Improvisational Comedy and Product Design Ideation
Making Non-Obvious Connections between Seemingly Unrelated Things

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Abstract: It is believed that both wit and product design innovation involve making non-obvious connections between seemingly unrelated things. In a study involving 84 participants taking a cartoon caption test and a nominal product brainstorming test, we found that improvisational comedians on average produced 20% more product ideas and 25% more creative product ideas than professional product designers. Individual quantity of product ideas was highly correlated ($r^2=.82$) with that individual’s product creativity scores, and individual quantity of cartoon captions was highly correlated ($r^2=.64$) with that individual’s caption humor scores. It was also found that the few individuals that were highly fluent in prolific creative product ideation were also highly fluent in prolific humorous cartoon caption production. The majority of these prolific generators had improvisational comedy training. Many of the games used in introductory improvisation comedy classes are designed to train people in making prolific non-obvious connections between seemingly unrelated things. A workshop was developed composed of these association-based games with the goal of helping designers be more prolific, and thus creative, idea generators. A group of 11 subjects who participated in this workshop increased their idea output on average by 37% in a subsequent product brainstorming session.

Keywords: humor, creativity, idea generation, improvisation, design

1. Introduction

There have been several researchers and philosophers that have theorized connections between humor and creativity [1-5]. There have also been several experimental studies that have found positive correlations between humor and creativity. Many of these studies attempt to correlate general humor with general creativity. Wit, or intentional impromptu humor production, is where the two realms overlap most clearly [6]. “Being funny on demand requires complex analysis and creative restructuring of an immediate situation. It is problem solving behavior of the most elegant kind [7].” It is this reason why we have looked to improvisational comedy for inspiration in the realm of product design ideation with the hopes of developing better and more productive idea generation techniques and methods for designers.

2.0 Background

2.1 Incongruity Theory of Humor
There are three main families of theories that attempt to explain the essence of humor: Cognitive or incongruity theories, social or superiority theories and psychoanalytical or release theories [8-9]. The most commonly referenced and most applicable to this study is the incongruity theory of humor. The incongruity theory is cognitively based and attempts to explain humor with less attention to the emotion or social aspects. The basis of the incongruity theory is that something is humorous when there are “disjointed, ill-suited pairings of ideas or situations or presentations of ideas or situations that are divergent from habitual customs” [10]. In other words, something is funny when two or more things come together that are not expected to do so. Arthur Koestler developed the concept of *bisociation*, which is strongly related to the incongruity theory of humor, but he also emphasized how it is applicable to artistic creativity and scientific discovery [2]. Bisociation occurs when an idea, event, or situation is simultaneously perceived from two incompatible or disparate frames of reference [11]. In other words, taking two concepts that appear to have nothing in common, but upon further inspection finding non-obvious connections.

Most theorists acknowledge that incongruity is a necessary but insufficient condition for humor, as there are many incongruent occurrences that are not funny [11]. Shultz suggested the incongruity-resolution model that states that the incongruity must be resolved in order for humor to exist [12]. Similarly, Suls formulated an incongruity resolution model in his “Two-Stage Model for the Appreciation of Jokes and Cartoons” [13]. In his model, shown as a flow chart in Figure 1, the process is a series of steps that begins with a set-up in verbal or visual format. This set-up is the first part of a joke and it should not contain any incongruent elements. The listener then makes a prediction of what will follow from the information in the set-up. If the ending follows as predicted, the listener will not be surprised and will probably not laugh. If the ending does not follow as predicted, the listener will then search for a cognitive rule that will make sense of the incongruent information. If a rule is found then the joke should be taken as humorous. If no rule is found then the listener will most likely be confused by the incongruity.

![Figure 1. Adaptation of the Two-Stage Model for Joke Appreciation [13]](image)

2.2 Wit - Connecting Humor and Creativity

Wit is a subset of humor that describes intentional humor production [14]. We define *wit* as being the ability to perceive in an ingeniously humorous manner the relationship between seemingly incongruous things [15] and not simply the ability to be funny. Wit has also been defined as “creative aligning of concepts” or “the advancement of new and often unexpected relation of concepts” [9].

