The Role of Incubation in Creative Problem Solving When Controlling for Artistic Inclination
Erna Sólrún Haraldsdóttir

2016
BSc in Psychology

Author: Erna Sólrún Haraldsdóttir
ID number: 020792-3109

Department of Psychology
School of Business
Foreword

Submitted in partial fulfilment of requirements of the BSc psychology degree, Reykjavík University, this thesis is presented in the style of an article for submission to a peer-reviewed journal.
Abstract
The main focus of this study was to assess incubation effects on creative problem solving before and after artistic inclination was controlled for. Participants were 56 students from Reykjavík University, 14 men and 42 women, age 18 to 38. Three tasks were administered; the Guilford’s Unusual Uses Task, followed by a distraction task for half of the participants to assess incubation effects and finally a creativity questionnaire. It was hypothesized that incubation has an effect on creative problem solving such that those who receive a distraction task (incubation present) will score higher on creative problem solving than those who do not (incubation absent). It is further hypothesized that artistic inclination is positively associated with creative problem solving and that when controlling for artistic inclination the effects of incubation on the outcome may vanish. The findings of the study revealed that the distraction task (incubation present) had no significant effect on creative problem solving before and after artistic inclination was controlled for. However, artistic inclination was positively associated with creative problem solving.

Key words: creative problem solving, incubation effects, artistic inclination

Útdráttur
Megináhersla þessarar rannsóknar var að athuga hvort þeir sem eru listhneigðari græði meira á hugmyndagerjun í skapandi vandamálalausnum í samanburði við þá sem eru minna listhneigðari. Þáttakendur voru 56 nemendur frá Háskólanum í Reykjavík, 14 karlar og 42 konur, á aldrinum 18 til 38. Ætr próf voru lögð fyrir; Guilford’s Unusual Uses Task ásamt truflun með öðru verkefni fyrir helming þáttakenda til að meta áhrif hugmyndagerjun og síðast var spurningalisti sem mat listhneigð lagður fyrir. Sú tilgáta var sett fram að þeir þáttakendur sem fá truflunar verkefni (hugmyndagerjun til staðar) muni ganga betur á skapandi vandamálalausnum en þeir sem fá ekki truflunar verkefni (hugmyndagerjun ekki til staðar). Seinni tilgátað var sú að fylgni væri á milli listhneigðar og skapandi vandamálalausna og þegar búið væri að stjórna fyrir áhrifum listhneigðar muni áhrif hugmyndagerjunar ekki lengur vera til staðar. Niðurstöður gáfu til kynna að truflunar verkefni (hugmyndagerjun til staðar) hafið engin áhrif á skapandi vandamálalausnir og einnig voru áhrif hugmyndagerjunar ekki til staðar þegar búið var að stjórna fyrir áhrifum listhneigðar. Listhneigð hafið þó jákvæð áhrif á skapandi vandamálalausnir.

Lykilhugtök: skapandi vandamálalausnir, hugmyndagerjun, listhneigð

INCUBATION, ARTISTIC INCLINATION, AND CREATIVITY

3
The Interaction between Artistic Inclination and Incubation in Creative Problem Solving

Studies have suggested that when people are distracted they suddenly find a solution to their problem. What people are likely experiencing is a phenomenon that has been called an incubation effect in the literature and research has repeatedly disclosed significant effects of incubation in creative problem solving (Dijksterhuis & Meurs, 2006; Gilhooly, Georgiou, & Devery, 2013; Sio & Ormerod, 2009; Kaplan & Davidson, 1989).

According to Dietrich (2004) the characterization of a creative individual is cognitive flexibility, or the ability to step outside the box and think unconventionally or abstractly and even adapt rules that normally would not apply. Originality and resourcefulness are also important, being able to produce ideas by linking unrelated things together that others can not see immediately (Ansburg & Hill, 2003; Guilford, 1957). In 1926, Wallas (as cited in Sio & Ormerod, 2009) believed that the creative process contained four stages and the second stage consisted of an incubation period.

