Chapter 7

Creativity outcomes of arts education

In this chapter we review the effects of arts education on creativity, examining separately the effects of multi-arts education as well as music, visual arts, theatre, and dance. Despite the common assumption that arts education teaches creativity, we found little evidence for this hypothesis in the area of multi-arts and visual arts education. We did, however, find some support for this hypothesis in the area of theatre and dance. We suggest that the lack of support for this hypothesis may be due to the limited way in which creativity is measured, to the small number of studies, and to the fact that not all arts teaching pushes students to think creatively.

The arts are commonly associated with creativity. Artists are our prime social role models for creativity and innovation. Even practiced in an amateur capacity, the arts are typically seen as activities like play, where one can express one's imagination, express one's self, and be "creative." These assumptions generally inspire educational programmes based on the arts, with the hope that students' creativity will be enhanced and possibly transfer to other academic subjects.

Why should arts education engender creativity? One hypothesis grows out of Hetland, Winner, Veenema and Sheridan's (2013) analysis of visual arts teaching. As described in Box 4.1, they found that visual arts teachers continually asked student to take risks, experiment, try new things, and thus to extend themselves beyond what they had done before. This was coded by Hetland et al. as asking students to "stretch and explore." If this kind of discourse is common in all kinds of arts classes,

we might expect arts classes to train students to be more creative, at least in the domain of the art form in question. Whether this habit then transfers to other areas is an open question.

We distinguish sharply here between "little-c" and Big-C" creativity. Big-C creativity refers to the kinds of major innovations that revolutionise a domain: e.g. Einstein's theory of relativity, Darwin's theory of natural selection, Picasso and Braques' invention of cubism, Martha Graham's invention of modern dance (Csikszentmihalyi, 1996). These are innovations that leave a domain forever changed. Little-c creativity refers to the activity of discovering how to solve a problem on one's own (even if the solution is already known by others) or solving problems in unusual ways. This kind of behaviour requires thinking in new ways, but does not lead to big changes in a domain. No child can be Big-C creative: one must first master a domain before one can change it (Gardner, 1993; Winner, 1996).

When psychologists and educators attempt to quantify creativity, they most typically use the Torrance Tests of Creativity developed by Paul Torrance in 1966. These tests, consisting of both a verbal and a figural (visual) measure of creative thinking, assess four aspects of "divergent" thinking: fluency, flexibility, originality, and elaboration. Sample tasks on the verbal form include imagining how to improve a stuffed toy animal so that it would be more fun to play with; imagining what would happen if something improbable occurred, such as people gaining the ability to move themselves from location to location by winking; or coming up with unusual ways to use a common object such as a brick. The figural form includes drawing and giving a title to the drawing, and naming an unusual looking design by answering the question "What might this be?".

These tests are "domain-general" in that they are meant to assess a general factor of creativity, rather than level of creativity in a specific area such as music or mathematics or visual arts, etc. Thus some have questioned the predictive validity of these tests (e.g. Baer, 1993). However, Millar (2002) demonstrated that children who scored high on these tests were more likely than those who scored low to enter creative professions as adults – they become entrepreneurs, inventors, authors, software developers, and were more likely to get awards for creativity, or to become involved in the arts. It is most likely that these creative adults were little-c rather than Big-C creative.

Plucker (1999) reanalysed Torrance's data using structural equation modeling and demonstrated that about half of the variance in adult creative achievement could be explained by Torrance's divergent thinking test scores – which was more than three times the variance explained by IQ. Creative achievement was again most likely not Big-C creativity (as this kind of creativity is so rare). Creative achievement was measured by number of publicly recognised creative achievements such as inventions, published articles, creativity awards, as well as by judges' ratings of the level of creativity of participants self-listed three most creative achievements.

Plucker's (1999) finding suggests that despite all of the criticism of domain-general paper and pencil tests of creativity, such tests actually do predict later creative achievement.

While IQ scores have been rising about ten points with each generation (probably due to our increasingly urban and enriched environments), it was recently reported that creativity test scores in the United States, which had been steadily rising until 1990, are now falling (Kim, 2010)[1]. This analysis was based on almost 300 000 Torrance scores of both children and adults. Apparently the scores of American children in kindergarten through 6th grade (which means from about ages 5 to 11) have been declining the most steeply.