When comparing the manners in which researchers and theorists describe wit and creativity, there is a clear overlap in definitions. Both wittiness and creativity are referred to as variants of metaphoric thought. “The
creative act of the humorist consists in bringing about a momentary fusion between two habitually incompatible frames of reference” [2]. Whereas, the creative act, whether in poetry or science, depends on discovering analogies between two or more ideas previously thought unrelated [16]. More explicitly, Mednick refers to creative thinking process as “the forming of associative elements into new combinations which either meet specified requirements or are in some way useful [1].”

Both the associative theory of creativity and the incongruity theory of humor explain the degree of creativity or humor in terms of remoteness of association. Based on the two-stage model for joke appreciation, what makes a joke funny is the amount that the punch line violates the recipient’s expectations while assuming the recipient is still able to make sense of the information [13]. Putting this in terms of creativity, “the more mutually remote the elements of the new combination, the more creative the process or solution” [1]. When the connections are too obvious, the output is not considered creative or funny. When connections cannot be made, then the output is considered confusing.

2.3 Measuring Wit – The Cartoon Caption Test

There are many “sense of humor” tests which cover different humor aspects including: ability to comprehend jokes, ability to express humor, ability to appreciate humor, desire to seek out humor, memory of jokes, and tendency to use humor as a coping mechanism [17]. There are very few humor tests that focus on humor production and it is the least studied area of humor [18]. Out of the 65 humor tests listed by Ruch, the cartoon caption test or cartoon punch line production test (CPPT) was the only one that specifically tests humor production ability or wit [19].

The first use of the cartoon caption test was as a creativity test and not specifically a test of humor production [20]. This was the only published caption test to describe the cartoons that were used. It was also one of the only tests that asked the participants to come up with as many captions as they can in order to measure fluency. In 1970, this test was used as a measure of humor production ability where participants were asked to annotate a set of caption-less cartoon images with a humorous caption [21]. The cartoon caption test is the only repeatedly used test for humor production ability. Table 1 summarizes the details of the prior studies involving a cartoon caption test.

Table 1. Details of Studies Involving a Cartoon Caption Test

<table>
<thead>
<tr>
<th>Test</th>
<th># Subjects</th>
<th># Cartoons / # Captions</th>
<th>Time Limit</th>
<th>Total # Captions</th>
<th># Judges</th>
<th>Rating Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ziller, Behringer, &amp; Goodchilds, 1962 [20]</td>
<td>192 undergraduate males, in groups of 3</td>
<td>1 cartoon / as many as possible</td>
<td>5 min</td>
<td>~573</td>
<td>?</td>
<td>5 point</td>
</tr>
<tr>
<td>Treadwell, 1970 [21]</td>
<td>83 science/engineering undergrads</td>
<td>18 reduced to 11, one per</td>
<td>2.5 min / cartoon</td>
<td>913</td>
<td>2</td>
<td>5 point</td>
</tr>
<tr>
<td>Babad, 1974 [22]</td>
<td>77 female undergrads</td>
<td>15, one per</td>
<td>1 min / cartoon</td>
<td>&lt; 1155</td>
<td>13</td>
<td>2 points</td>
</tr>
<tr>
<td>Brodzinsky &amp; Ruben, 1976 [23]</td>
<td>84 undergrads</td>
<td>12, one per</td>
<td>5 min / cartoon</td>
<td>1008</td>
<td>6</td>
<td>6 points</td>
</tr>
<tr>
<td>Turner, 1980 [18]</td>
<td>87 undergrads</td>
<td>12, one per</td>
<td>2.4 min / cartoon</td>
<td>&lt; 1044</td>
<td>2</td>
<td>4 points</td>
</tr>
<tr>
<td>Derks &amp; Hervas, 1988 [24]</td>
<td>38 undergrads</td>
<td>3, 2 or 10 per</td>
<td>NA</td>
<td>684</td>
<td>10</td>
<td>11 points</td>
</tr>
<tr>
<td>Feingold &amp; Mazzella, 1993 [25]</td>
<td>51 and 47 Central Park visitors</td>
<td>8, one per</td>
<td>NA</td>
<td>784</td>
<td>2</td>
<td>5 points</td>
</tr>
<tr>
<td>Kohler &amp; Ruch, 1996 [26]</td>
<td>110 German adults</td>
<td>15, as many per</td>
<td>30 min</td>
<td>1650</td>
<td>12</td>
<td>9 points</td>
</tr>
</tbody>
</table>
2.4 Measuring Applied Creativity – Nominal Product Brainstorming Test