Incubation effects are widely cited in creative research (Baird et al., 2012; Chen-Bo Zhong, Dijksterhuis, & Galinsky, 2008; Ellwood, Pallier, Snyder, & Gallate, 2009; Gilhooly et al., 2013; Gilhooly, Georgiou, Garrison, Reston, & Sirota, 2012; Hao et al., 2014; Kaplan et al., 1989; Mednick, Mednick, & Mednick, 1964; Patrick, 1986; Ritter & Dijksterhuis, 2014; Sio & Rudowicz, 2007; Segal, 2004; Snyder, Mitchell, Ellwood, Yates, & Pallier, 2004). There is substantial evidence supporting incubation effects, but according to Ellwood et al (2009) over 75% of studies have at least one reported condition with evidence of incubation effects. The general idea is that incubation effects occur when someone is fully concentrated on a particular problem by using conscious thought processes, then takes a break and directs his or her attention onto something different (Dijksterhuis, 2004; Ellwood et al., 2009; Fulgosi & Guilford, 1968;
Gilhooly et al., 2013; Ritter et al., 2014; Smith, 1995; Smith & Blankenship, 1989; Sio et al., 2009). Therefore, by allowing unconscious thought processes to take over, a solution will often present itself and that solution is generally considered more creative than if conscious thought processes alone had been at work (Dijksterhuis & Nordgren, 2006; Ritter et al., 2014; Smith & Dodds, 1999; Kaplan et al., 1989).

Conscious and unconscious thoughts are two different variations of thought processes, where conscious thought is considered to be convergent and more focused and unconscious thought is linked to more divergent thinking and more original and creative ideas, therefore enabling more creativity (Dijksterhuis et al., 2006; Van de Kamp, Admiraal, van Drie, & Rijlaarsdam, 2015; Runco & Acar, 2012). According to UTT’s framework, unconscious thinking happens during the incubation period which is proposed to be more divergent and will increase the probability of creative ideas to emerge (Dijksterhuis, 2004; Dijksterhuis et al, 2006; Dijksterhuis et al., 2006; Dijksterhuis & van Olden, 2006).

Alternative viewpoints stress that incubation effects can be explained by conscious thought that already went on solving the problem prior to the distraction task or even portray no substantial effects (Vul & Pashler, 2007; Olton & Johnson, 1976). Another debate is whether unconscious thought processes contribute at all to incubation effects or if it is merely the absence of conscious thought that allows for creative thinking (Silveira, 1972; Yang, H., Chattopadhyay, A., Zhang, K., and Dahl, D. W., 2012). As such, the mechanisms involved in incubation effects on problem solving need more exploration and particularly the role of unconscious thought processes, which still remain unclear (González-Vallejo, Lassiter, Bellezza, and Lindberg, 2008).

Previous research suggests that participants benefit from a distraction task, during which it is hypothesized that unconscious thought processes take place during an incubation period,
resulting in more creative solutions (Dijksterhuis et al., 2006; Ellwood et al., 2009). It is considered that incubation effects are most beneficial for participants when the distraction task is low demanding and completely different from the main task (Sio et al., 2009). For example, if the main task is for example verbal, it is recommended that the distraction task is spatial due to possible separate networks (Ellwood et al., 2009; Gilhooly et al., 2013; Hélie & Sun, 2010).

Incubation research generally contains the three following condition: immediate condition, a conscious thought condition, and unconscious thought condition (Chen-Bo Zhong et al., 2008; Dijksterhuis et al., 2006; Gilhooly et al., 2013; Gilhooly et al., 2012; Ritter, van Baaren, & Dijksterhuis, 2012). In the immediate incubation condition, participants are told about a problem and then asked to start right away. In the conscious thought condition participants are given some amount of time to devote their conscious thought on a solution before listing solutions. In the unconscious thought condition, participants are told about a problem and then they immediately get distracted, usually by another task occupy their conscious minds. After a particular time they are instructed to solve the initial problem, this allows for the incubation effects to occur.

Majority of studies on incubation and creative problem solving use problems based divergent thinking tasks, which include Idea Generation Tests (IGT), created by French, Ekstrom, & Price (1963) and Alternative Uses Tasks (Kettner, Guilford, & Christensen, 1959). Both require participants to name as many possible alternative uses they can think of with ordinary objects such as paper or bricks, or to name some things that starts with a particular letter. All these experiments test ideational fluency (Kettner et al., 1959; Ellwood et al., 2009; Dijksterhuis et al., 2006; Snyder et al., 2004; Gilhooly et al., 2013; Segal, 2004). Results from these studies unanimously demonstrate that participants in the unconscious thought condition
benefit more from an incubation period. This is demonstrated by participants coming up with solutions that are considered more creative and less obvious than answers from the other conditions (immediate condition and conscious thought condition).

