
11 investigation of the properties of ice-eggs, construction of a magnet  
12 man, mathematical investigations and making their own personal clay  
13 tile. Whether working on a product which would be eventually a  
14 personal one (in the case of the clay tile) or a collective outcome (as  
15 with the ice-eggs, magnet man and mathematical investigations), the  
16 children were demonstrating Beghetto's (2007) 'ideational code  
17 switching' (discussed earlier). They were, in other words, able to  
18 share their ideas with others and have these recognised.  
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25 Children documented in this study were thus making the transition  
26 from their own internal meaning-making or mini-c creativity to  
27 sharing that with others, or what Beghetto and Kaufman (2007) call  
28 little c creativity. Whilst for Craft (2005) the intrapersonal and  
29 interpersonal dimensions are all part of little c creativity, what this  
30 study of possibility thinking offers is some insight into the processes  
31 at work as children make the transition from their own to shared  
32 creativity. It is hoped that, to this degree, it may offer some  
33 contribution to the as yet separately traversed territory explored by  
34 the conceptual work undertaken by Kaufman and Beghetto in the  
35 USA and the empirical and conceptual work by the authors of this  
36 paper and others researching PT in England and Taiwan (eg Clack,  
37 2011, Lin, 2010, 2011). The degree to which PT as an evidence-based  
38 concept can help to shed light on what drives everyday creativity and  
39 how, is for others to judge.  
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#### 49 **Acknowledgments**

50 **The team thank all of the children and teachers participating in earlier phases of**  
51 **this study. In addition, we wish to acknowledge the contribution made by**  
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53 **the PT work, and the funders: Cambridge, Exeter and Open Universities.**  
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#### 56 **Biographical notes**

57 DELETED FOR PEER REVIEW  
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56 <sup>i</sup> SATS as they were known, were undertaken by all Year 6 classes in the year we collected this  
57 data. Some schools have since chosen to boycott these controversial assessments.  
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