In the product design industry, what ultimately matters is the product. If an individual produces creative product ideas, it is less important how they score on a standardized creativity test. As Amabile states “any identification of a thought process as creative must finally depend on the fruit of that process—a product or response. …Not only does the task [product creation] itself mimic real-world performance, but the assessment technique mimics real-world evaluations of creativity [27].” O’Quin and Besemer agree with the view that judgments of products are more stable and more valid than the standardized tests of creativity [6]. A nominal product brainstorming can be used as a test for applied creativity.

Nominal brainstorming is not actually “brainstorming” as originally described by Osborn in Applied Imagination [28]. In a nominal brainstorm session, the participants do not talk to each other and silently sketch ideas for a given prompt. They either share their ideas silently or do not share the ideas until after the session ends. Nominal brainstorming is used in studies when individual ideation ability is of interest. It has also been argued that nominal brainstorming is more effective than traditional brainstorming [29].

2.5 Prior Humor and Creativity Correlation Studies

There are several studies that have attempted to relate a sense of humor with creative abilities and the results are mostly positive as shown in Table 2. Many of these studies attempt to correlate a general sense of humor with general creative abilities. Humke uses the Multidimensional Sense of Humor Scale because it taps into many different types of humor including appreciation, playfulness, and coping ability [30]. We are interested, however, in humor production as this is where the two realms overlap most clearly [5]. In the few studies that have dealt with creation of humor (bolded in Table 2) and not simply humor appreciation, three involved the cartoon caption test [21-23]. The two more contemporary studies did not provide any details on the humor production test [31-32].

As one can see in Table 2, most of these correlation studies have positive $r^2$ values indicating low-moderate levels of correlation. It is possible however that a third factor, such as intelligence or linguistic fluency, is a hidden variable that connects humor and creativity.

<table>
<thead>
<tr>
<th>Study</th>
<th>Test of Humor</th>
<th>Test of Creativity</th>
<th>Maximum R Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith &amp; White, 1965 [33]</td>
<td>Self Survey, Peer Rating</td>
<td>Word Association</td>
<td>+.18 (p&lt;.05)</td>
</tr>
<tr>
<td>Babad, 1974 [22]</td>
<td>Cartoon caption, humor appreciation, peer rating</td>
<td>Torrance’s Circles, Sentences</td>
<td>+.08 (p&lt;.01)</td>
</tr>
<tr>
<td>Rouff, 1975 [34]</td>
<td>Explaining Cartoon Humor</td>
<td>Remote Associates Test</td>
<td>+.37 (p&lt;.001)</td>
</tr>
<tr>
<td>Clabby, 1980 [31]</td>
<td>Campaign slogan creation</td>
<td>Alternative uses</td>
<td>+.325 (p&lt;.01)</td>
</tr>
</tbody>
</table>
The studies in Table 2 use a variety of creativity tests, but none of these examine applied product design creativity.

2.6 Rating Product Ideas and Captions

The “criteria problem” is the term given to the issue of obtaining a valid assessment of the level of creativeness of a person [4]. In the studies that have dealt with product ratings, there are various sets of criteria that have been suggested as to what determines a creative product (and thus a creative person). Amabile claims that creativity cannot be determined objectively using metrics [27]. She suggests a subjective Consensual Definition of Creativity: “A product or response is creative to the extent that appropriate observers independently agree it is creative [27].” In other words, instead of determining if a product is creative by asking reviewers if the product is novel, useful (etc.), simply ask reviewers if the product or product idea is creative. Similarly applied to humor: something is humorous to the extent that appropriate observers independently agree it is humorous.