Measurements of individual differences in creativity have long received attention (Wilson, Guilford, & Christensen, 1953). Guilford (1950) concluded that primary abilities define creativity and that individuals vary in their primary abilities. Research has shown that there are individual differences in thinking style and everyday creative achievements (von Stumm, Chung, & Furnham, 2011; Gabora, O’Connor, & Ranjan, 2012). Interestingly, the effect of incubation has not been looked at while controlling for the individual’s creative tendencies in daily life, a major factor in how creatively a task is solved.

While research has previously shown that incubation effects facilitate creative problem solving, the present study addresses whether these effects are in any way mitigated by individual differences in artistic inclination. It is hypothesized that incubation has an effect on creative problem solving such that those who receive a distraction task (incubation present) will answer more creatively than those who do not (incubation absent). It is further hypothesized that artistic inclination is positively correlated with creative problem solving and that when controlling for artistic inclination the effects of incubation on the outcome may vanish.

**Method**

**Participants**

Participants in this study were 56 undergraduate students from Reykjavík University (42 women, 14 men, $M_{age} = 23.75$ years, $SD = 3.6$, age range: 18-38 years). Psychology students were the majority of participants. They were recruited from a participant pool of Reykjavík University and received course credit for their participation. Other students did not receive anything for their participation. Participants signed an informed consent form before their
participation. They were informed that they could stop participation at any time without further explanations.

**Measures and instruments**

**Guilford’s Unusual Uses task.** The task was administered to assess incubation effects (UUT; Kettner et al., 1959). In this task, participants have to list different uses for common items which in this case were unconventional ways to use a brick (Appendix B). Administration of the task was adapted from Gilhooly, Georgiou and Devery’s (2013) and Dijksterhuis & Meurs (2006) approaches. However, both studies varied in terms of timing between and during conditions. In Gilhooly’s et al. (2013) participants were instructed to come up with new ideas either immediately, after five minutes of conscious thought or after five minutes of distraction. Dijksterhuis & Meurs’ (2006) consisted of three minute incubation period and gave participants one minute to write their ideas down. Therefore, the time frame in this study was compromised to three minutes in each condition.

The scoring of the UUT task consisted of one to five points for each idea (one being very uncreative and five being very creative). Scores for each participant were then summed up in terms of fluency (number of generated ideas within the time frame) and the average creativity of their ideas. Therefore, the average creativity score was multiplied with number of creative ideas resulting in the final UUT score. For example, if a participant’s average creativity score was five with a total number of five ideas the final score would be 25. Both researchers scored each participant first individually and then the scores were compared arriving at final UUT score for each participant. Inconsistencies of one point or less in scoring were met by calculating the average and greater inconsistencies were met by discussing the idea where researchers arrived at a mutual conclusion.
**Distraction task.** The distraction task in this study was created to induce incubation effects and consisted of 28 simple mathematical problems that participants solved individually with paper and pencil (Appendix C). The distraction task is supposed to be low demanding according to Sio & Ormerod (2009) meta-analysis, which leads to beneficial incubation effects as opposed to resting. Therefore, the math problems required participants only to subtract, multiply, add and divide. Participants were advised to solve as many math problems as they could, but since the task was supposed to be easy they were told that there was no pressure to finish them all and they were allowed to skip math problems. It was important that they knew that they would continue with the Unusual Uses task after the distraction task. The participants that did not receive a distraction task worked on the UUT task the whole time, or six minutes.

**The Creativity Styles Questionnaire-Revised (CSQ-R).** The CSQ-R was adapted from Kumar & Holman (1997), and includes 78 questions on a five point Likert scale (strongly agree, agree, unsure, disagree and strongly disagree). The questionnaire examines how people go about being creative (Appendix D). It was chosen because it had been successfully used in creative research before (Keller, Lavish, & Brown, 2007). The CSQ-R consists of eight subscales and four of them (63 questions in total) were chosen for use in this study because of good reliability.

Those four subscales included: Kumar and Holman’s Global Measure of Creativity Capacity which measured how creative a person perceives themselves to be (for example “I consider myself to be a creative person”) and has .76 Cronbach’s alpha reliability. Belief in Unconscious Processes measured the how much the person views the creative process as insightful and inspirational (for example “Creative ideas simply occur to me without even thinking about them”) and has .70 Cronbach’s alpha reliability. Use of Techniques measures if the uses specific strategies and technologies in creative work (for example “I often let my mind
wander to come up with new ideas”) and has .81 Cronbach’s alpha reliability. Environmental Control/Behavioral Self-Regulation measures if the person uses discriminative stimuli to self-regulate or to facilitate creative work (for example “I have set aside a particular place (or places) for creative work”) and has .83 Cronbach’s alpha reliability.