A very different measure of creativity was developed by Getzels and Csikszentmihalyi (1976) in a study of adult visual arts students. The authors argued that true creativity does not consist in solving a known problem, but often calls for finding a new problem to solve. This was a domain-specific measure of visual arts creativity and it was termed a measure of "problem finding" rather than problem solving. Visual arts students were given a wide variety of objects and were told to make a drawing that incorporated any of the objects they wished. Problem findings was measured in a number of ways, including time spent exploring the objects, and time spent experimenting with a drawing on paper before reaching "closure" on the drawing. We know of no attempts to develop problem finding measures of creativity in other arts domains.

The renewed focus of schools on preparation for standardised tests is criticised for not being the way to enhance creativity (e.g. Looney, 2009). Many arts educators have bemoaned the fact that by cutting out the arts from school curricula we deprive children of one excellent route to becoming more creative. And of course creativity is considered an important outcome – both for educational reasons as well as for economic development.

But is there an established link between any form of arts education and performance on standardised tests of creative thinking? Does studying the arts lead to enhanced critical and creative thinking either within arts class or outside of the arts?

No studies have yet examined whether creativity in the arts is enhanced in arts classes, though surely strong arts teachers do teach their students to work and think creatively in the art form they are being taught. The study by Hetland et al. (2013) analysing the studio habits of mind stressed by visual arts teachers (see Box 7.1) does report that teachers pushed students to "stretch and explore," to go beyond their usual limits and try new things. Thus teachers were pushing their students to be creative. But note that no measure creativity in art was given to these students. All that we can conclude from this study is that teachers tried to get students to work creatively in the visual arts; we cannot conclude from this study that creative behaviours were actually learned. However, it seems highly likely that in strong arts classes with excellent teachers, students do learn to work creatively in the art form.

A number of studies have investigated the relationship between arts education and creativity using paper and pencil creativity tests such as the Torrance test. As shown below, many report positive associations. We found studies examining creativity and multi-arts instruction, visual arts, theatre, and dance, but none examining this specific question with respect to music instruction.

Multi-arts education and creativity

REAP meta-analyses of multi-arts education and creativity

The claim that multi-arts instruction boosts creativity seems more plausible than the claim that such instruction boosts verbal and mathematical test scores, since the arts are an arena where students can really be encouraged to be creative.

Correlational studies

One of the reports of the Reviewing Education and the Arts Project (REAP) meta-analysed ten correlational studies assessing the claim that arts instruction boosts creativity (Moga, Burger, Hetland and Winner, 2000) (listed in Table 7.1). All of these studies used as their outcome measures standard paper and pencil creativity tests, and compared the creativity test scores of students who took arts courses vs. those who did not. The weighted mean effect size was r = .28 (equivalent to a d of about .6), and the *t*- test of the mean Zr was significant, showing that this effect could be generalised to new studies.

Table 7.1. **Ten correlational studies on the relationship between multi-arts education and creativity outcomes**

Study	Positive relationship	Mixed, null, or negative relationship
Burgart (1961)	X	
Burton, Horowitz, and Abeles (2000)	X	
Hamann, Bourassa, and Aderman (1991)	X	
Howell (1990)		X
Even (1963)		X
Skipper (1969)		X
Skipper (1969)		X
Dillard (1982)	X	
Even (1963)		X
Luftig (1993)	X	
Weighted mean		X

Note: The full results are presented in Table 7.A1.1.

Source: Moga *et al.* (2000).

Quasi-experimental or experimental studies

Moga et al. (2000) meta-analysed three studies with verbal creativity outcomes. These studies were either quasi- or true experimental studies (the report did not distinguish these two kinds of studies). Table 7.2 lists the three studies identified with verbal creativity outcomes. Here a weighted mean effect size was $r = .003$, and the *t*- test of the mean *Zr* for this tiny effect was not significant.

Table 7.2. **Three quasi-experimental or experimental studies on the effects of multi-arts education on verbal creativity outcomes**

Study	Positive relationship	Mixed, null, or negative relationship
Even (1963)		X
Skipper (1969) (females)		X
Skipper (1969) (males)		X
Weighted mean		X

Note: The full results are presented in Table 7.A1.2.