In some idea or caption rating experiments [35-36] a panel rates qualities on a scale (e.g. from 1-5). If scores are to be combined for an individual’s set of ideas, they can be added or averaged. If added, a large number of bad ideas are helpful and if averaged, a large number of bad ideas will lower the overall score. Some argue that it is best to simply count the number of humorous captions or creative ideas as opposed to average a rating to avoid the influence of a large number of bad ideas [37].

3.0 Experiment

The basis of this study involved a series of correlations between individual performances on a cartoon caption test and performance in a nominal product brainstorming. All participants completed both a cartoon caption test and a nominal product brainstorming test. The order in which these two tests varied between test groups.

3.1 Participants

We administered this test to 84 participants (52 male, 32 female). The test was administered to four interest groups: 24 product designers, 21 improvisational comedians, 26 MIT students, and 13 other. The “other” category was composed of participants that were not product designers, improvisational comedians or students. The combined age range of the participants was between 18 and 63 years. The mean age was 28 and the median age was 23. The MIT students that volunteered to participate were all involved in one of three different product design-related courses (2.00b Toy Product Design, 2.009 Product Engineering Processes, or 2.97 DesignApalooza). The majority of the students were underclassmen and more specifically freshmen.

Participants were given the test in familiar locations. Tests were performed individually but sitting together as a group to save time on the part of the administrator and to make the participants more comfortable.

3.2 Cartoon Caption Test

In determining which cartoons to use for the caption test, we first reviewed the studies in Table 1. None of these studies provided pictorial examples of the cartoons that were used, however, a more recent study made reference to the New Yorker Cartoon Caption Contest [25]. In the contest, the New Yorker magazine publishes a captionless cartoon on the last page of each issue for readers to submit and vote on captions. In 2006, the New
Yorker released a board game that consisted of a deck of cards containing caption-less cartoons featured in past issues of the magazine. We decided to choose our cartoons from this collection. In a first pass of the cards, we removed any that were potentially violent, sexual, or offensive in nature. Violent or sexual themes were found to create a bias towards males in humor production abilities [23]. Somewhat comically, the deck of 189 cards reduced to 12 that showed potential. In a pretest, participants stated that they became restless after three or four cartoons. We choose the three cartoons that produced the highest number of responses.

Figure 2. Cartoons from the New Yorker Cartoon Caption Contest Used in this Study

Figure 2a was drawn by Robert Mankoff and published in the New Yorker on January 17, 2000 with the original caption: "You know, Burkhart, if you're so damn afraid of the flu maybe you should just stay home."

Figure 2b was drawn by Jack Ziegler and published in the New Yorker on April 18, 2005 with the original caption: "At long last, Wyatt, our dream has come true and we are within reach of the legendary toast fields of the Sierra Madre."

Figure 2c was drawn by Henry Martin and published in the New Yorker on May 11, 1992 with the original caption: "Do you think your failure to bloom could be caused not just by improper location but also by a fear of having your blooms compared with those of other African violets?"

The three cartoons were presented in random order for each participant. Each of three test pages included a captionless cartoon and series of blank lines. Participants were given five minutes per cartoon similar to prior studies [20, 23]. Participants were asked to write as many humorous captions as they can for the given cartoon in 5 minutes. Participants were asked to write legibly and start each caption on a new line. They were asked to write all captions that come to mind even if they are only mildly amusing. Participants were asked to not talk to each other. Time was called at 5 minutes and participants were allowed to finish any caption that they had started for that cartoon.
3.3 Nominal Product Brainstorming Test

We chose to have the participants ideate around a product theme (less structured) instead of developing solutions to a problem (more structured). We chose umbrellas, toasters and toothbrushes as the three product themes for subjects to ideate. These themes are common enough for the general public to have a good understanding of the current state of the art. The themes are also common enough for the “average” person to be considered an appropriate judge of creativity [27]. A similar study evaluating the creativity of products chose two of these same themes (toasters and toothbrushes) because of their “commonality, moderate cost, and level of interest for general young professional consumers [38]”. This similar study evaluated products that were currently on the market and not conceptual product ideas.