The internal consistency for the four subscales collectively in this study was high with 9.16 Cronbach’s alpha value. Each subscale in this study had Cronbach’s alpha value of; Kumar & Holman’s Global Measure of Creativity Capacity .83, Belief in Unconscious Processes .66, Use of Techniques .88 and Environmental Control/Behavioral Self-Regulation .89. Questions 1 to 13 were reversed as well as questions 18 to 63 (Kumar & Holman, 1997).

Research design and procedure

More tasks were submitted to participants because the research was done in cooperation with another researcher, Eyðís Arnardóttir. Participants completed a working memory task and a figure of fluency task in addition to the tasks described and used in the present study.

The data was analyzed using one way FANOVA with incubation (present or absent) as the between subject factor followed up with ANCOVA where artistic inclination was added as the covariate. The dependent variable was participants’ creative problem solving scores.

The study took place in the spring of 2016 and was conducted in Reykjavík University, the tasks were administered one on one and the experimenters were two. All participants begun by reading information about the study (Appendix A) and signing an informed consent form informing that they could stop participation at any time without further explanations.

The first task that all participants began solving was the Unusual Uses task. Odd or even numbers were randomly assigned to each participant to decide whether they would receive the distraction task (incubation present) or not. Participants who were supposed to solve the
distraction task did so immediately after three minutes into the Unusual Uses task. They were then also given three minutes to solve the distraction task. It was important to let participants know that they would continue solving the Unusual Uses task afterwards so the incubation period would be successful. After solving the distraction task they were immediately instructed to keep working on the Unusual Uses task again for three minutes. Participants who did not receive a distraction task solved the Unusual Uses task for six minutes without any pause.

The questionnaire (CSQ-R) was administered last. Participants were given the instructions not to think about any question for too long. They were then told that there are no right or wrong answers and that their answers would be treated confidentially.

This research had permission from the psychology department institutional ethics committee at Reykjavík University and was reported to the Data Protection Authority.

Results

The purpose of this study was to compare creative problem solving between those that receive a distraction task (incubation present) and those that don’t (incubation absent). Furthermore, the aim was also to examine the correlation between artistic inclination and outcome in creative problem solving and to study the incubation effect when controlling for artistic inclination in the participants.

All participants \((n = 56)\) completed every task and therefore were no missing values. Incubation effects were measured using UUT scores (creative problem solving). The final UUT scores ranged from 2 to 109 (median = 26.23). Figure 1 shows the distribution of participants’ final UUT scores \((M = 29.49, SD = 17.20)\). The distribution was positively skewed and leptokurtic, \(D (56) = 0.143, p < 0.001\), and therefore significantly not normal.
Scores from the UUT in number of generated ideas ranged from 1 to 39 ($M = 10.58$, $SD = 5.91$), and average creativity score ranged from 1.88 to 4 ($M = 2.79$, $SD = 0.38$). Participants’ artistic inclination was measured using the CSQ-R. The scores ranged from 1.68 to 4.97 (median = 2.70). Figure 2 shows the distribution of participants’ scores on the CSQ-R ($M = 2.98$, $SD = 0.84$). The majority of participants had a score between 2.1 and 3.
The distribution of the CSQ-R was positively skewed and leptokurtic, \( D (56) = 0.193, p < 0.001 \), and therefore significantly not normal. The internal consistency of the four subscales of the CSQ-R was relatively high according to Cronbach’s alpha. Table 1 shows number of questions, means, standard deviations and Cronbach’s alpha values for the four subscales of the CSQ-R.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>n</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kumar and Holman’s</td>
<td>3.05</td>
<td>1.22</td>
<td>2</td>
<td>0.828</td>
</tr>
<tr>
<td>Global Measure of Creativity Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Belief in Unconscious Processes</td>
<td>2.84</td>
<td>1.13</td>
<td>17</td>
<td>0.665</td>
</tr>
<tr>
<td>Use of Techniques</td>
<td>2.96</td>
<td>1.19</td>
<td>18</td>
<td>0.892</td>
</tr>
<tr>
<td>Environmental Control/Behavioral Self-Regulation</td>
<td>2.06</td>
<td>1.24</td>
<td>18</td>
<td>0.887</td>
</tr>
</tbody>
</table>