Source: Moga *et al.* (2000).

Moga et al. (2000) also meta-analysed three studies with figural creativity outcomes (and again the report did not distinguish between quasi- and true-expeirmental studies. Table 7.3 lists the three studies identified with figural creativity outcomes. A weighted mean effect size of $r = .15$ was found, but the *t*- test of the mean *Zr* was not significant, so that we cannot generalise this finding to new studies.

Table 7.3. **Three quasi-experimental or experimental studies on the effects of multi-arts education on figural creativity outcomes**

Study	Positive relationship	Mixed, null, or negative relationship
Dillard (1982)	X	
Even (1963)		X
Luftig (1993)	X	
Weighted mean		X

Note: The full results are presented in table 7.A1.3.

Source: Moga *et al.* (2000).

Box 7.1. Multi-arts education and creativity: Is it the arts or the innovative teachers?

Among the studies assessing the relationship between arts and creative thinking is a study by Burton, Horowiz and Abeles (2000). They studied 2 406 students in the 4th, 5th, and 8th grades who were either given an arts integrated curriculum or the arts taught as separate subjects by arts specialists. Some schools were classified as arts rich while others were considered arts poor, as defined by the quantity of arts programming. Children in the top quartile of high arts exposure schools were compared to those in the lower quartile of arts exposure. High arts children scored higher on the Torrance Test of Figural Creativity (although no statistics were reported).

This study is difficult to interpret because the teachers in the arts rich schools were also more innovative (as measured by teacher self-ratings). If the teachers in the arts rich schools were really more innovative (and it is hard to tell based on self-reports), then it is possible that teacher innovation is the factor that led to greater creativity.

We found one quasi-experimental and two experimental studies since REAP investigating the effects of multi-arts education on creativity (Tables 7.4 and 7.5).

Byun (2004) studied the impact of the Arts Educational Program with Picture Books (AEPPB) on creativity among 111 5-6 year old children from similar socio-economic backgrounds living in the Seoul and Kyonki provincial areas in Korea. While the control group received the usual programme, the 61 young children in the experimental groups had three types of instructional activities with picture books: after the collective study of the book with the teacher, children were asked to either draw or paint a picture related to the story, express their feelings about the story with musical instruments (tambourine, castagnettes, etc.), or invent the continuation of the story, before sharing their thoughts about their production and its relationship to the story. In this 10-week experiment, creativity in language, fine arts and body expression was measured with the Korean Comprehensive Creativity Test for Young Children (K-CCTYC) and creativity in music was measured with the Measures in Creativity in Sound and Music (MCSM) test. While the two groups showed no difference on both tests at the beginning of the intervention, the experimental group exhibited statistically significant higher scores in all forms of creativity after participating in the programme.

Garaigordobil and Pérez (2002) assessed the effects of the Ikertze arts programme on verbal and figural creativity with 6-7 year old children (first grade). The intervention involved 89 experimental and 46 control students who were randomly assigned in their groups. The experimental groups followed the Ikertze arts programme that implements a coordinated pedagogy based on the parallel exploration of related concepts in visual art, music, and drama. For example, as emptiness and fullness will be explored in visual art, there will be work on sound and silence in music and on stillness and movement in drama. The control group, which did not differ in its characteristics or prior exposure to arts education from the experimental group, followed the traditional curriculum in arts education (which covers the three art

forms of the intervention). The authors found a positive effect of the multi-arts programme on verbal and figural creativity, as measured by the Torrance Tests of Creative Thinking and the *Test de Abreacción para Evaluar la Creatividad* by De la Torre. In a diferent paper based on the same intervention, Garaigordobil and Pérez (2001) also find positive effects of their intervention on motor creativity (measured by another Torrance creativity test).

While one multi-arts programme with a specific pedagogy has a proven positive impact on creativity, this does not allow us to conclude that any multi-arts education will have this effect. It makes it clear though that arts education taught in certain ways can boost some aspects of creativity.