Participants were asked to think of as many innovative concepts they can around a given product theme. Each participant was given a stack of blank legal paper and a black fine tipped Sharpie® permanent marker. They were asked to sketch each idea with a title on a new piece of paper in the portrait orientation. We asked that all sketches be made in the portrait orientation to simplify the scanning, processing and reviewing. Participants were asked to draw large, legibly and use as few words as possible to explain the concept. They were told that drawing ability does not count and that they should sketch all ideas that they feel are innovative in some way. Participants were told explicitly to not talk to each other or share ideas.

Each group of participants ideated around all three themes in a different order. Each brainstorm session lasted 12 minutes. In a pretest we found that 12 minutes is an acceptable time to limit fatigue and still produce a good quantity of ideas. Time was called at 12 minutes and participants were allowed to finish any sketch they had started.

3.4 Designing the Experimental Review Method

3.4.1 Cartoon Caption Test Review

In reviewing the cartoon captions, we used a format similar to the prior caption studies of Table 1. Participants’ unique responses were counted for fluency scores. The captions were then digitized with grammar corrected. Judges evaluated the funniness of the captions. All prior studies have a panel of judges read through all captions. Those panels range in size from 2 to 13. For this study we will have a website that is open to the general public to visit and rate random captions. We feel that this method is best for reducing rater fatigue and getting a wide variety of senses of humor to evaluate the captions. This also allows reviewers to rate individually where they cannot influence other reviewers. Humor like creativity is subjective and, following the subjective assessment method of Amabile, something is funny if an appropriate panel of reviewers thinks it is funny [27].

Rating of funniness should be based on a set scale as opposed to a ranking, a decibel laugh measure, or a binary funny/not funny [25]. One prior study used a binary funny/not funny rating [22], but the rest of the studies use scales of 4 points and greater. If reviewers are going to read hundreds of captions, a large point scale is only effective if each point value is assigned a qualitative description. We feel that a descriptive three-point scale (2=funny, 1=somewhat/moderately funny, 0=not funny) similar to Turner’s 4-point scale [18] is an effective way
of quickly and consistently judging captions. Each caption was reviewed by at least 12 people. The largest panel size used in any prior cartoon caption test was 13.

A participant’s funny score can be measured several ways including: A count of captions produced that have an average score over 1.0, a total count of 2s for all captions produced by that participant, or the percentage of captions that have an average score of 1.0 or greater out of the total number of captions produced. We will use a total count of 2s as opposed to averages or percentages, as this measure does not penalize participants for less funny captions.

3.4.2 Nominal Product Brainstorming Test Review

All idea sketches were scanned and digitized. Ideas were rated on several dimensions including creativity, novelty, usefulness, product worthiness and clarity. However for the purpose of this study, we will only discuss one rating dimension: creativity. Following in the subjective assessment style of Amabile and Christiaans, we decided to ask the reviewers then to rate the ideas subjectively on creativity as defined by the reviewer [27,39]

Some prior studies that involved ratings of ideas used only 2 judges [37, 40]. As we have found in our testing, different people find different things creative and a review panel of two is not sufficient to accurately rate an idea. These prior studies also used Likert scales that range from binary to upwards of 5 points. We feel that a scale closer to binary is the only appropriate measure when dealing with hundreds of ideas. Creativity was rated on a 3-point Likert scale (2 = creative, 1 = somewhat creative, 0 = not creative):

When evaluating a set of ideas (i.e. the creativity of a participant) we believe that a total count of 2s is the most equitable measure to ensure that good ideas are not devalued by a large number of bad ideas [37]. A count of good ideas (e.g. number of ideas with a score over 1.0) is also an acceptable means of scoring the individual participants, however, the count of 2s gives a greater depth and finer resolution.