The variances of all groups were equal, as evidenced by a Levene’s test, \( p = 0.690 \). All participants were randomly assigned to the distraction or no-distraction conditions (incubation present or absent). Figure 3 shows participants’ mean scores on the UUT (creative problem solving) depending on whether participants received a distraction task \( (n = 28, M = 32.24, SD = 18.81) \) or no-distraction task \( (n = 28, M = 26.74, SD = 15.27) \).
Figure 3. Participants’ means on the UUT based on distraction vs. no-distraction.

The results from the FANOVA comparing the difference between the groups (incubation present or absent), showed that the difference was non-significant $F(1, 54) = 1.443, p = .235$, partial $\eta^2 = .026$. When artistic inclination was added as the covariate there were also no significant effects of incubation $F(1, 52) = 2.179, p = .146$, partial $\eta^2 = .040$. However, there was a significant effect of artistic inclination on scores on the UUT $F(1, 52) = 7.071, p = .010$, partial $\eta^2 = .012$. The correlation between artistic inclination and scores on the UUT was positive $r = 0.33, p = .011$. That is, artistic inclination variance can explain 11% of the variance in UUT scores.

Discussion

The results of the present study did not support the first hypothesis that participants who receive a distraction task benefit from incubation effects and therefore score higher on creative problem solving than those who do not receive a distraction task. This was unexpected since prior research has repeatedly demonstrated significant incubation effects in creative problem solving (Dijksterhuis et al., 2006; Ellwood et al., 2009; Gilhooly et al., 2013; Kettner et al., 1959; Smith et al., 1989). Therefore, it was speculated that the distraction task might have been too
difficult for participants, perhaps overshadowing unconscious thought processes during the incubation period (Dijksterhuis et al., 2006; Van de Kamp et al., 2015; Runco et al., 2012; Ritter et al., 2014). That was not the intention since Sio & Ormerod (2009) concluded that a low demanding distraction task is optimal for beneficial incubation effects. Other researchers have suggested that benefits from the distraction task increase when it is very different from the main task due to possible separate networks (Ellwood et al., 2009; Gilhooly et al., 2013; Hélie et al., 2010). Therefore, math problems were chosen as the opposite task to creative problem solving. The math problems only required participants to subtract, multiply, add and divide but the numbers were perhaps too high, making the distraction task too hard since most participants did not solve many problems.

However, the study may also support alternative viewpoints that portray no incubation effects or that they can be explained by conscious thinking that already went on solving the main task prior to the distraction task (Vul et al., 2007; Olton et al., 1976). It is also debated whether unconscious thought processes contribute at all to incubation effects or if it is merely the absence of conscious thought that allows for creative thinking (Silveira, 1972; Yang et al., 2012).

The second hypothesis that artistic inclination was positively associated with creative problem solving was however supported. That is, as artistic inclination increases the scores on creative problem solving increase as well. The variance in artistic inclination explained 11% of the variance in the creative problem solving. This is affirmed by previous research which has demonstrated individual differences in creativity and thinking styles, making some more inclined than others (von Stumm et al., 2011; Gabora, O’Connor et al., 2012; Guilford, 1950) It was also supported that when artistic inclination is controlled for the effects of incubation may not be present. That is, when the effects of artistic inclination are controlled for, the incubation effect
was even less pronounced (and of course still insignificant). As previously stated that might be affected by the format of the distraction task. However, previous research has shed little light on incubation effects while controlling for the individual’s artistic inclination in daily life which is important in terms of how creatively a task is solved.

The practicality of this study is that people should be aware of the part that artistic inclination possible plays in incubation effects on creative problem solving. Therefore, artistic inclination might be important in order of utilizing incubation effects to their fullest. However, assuming that the lack of incubation effects in the current study was caused by the difficulty of the distractor task, it would be interesting to see whether benefits of incubation or the effects of artistic inclination on incubation would apply in other settings. For instance, the school environment should consider promoting artistic inclination in children to optimize their creative solutions when they get distracted. Benefits of incubation effects might also be achieved by incorporating scheduled low demanding distractions during the day to maximize successful productivity in the work environment. Methodological limitations besides the distractor task might have been that the sample size was perhaps too small and a larger sample might have led to significant findings in incubation effects.