Table 7.4. **One quasi-experimental study on multi-arts education and creativity (kindergarten)**

Study	Positive results	Negative results
Byun (2004)	X	

Table 7.5. **Two experimental studies on multi-arts education and creativity**

Study	Positive results	Negative results
Garaigordobil and Pérez (2001)	X	
Garaigordobil and Pérez (2002)	X	

Although there is a robust correlation between multi-arts education and general creativity, and a number of positive findings, there is not enough evidence thus far to support the hypothesis that multi-arts education raises children's performance on paper and pencil creativity tests. Experimental studies have so far failed to produce findings that can be generalised. And even when studies did report a positive effect, no evidence was reported that the students used their increased creativity skills anywhere but on these measures of creativity.

Future research should investigate whether creativity in specific academic disciplines is actually affected by participation in art education programmes. Future research should also examine more qualitative creative thinking outcomes, such as the ability to find new problems (Getzels and Csikszentmihalyi, 1976), or the tendency to be curious and ask unusual questions.

The REAP investigators did not investigate creativity outcomes for specific art forms. Studies assessing creativity outcomes for specific art forms are reviewed below.

Music education and creativity

We were not able to find any studies examining specifically whether music education improves children's domain-generic creativity. In a quasi-experimental study about the effects of integrated mathematics and music activities in

kindergarten, Lee and Kim (2006) find no effect of their pedagogy on musical creativity (measured by the Recording Skill Development in Music test), but this may be due to the maths focus of the pedagogy (see Chapter 3, Box 3.5). We did also identify one study comparing musicians to non-musicians on divergent thinking: it demonstrates enhanced divergent thinking in musicians (Gibson, Foley and Park, 2009).

Visual arts education and creativity

Adult studies

In a correlational study, Morrison (2001) found that psychology students' self-reported involvement in the visual arts was related to performance on a visual creativity task in which one must create a new shape from a given shape. Involvement in the visual arts predicted more innovative (divergent) solutions to this problem. What is known about visual arts education and creativity in children?

Quasi-experimental studies

We identified two quasi-experimental studies assessing the relationship between visual arts education and creativity, summarised in Table 7.6.

Korn (2010) assessed a programme at New York's Guggenheim Museum called Learning Through Art (LTA) in which students created visual arts projects. Teaching artists often focused on problem solving skills, and they taught students to think intentionally and make deliberate choices. We consider the outcome of problem solving to be similar enough to creativity (since they were looking for innovative solutions to problems) to include this study here. The goal of the study was to determine whether LTA had a positive effect on students' problem solving skills. The study examined 418 fifth grade students from six schools: three schools received the LTA programme and three did not. One of the outcome measures assessed problem solving strategies on an artistic task: students were asked to design a miniature chair in 15 minutes using at least three different materials given to them in a bag (e.g. felt, glue, paper, scissors, etc.). Students were observed as they worked and were interviewed after completion on the process they used to solve this task. On three qualitative measures, LTA students performed better than control students: LTA children made more intentional choices; they felt less frustrated when they encountered obstacles; and they were more likely to name other materials that they might have used that were not available when they were explicitly asked what other materials they might have used. However, LTA students also scored lower than control students on the extent to which they tested the properties of the materials they were using (a measure of experimentation). In other areas (imagining, other forms of experimentation, recognising resources, and connecting their ends and aims), no differences between groups were found.

Catterall and Peppler (2007) compared two groups of third graders in inner city schools – those receiving high quality visual arts instruction over the course of

20 and 30 weeks and those at the same school not receiving any special visual arts instruction. Children in the arts groups rated themselves significantly higher than those not in the arts on one of these measures – originality. Originality was measured by questions asking them how good they thought they would be at inventing new kinds of toys. Since the measures were self-ratings, we cannot be very confident that students actually became more original – but only that they believed they had.

Table 7.6. **Two studies assessing relationship between learning in visual arts and creativity**

Study	Positive findings	Negative/inconclusive findings
Korn (2010)		X
Catterall and Peppler (2007)	X	

Evidence showing that visual arts education boosts creativity is weak. Out of three studies, two reported positive effects. But both of these were based on self-report.

Theatre education and creativity

Correlational studies

We found one correlational study examining the relationship between theatre education and creativity, listed in Table 7.7. Yeh (2008) reported that involvement in drama is associated with higher levels of creativity in preschoolers. Groups of preschoolers who had previously received either a high, medium or low amount of drama instruction were measured on the Preschoolers Creativity Test. Results showed that the group of preschoolers with the most drama training scored highest on creativity, followed by the group with a medium amount of training, with the preschoolers with the least drama training scoring the lowest.