3.5 Review Process

To evaluate the product concepts and captions, we chose to use an online website approach as opposed to a physical review form. An online review has several benefits. The reviewers can be located in many different locations and thus we can get a better general population sample. The reviewers can do the rating at their own convenience and in a comfortable setting. The data can be reviewed by hundreds of people as opposed to a select panel of individuals. The review data is also easy to collect and tabulate. As the product ideas are common it is acceptable to have a random laymen review panel [27].

We used Amazon Mechanical Turk as the means of collecting reviews. Mechanical Turk is a website (http://www.mturk.com) that allows any user to post tasks for any other user to complete. Each reviewer was paid $0.15 to rate 20 randomly selected product ideas or $0.15 to rate 24 randomly selected cartoon captions. Each product idea was presented as a scan of the original sketch alongside radio buttons for rating. Each set of 24 captions was listed below the corresponding cartoon image. Twelve different reviewers out of a pool of 397 (an average age of 34.4, approximately 38% male) rated each of 545 toaster ideas, 627 umbrellas ideas and 595 toothbrush ideas. Twelve different reviewers out of a pool of 437 (an average age of 34.3, approximately 44% male) rated each of 1398 captions. All reviewers were located in the United States.
4.0 Results

Improvisational comedians on average produced 17% more captions and 20% more product ideas than product designers. They also produced approximately 28% more captions and 44% more product ideas than the “other” group. As far as quality of the output, the improvisational comedians on average had approximately 32% higher funny caption scores (2s) and 21% higher creative product scores (2s) than the product designers. When comparing to the “other” group, the improvisational comedians had 42% higher caption scores and 48% higher creative product scores. These demographic comparisons can be seen in Figures 3a and 3b.

![Figure 3. Comparison of Average Quantity and Scores by Interest Group](image)

Quantity of product ideas was highly correlated with overall individual creativity scores as a count of 2s ($r^2=.82$). Quantity of captions was highly correlated with overall individual humor scores as a count of 2s ($r^2=.64$). These quantity vs. quality graphs are shown in Figures 4a and 4b respectively. A few studies have found similar results in both idea generation [29, 40] and in cartoon caption tests [24].

![Figure 4. Quantity vs. “Quality” for Product Ideas and Cartoon Captions](image)

In both Figures 4a and 4b, there seems be a small cluster of individuals that are highly prolific in humor and idea generation. These individuals are to the upper right of the diagonal bisectors of Figures 5a and 5b. Interestingly,
8/10 of the individuals located in this group for product ideation (Figure 5a) are also in this group for the cartoon caption test (Figure 5b). This suggests that highly prolific generators are highly prolific in many domains.

In Figure 5a and 5b, the improvisational comedian subjects are labeled as Xs. Over half of the highly prolific generators are improvisational comedians.

**Figure 5. Depicting Improvisational Comedian Subject Placement and Highly Prolific Generators**

### 5.0 Discussion

#### 5.1. Quantity and Quality

The high correlations of quantity of ideas to creativity of ideas as well as quantity of captions to humor of captions supports the quote by Linus Pauling that “the best way to have a good idea is to have a lot of ideas”. It could be argued that individuals that produce a lot of ideas and captions are better at divergent or associative thinking, which is often related to creative thought process [41-42]. As more associations are made, the probability of reaching a creative idea increases [1]. One could also argue that individuals that are uninhibited will edit thoughts less, produce many ideas and their output will be less restrained and thus more creative and humorous. Oppositely, individuals that are logical thinkers may come up with more useful concepts, but will also be restrictive and regulating in their thought process producing fewer ideas in total.

Almost all prior cartoon caption studies ask the participants to produce one caption per cartoon. We believe that this does not capture an individual’s true humor production ability.

#### 5.2 Learning from Improvisational Comedy Training

A recent conference paper on improvisation and brainstorming concluded that empirical studies are needed to better understand the relationships between these fields [43].

Figure 2a and 2b imply that improvisational comedians are better than professional product designers at prolific “blue-sky” product idea generation. It could be that improvisational comedians are better at making many
associations or they are less inhibited. Either way, perhaps designers can benefit from improvisational comedy training.