There are many interesting things for future research to focus on as the literature is relatively scattered in terms of conclusive findings to settle the inconsistencies in research on conscious and unconscious thought processes (Dijksterhuis et al., 2006; González-Vallejo et al., 2008). Future research should keep in mind the effects of artistic inclination, since according to this study, artistic inclination might possibly be an explanatory factor in incubation effects on creative problem solving. However, since no significant effects of incubation were established in this study, future research should consider a good balance when a distraction task is chosen.
References


http://doi.org/10.1080/10400410802633368


http://doi.org/10.1080/13546783.2012.749812


http://doi.org/10.1037/a0013134

http://doi.org/10.1037/h0048280


Incubation Period. *Frontiers in Human Neuroscience, 8.*

http://doi.org/10.3389/fnhum.2014.00215


http://doi.org/10.1080/10400419.2012.652929


http://doi.org/10.1037/a0014212


http://doi.org/10.1080/10400410701397453


Appendix A


Tilgangur
Rannsókn þessi skoðar ýmsa mögulega áhrifaþætti skapandi hugsunar.

Verkefni
Rannsóknin ætti að taka 45-60 mínútur. Þátttaka felur í sér að leysa fjögur stutt verkefni. Þessi verkefni reyna á vinnsluminni og skapandi vandálatáurlausn, auk þess sem rannsóknin endar á spurningalista sem metur skapandi stíl. Mikilvægt er að svara spurningalistanum af hreinskilni og leysa verkefni smævskumaloga af hendi.

Möguleg áhætta eða óþægindi
Óll verkefni sem løgð eru fyrir í þessari rannsókn hafa verið notuð áður í fjölmögum rannsóknnum með góðum árangri. Engin áhætta eða óþægindi ætti því að fylgja þátttöku í rannsókninni, en ef þú finnur fyrir einhverjum óþægindum, endilega láttu rannsakendur vita. Rannsókn þessi hefur verið tilkynnt til Persónuverndar.

Réttur til að hætta þátttöku
Þú hefur rétt á að hætta þátttöku hvenær sem er í rannsókninni án ástæðu og án þess að það hafi einhverjar afleiðingar í för með sér. Pað ber engum skylda til að klára þátttöku þrátt fyrir að hafa skrifað undir upplýst samþykki.

Nafnleynd og trúnaður
Nafnleyndar og fulls trúnaðar verður gætt. Óll gögn verða merkt með þátttakandanúmeri svo ómögulegt er að rekja svör til einstakra þátttakenda. Gögnin verða ekki notuð í aðrar rannsóknir.

Frekari upplýsingar
Þær stendur til boað að fá útbrúð úr megin niðurstöðum rannsóknarinnar þegar unnið hefur verið úr gögnunum (þetta ætti að vera innan hálfis árs frá þátttöku þinni). Ef einhverjar spurningar koma upp eftir þátttöku, eða ef þig vantar meiri upplýsingar, vinsamlegast hafðu samband. Ef þú vilt koma einhverju á framfæri í sambandi við þessa rannsókn, vinsamlegast hafðu samband við Sálfræðideild Háskólan í Reykjavík. Þar er fulls trúnaðar gætt.

Rannsakendur:
Erna Sólrún Haraldsdóttir, BSc nemi í sálfræði
ernah12@ru.is
Eyðís Arnardóttir, BSc nemi í sálfræði
eydis13@ru.is
Appendix B

Múrsteinsverkefni

Í þessu verkefni verður þú beðin/nn um að finna nýjar leiðir til að nota múrstein, en múrsteinar eru venjulega notaðir til að byggja. Vinsamlegast skrifaðu eins margar ólíkar leiðir til að nota múrstein og þér kemur til hugar. Til dæmis er hægt að nota múrstein til að brjóta annan hlut. Þú verður látin/nn vita þegar verkefninu er lokið.