Table 7.7. **One correlational study assessing relationship between learning in theatre and creativity**

Study	Positive findings	Negative/inconclusive findings
Yeh (2008)	X	

Experimental studies

We identified two experimental studies assessing the relationship between theatre/drama education and creativity/problem solving, summarised in Table 7.8.

In an experimental study, Warger and Kleman (1986) examined the effects of theatre on the creativity scores of four kinds of 6-10 years olds. These children were either institutionalised behaviour disordered, non-institutionalised non-behaviour disordered children, institutionalised non-handicapped children, and non-institutionalised non-handicapped children. In each group, children were randomly assigned to 30-45 minutes per day of creative dramatics for two weeks, or to a control group that received no creative dramatics training. The drama group for all four subgroups outscored the control group on Torrance's tests of fluidity, originality, and imagination.

In a second experimental study, Hui (2006) reported that drama training improved creativity, expressive communication, and creative drawing. One-hundred twenty six children in grades 1 and 4 were randomly selected to receive drama lessons. Sixty-nine children were randomly selected to create the control treatment – other instruction, such as sports. All participants completed the Wallach-Kogan creativity tests, tests for creative thinking-drawing production, and a story-telling test created and scored by the experimenters. Children in the drama project generated more creative responses, tended to provide more creative drawings, were more expressive, and provided more interesting stories than those who were not in the project.

Table 7.8. **Two experimental studies assessing relationship between learning in theatre and creativity**

Study	Positive findings	Negative/inconclusive findings
Warger and Kleman (1986)	X	
Hui (2006)	X	

Thus far there are two experimental studies that all provide evidence to support the hypothesis that learning in theatre (or creative dramatics) boosts creativity scores in children.

We do not know why theatre training should have stronger effects on creativity than visual arts training. However, one possibility is that theatre training boosts performance on verbal creativity tests due to the strong effect that theatre training has on verbal skills, reviewed earlier.

Dance education and creativity

Adult dancers

We identified one correlational study assessing the relationship between dance education and creativity/problem solving in adults. Brennan (1982) found no relationship between dance creativity in college student dancers and Guilford's

measures of creativity. Sixty-one graduate and undergraduate dance majors were assessed on their creativity in dance, and on their creativity in general using Guilford's Plot titles, Alternative uses, Making Objects and For Sketches tasks. No correlations were found between the measures of creativity in dance and the measures of creativity in general. This finding suggests that domain-general measures of creativity may not be a good measure of creativity in a specific art form.

Quasi-experimental studies

We identified two quasi-experimental studies assessing the relationship between dance education and creativity/problem solving (see Table 7.9). These studies assessed dance taught as a separate discipline rather than integrated into the academic curriculum.

Kim (1998) compared the effects of 15 sessions of creative vs. traditional dance instruction over 8 weeks on creative thinking in 7th grade girls. This quasi-experimental study was included in Keinenan et al's (2000) REAP meta-analysis, but the outcome used in the meta-analyses was non-verbal reasoning. Here we examine the findings of this study with respect to creativity. Creative thinking was measured by the figural forms of the Torrance Test of Creative Thinking. Students in the creative but not traditional dance programme gained significantly in creative thinking. In contrast, no effects of creative dance instruction were found on a test of non-verbal reasoning (the Raven's Standard Progressive Matrices). This study demonstrates that one form of dance instruction, creative dance, may selectively strengthen creative thinking while not affecting more logical, less creative forms of reasoning.

Minton (2000) compared the effects of one semester of dance training vs. no training on 15 year olds' creative thinking, again measured by the figural forms of the Torrance Test of Creative Thinking. Scores of those receiving dance instruction grew significantly stronger over one semester than did scores of those receiving no training.

Table 7.9. **Two quasi-experimental studies assessing effects of dance education on creativity**

Study	Positive findings	Negative/inconclusive findings
Kim (1998)	X	
Minton (2000)	X	

Experimental studies

We identified two expeimental studies assessing the relationship between dance education and creativity/problem solving (see Table 7.10). These studies also assessed dance taught as a separate discipline rather than integrated into the academic curriculum.