After studying improvisational theatre, it was found that most improvisational games are designed to promote prolific non-obvious association. There is a common rule of improv called “yes and…” which essentially sums up the two main rules of brainstorming: defer judgment and build off each other’s ideas [28]. A list of improv games that are most related to training for prolific non-obvious associations is located in the Appendix. Many of these games are similar to those suggested and described by Gerber [43]. A workshop was developed from these improvisational games and we are currently in the process of testing the effect of improv training on idea generation. We found that a group of 11 students generated on average 37% more ideas after this workshop.

In interviewing five of the highly prolific idea generators, who also happened to be improvisational comedians, several statements were made on how improv training can improve idea generation ability. These comments include: “I say all ideas that come to mind,” “I don’t over think,” “I anticipate what may happen,” “I actively think about alternatives,” “I am better at dealing with the unexpected,” “I am comfortable talking to people,” “I am always building on ideas,” “I am good at handling conflicts,” and “I am better at responding quickly with input.”

6.0 Conclusions
Several studies have found correlations between humor and standardized creativity tests. Humor production, or wit, is perhaps the area that is most related to product design creativity. It is believed that both wit and product design innovation involves making non-obvious connections between seemingly unrelated things. In this study, we found that improvisational comedians on average produced 20% more product ideas and 25% more creative product ideas than professional product designers. Individual’s quantity of product ideas produced was highly correlated ($r^2=.82$) with that individual’s creativity scores and individual’s quantity of cartoon captions produced was highly correlated ($r^2=.64$) with that individual’s humor scores. It was also found that the few individuals that were highly fluent in prolific creative product ideation were also highly fluent in prolific humorous cartoon caption production. The majority of these prolific generators had improvisational comedy training. Many of the games used in introductory improvisation comedy classes are designed to train people in making prolific non-obvious connections between unrelated things. A workshop was developed composed of short-form association games to be administered prior to idea generation and in our testing we found that a group of students increased their ideation output by 37% after this workshop.

Further testing is needed to better understand the impact of the improvisational training on the quality and quantity of ideas developed in brainstorming. Future work could explore what element of improvisational training is most important for idea generation: developing associative thinking skills, decreasing inhibition, improving group dynamics, or simply having fun.
Acknowledgements

We thank Professor Maria Yang and Professor Emeritus Woodie Flowers from MIT, Professor Nicola Senin from the University of Parma and Professor Doris Bergen at Miami University for their advice. We thank students from MIT classes 2.00b Toy Product Design, 2.009 Product Engineering Processes, and 2.79 Design-a-palooza for participating in this study. We also thank ImprovBoston for participating in this study and providing introductory improvisational theatre classes. Finally, thank you to Monica Rush, Justin Lai, the MIT Toy Lab, the MIT CAD Lab and the MIT Ideation Lab for their support.

References


Appendix

Improvisational Theatre Games for Prolific Non-Obvious Associations [44]

**Word Ball** – All players in a circle. One player starts by tossing a word to another player. The receiver associates
on this word, and throws his association to yet another player.

**Red Ball** – Players are in a circle. An imaginary red ball is tossed between players. The ball can be transformed
into different objects but maintains some connection to a ball. The receiving player must pay attention to
understand what form the red ball is taking on.

**Freeze Tag** – Two actors start an improvised scene. At any point in time another player can call Freeze. This
player then tags out one of the two actors, and takes his place. Both players then start a new scene, justifying
their positions.

**Story Spine** – Players tell a story one line at a time following a structure similar to:

- Once upon a time ...
- And every day ...
- And then one day ...
- And because of that ...
- And because of that ...
- And ever since that day ...

**Ding** – A scene is played. Whenever the MC rings a bell (or yells `Ding`), the player that is doing
something/saying something needs to say/do something else.

**Props** - In this game, the players need to come up with an original/funny use of a prop. They cannot use the prop
for its intended use.

**Yes Let’s** - One player starts, saying "Hey everyone! Let’s ..." filling in an action for everyone to do. Then
everyone loudly agrees “Yes, Let’s!” and begin said activity. Continue until everyone has suggested something.