Vinsamlegast skráðu lausnir þínr hér að nede

Appendix C

Reikningsdæmi

Vinsamlegast leystu eftirfarandi dæmi eftir bestu getu. Reiknaðu eins mörg dæmi og þú getur áður en við höldum áfram með Múrsteinsverkefnið.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>189</td>
<td>998</td>
<td>651</td>
<td>523</td>
<td></td>
</tr>
<tr>
<td>+369</td>
<td>-356</td>
<td>*7</td>
<td>+568</td>
<td></td>
</tr>
<tr>
<td>564</td>
<td>984</td>
<td>324</td>
<td>235</td>
<td></td>
</tr>
<tr>
<td>-285</td>
<td>*18</td>
<td>+689</td>
<td>/5</td>
<td></td>
</tr>
<tr>
<td>787</td>
<td>691</td>
<td>275</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td>-198</td>
<td>-457</td>
<td>+578</td>
<td>/2</td>
<td></td>
</tr>
<tr>
<td>368</td>
<td>845</td>
<td>231</td>
<td>754</td>
<td></td>
</tr>
<tr>
<td>*8</td>
<td>+846</td>
<td>*15</td>
<td>-457</td>
<td></td>
</tr>
<tr>
<td>657</td>
<td>567</td>
<td>913</td>
<td>453</td>
<td></td>
</tr>
<tr>
<td>-487</td>
<td>*13</td>
<td>-777</td>
<td>+687</td>
<td></td>
</tr>
<tr>
<td>897</td>
<td>853</td>
<td>941</td>
<td>466</td>
<td></td>
</tr>
<tr>
<td>-573</td>
<td>*9</td>
<td>-352</td>
<td>+782</td>
<td></td>
</tr>
</tbody>
</table>
Appendix D

Creativity Styles Questionnaire—Revised

Tilgangur þessa spurningalista er að athuga hversu skapandi fólk er í daglegu lífri. Hugtakið „sköpun“ er notað hér í því samhengi að gera hversdagslega hluti á nýstárlegan hátt: s.s. leysa verkefni daglegs lífs og vinnu, að stunda viðindalegar og annarskonar rannsóknir, skrifa, mála, skapa tónlist, o.s.frv. Við viljum vita hversu skapandi þín nálgun er.

Hér á eftir kemur listi með nokkrum staðhæfingum sem endurspegla mismunandi leiðir til að vera skapandi í daglegu lífi. Lestu hverja staðhæfingu, ákveddu hversu vel staðhæfingin á við þig og svaraðu með því að nota eftirfarandi 5-punkta skala:

<table>
<thead>
<tr>
<th></th>
<th>Mjög sammála</th>
<th>Frekar sammála</th>
<th>Óviss</th>
<th>Frekar ósammála</th>
<th>Mjög ósammála</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ég tel mig vera skapandi manneskju</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Ég vinn reglulega að skapandi verkefnum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Ég fæ skapandi hugmyndir ósjálfrát á umhugsunar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Ég bíð yfirleitt eftir innblæstri áður en ég hefst handa</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Ég myndi lýsa sköpunarstíl mín sem sibreytilegum og ókerfisbundnum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Ég hef fengið uppljómun, án þess að geta útskýrt uppruna hennar né skilið hana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Ég trúi að ómeðvitaðir ferlar hjálpi mér við skapandi verkefni</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Í vinnu minni lítur oft langur tími þar sem ég hef enga áhugahvööt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Mér hefur tekst að nýta margar hugmyndir til skapandi verka sem hafa bírð mér í draumi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Ég þarf að vera tilfinningalega snortin/nn til að vera skapandi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>Ég þarf að vera í réttu skapi eða finna fyrir réttir tilfinningu til að sinna skapandi verkum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>Þegar ég fæ nýja hugmynd heltekur hún mig þangað til ég hef fylgt henni eftir til enda</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Mér finnst nýjar hugmyndir gagntaka mig og leiða mig í gegnum ferlið þar til þær eru fullunnar, nær sjálfkrafa</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>Ég tel sköpunargáfu vera afleiðingu mikillar vinnu og þratseigju</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Sköpunargáfa mín verður til vegna góðs skipulags og fyrirhyggju</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>Ég æfi mig að vera skapandi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Sköpunargáfa mín kemur frá sjálfsgaga</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Ég eigna sköpunargáfu mín guðlegum innblæstri</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>Tímaskyn mitt á það til að brenglast þegar ég vinn að skapandi verkefnum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Ég hef penna/skrifblokk/upptökutæki við hendina til að skrá nýjar hugmyndir um leið og ég fæ þær</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Ég lêt hugann oft reika til að fá nýjar hugmyndir</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>Ég skapa vanalega nýjar hugmyndir með því að breyta (skipta út, endurraða, útfæra nánar, o.s.frv.) kerfisbundið hugmyndum sem þegar eru til</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Ég bý vanalega til nýjar hugmyndir með því að sameina hugmyndir sem þegar eru til</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Þegar ég skoða vörur sem til eru, þá met ég þær yfirleitt á gagnrýninn hátt til að sjá hvernig ég æti endurbætt þær</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Ég endurskoða of hugmyndir sem ég hafði áður hafnað</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>Ég íhuga oft (ímyna mér) hvernig hægt væri að gera hversdagslega hluti öðruviðsi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Ég breyti yfirleitt fyrri hugmyndum aðeins lítilega, með einu skrefi í einu</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>Ég hafna eða hunska viljandi hefðbundnum eða áður samþykktum hugmyndum til að finna upp á nýjum hugmyndum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>Ég leita oft nýrra hugmynda fyrir utan mitt svið og reyni að nýta þær á mínu sviði</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>Ég vinn oft að mör gum hugmyndum samtímis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>Ég nota oft þankahrið (e. brainstorming) til að fá nýjar hugmyndir</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ég hef haldið dagbók yfir nýjar hugmyndir sem ég myndi vilja fylga eftir einhvern tíma.