Caf et al. (1997) found that dance classes help hypoactive children develop creative thinking. Sixteen children between the ages of 7-10, all of whom had been diagnosed with learning disabilities and hypoactivity, were randomly assigned to either dance training or no training. Those receiving dance training gained significantly more in creative thinking again as measured by the figural forms of the Torrance Test of Creative Thinking, but not in body image or hypoactive behaviour (as measured by teachers).

Reber and Sherrill (1981) showed that dance can be used to teach creative skills to deaf students. Twenty hearing-impaired children were tested on the Torrance figural creativity measures. Half were then assigned to 10 weeks of dance training, and half to no training. The students receiving dance instruction improved on all three tests of creative thinking over and above those not in dance classes.

Table 7.10. **Two quasi-experimental studies assessing effects of dance education on creativity**

Study	Positive findings	Negative/inconclusive findings
Caf (1997)	X	
Reber (1981)	X	

Thus far there are two quasi-experimental and two experimental studies that all provide evidence to support the hypothesis that learning in dance boosts creativity scores in children.

Creativity outcomes: Conclusions

The claim that arts education nurtures children's creativity seems self-evident. After all, the arts are inherently creative activities. Surprisingly, however, we found little evidence for this hypothesis in the area of multi-arts and visual arts education, though we found studies supporting this hypothesis in the area of theatre and dance.

One explanation for the lack of overwhelmingly clear findings that arts education boosts creativity is that the measures used are typically paper and pencil tests of creativity. Perhaps these are poor measures. In addition, there is no reason to think that arts education will make children more creative unless the arts are taught in a way that really pushes children to explore and invent. It is likely that many arts classes ask children to do rather routine things – sing in a group, make Christmas decorations for the school hallway, etc. It is also possible that, like in other disciplines, one needs to reach a certain level of proficiency or mastery before being able to have a more inventive approach to the practiced art, and even more so before such creativity can transfer to other disciplines or practices. However, creativity may be highly domain specific, in which case we would not see transfer of creativity from an art form even to another art form, much less to an academic subject.

Notes

1. *www.newsweek.com/2010/07/10/the-creativity-crisis.html*.

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Annex 7.A1

Supplementary tables

Table 7.A1.1. **Ten correlational studies on the relationship between multi-arts education and creativity outcomes**

Study	N	R	Z(p)
Burgart (1961)	100	.43	4.25*
Burton, Horowitz, and Abeles (2000)	1202	.29	10.20*
Hamann, Bourassa, and Aderman (1991)	76	.27	2.34 (p=.01)
Howell (1990)	135	.09	1.03 (p=.15)
Even (1963)	37	.16	0.95 (p=.17)
Skipper (1969)	157	-.05	-0.68 (p=.25)
Skipper (1969)	55	.05	0.33 (p=.37)
Dillard (1982)	97	.30	2.95 (p=.002)
Even (1963)	37	.15	0.90 (p=.18)
Luftig (1993)	412	.12	2.33 (p=.01)

Note: N: number of observations; R: effect size; Z(p): statistical significance; *: significant at p < 0.001. See Box 1.2

Source: Moga et al. (2000).

Table 7.A1.2. **Three quasi-experimental or experimental studies on the effects of multi-arts education on verbal creativity outcomes**

Study	N	R	Z(p)
Even (1963)	37	.16	0.95 (p=.17)
Skipper (1969) (females)	157	-.05	-.068 (p=.25)
Skipper (1969) (males)	55	.05	0.33 (p=.37)

Note: N: number of observations; R: effect size; Z(p): statistical significance; *: significant at p < 0.001. See Box 1.2

Source: Moga et al. (2000).

Table 7.A1.3. **Three quasi-experimental or experimental studies on multi-arts education on the effects of figural creativity outcomes**

Study	N	R	Z(p)
Dillard (1982)	97	.30	2.95 (p=.002)
Even (1963)	37	.15	0.90 (p=.18)
Luftig (1993)	412	.12	2.33 (p=.01)

Note: N: number of observations; R: effect size; Z(p): statistical significance; *: significant at p < 0.001. See Box 1.2

Source: Moga et al. (2000).