Þegar ég finn upp á nýjum hugmyndum vil ég helst ekki meta þær fyrir en ég hef fengið margar hugmyndir.

Ég prófa mig mikið áfram (happa-og-glappa aðferðin) þegar ég er að reyna að fá frankvæmanlega hugmynd.

Þegar ég festist þá á ég til að geyma hugmyndina um stund og gera eithvæðannað, áður en ég held áfram að vinn aað henni.

Ég fer í göngutúra til að fá nýjar hugmyndir.

Ég les mikið til að fá nýjar hugmyndir.

Ég prófa mig mikið áfram (happa-og-glappa aðferðin) þegar ég er að reyna að fá frankvæmanlega hugmynd.

Ég fer í göngutúra til að fá nýjar hugmyndir.

Ég leynilega með nýjar hugmyndir.

Ég fer leynilega með nýjar hugmyndir.

Ég sýni öðrum yfirleit þau skapandi verk sem ég hef unnið að.

Ég einangra mig frá öðrum til að fá nýjar hugmyndir.

Ég hef tekið frá ákveðinn stað (eða staði) fyrir skapandi vinnu.

Ég hef tekið frá ákveðinn stað (eða staði) fyrir skapandi vinnu.

Ég hef sérstakan stað (eða staði) þar sem ég mest af minni skapandi hugmynd.

Ég hef ákveðinn (eða ákveðna) tíma dags þar sem ég stunda mest af minni skapandi hugmynd.

Ég á það til að reyka (sigaretta, pipu, vindil) áður en ég hef skapandi vinnu.

Ég á það til að drekka tei/kaffi annan drykk með kofeini áður en ég hef skapandi vinnu.

Ég á það til að drekka tei/kaffi annan drykk með kofeini áður en ég hef skapandi vinnu.

Ég reyki yfirleitt eftir að hafa unnið að skapandi hugmynd(um) í ákveðinum langan tíma.
| 55 | Ýg drekk yfirleitt te/kaffi/annan koffeindrykk **eftir** að hafa unnið að skapandi hugmyndum mínun í ákveðið langan tíma |
| 56 | Ýg verðlauna sjálfa/nn mig á einhvern hátt eftir að hafa unnið að skapandi hugmynd(um) í ákveðið langan tíma |
| 57 | Ýg vinn yfirleitt að skapandi verkefnum á hljóðláatum stað |
| 58 | Ýg hef yfirleitt tónlist í bakgrunninnunum þegar ég vinn að skapandi verkefni |
| 59 | Ýg nota áfengi til að komast í rétt skap fyrir skapandi vinnu |
| 60 | Ýg nota vimuefni (önnur en áfengi) til að komast í rétt skap til að stunda skapandi vinnu |
| 61 | Ýg hef yfirleitt skapandi vinnu með bæn |
| 62 | Vanalega hugleiði ég áður en ég hef skapandi verk |
| 63 | Ýg fæ mér snarl á meðan ég vinn að skapandi verk |

Að lokum biðjum við þig að svara eftirfarandi bakgrunnsþurningum:

Hafðir þú heyrt um Múrsteinsþröfíð fyrir þessa rannsókn? ☐ Já ☐ Nei

Hvert er kyn þitt? ☐ Kona ☐ Karl

Við hvaða deild stundar þú nám? ________________________________

Vinsamlegast skráðu aldur þínn á línnuna: ____________