Two thoughts diverged in a funny joke: the connection between divergent thinking and humor appreciation.

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TWO THOUGHTS DIVERGED IN A FUNNY JOKE: THE CONNECTION BETWEEN DIVERGENT THINKING AND HUMOR APPRECIATION

A Thesis Presented
by
JASON J. GLASS

Submitted to the Graduate School of the University of Massachusetts Amherst in partial fulfillment of the requirements for the degree of
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Despite the single authorship of this work, this piece exists as it does because of those who stood, simultaneously, behind me and with me.
ABSTRACT

TWO THOUGHTS DIVERGED IN A FUNNY JOKE: THE CONNECTION BETWEEN DIVERGENT THINKING AND HUMOR APPRECIATION

SEPTEMBER 2005

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The current study seeks to go beyond the correlational link between humor and creativity by examining the possible underlying cognitive processes accounting for a relationship between humor appreciation and divergent thinking (considered to be a prominent factor of creativity). The cognitive link between the two is thought to be explained by an openness to possibilities that allows for more effective understanding and a wider awareness of the issue (be it a creative task or an incongruent punch line to a joke). Insights into the effect of mood on humor appreciation and divergent thinking are offered. Divergent thinking was predicted to facilitate humor appreciation, but results were non-significant. Convergent thinking, on the other hand, was thought to be an opposing process and predicted to be associated with decreased appreciation for humor, but these results were also non-significant. Correlational findings did still indicate a relationship among creativity, cognitive complexity, and sense of humor on a dispositional as opposed to an episodic level of analysis.
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CHAPTER 1

INTRODUCTION

There is a fairly sizable base of research that has found that having a good sense of humor is related to behaving in creative ways. Scales of wittiness, humor receptiveness, sarcastic tendencies, and other variants of humor assessment tend to correlate well with ratings of creative performance and thought (Murdock & Ganim, 1993; Ruxton & Hester, 1987), and interpersonal perception of both attributes also appear to be linked (Cann & Lawrence, 2001; Jurcova, 1998).

More broadly, simply putting people into a good mood has been shown to encourage creativity (e.g., Grawitch, Munz, & Elliot, 2003), and with humor being an effective way to do so, we must ask if the correlation is merely due to mood enhancement. While attempts have been made to identify the reasons for what makes something funny or innovative, with some insightful conclusions, a formal comparison of the cognitive processes underlying humor and creativity have not been properly linked in order to make any existing correlation between the two practically useful. This is the provocative niche which the current study purports to address.

The Case of Humor

The typical construct of humor is that of a socially desirable personality characteristic on which over 90 percent of people claim to rate average or above average (Lefcourt & Martin, 1986), or perhaps a quality that one has to be born with and utilize in a regular fashion in order to survive the stereotypical dating scene, finding it a preferred attribute in and effective in attracting a potential mate (Buss, 1988). While these notions and others may not be at odds, in order to properly define humor for research purposes, we must disentangle its properties.

There are two obvious directions from which we can approach the study of humor: from the process of forming some humorous product, or from the product itself. The more common method is to examine the product as a glimpse into people’s appreciation for humor (e.g., Ruch,
1992). This ability to find something funny, has, in the past, been most often referred to in the literature as one's sense of humor, but this linkage is grossly misleading. In everyday contexts, as shown by more recent investigations of the topic (Galloway, 1994), a sense of humor is actually a combination of being able to appreciate something funny and having some capacity for producing something funny.

If typical notions of humor appear to contain both process and product appreciation components, then what is the reason for focusing on simply one of them (in the case of the present study, appreciation)? There are two. First, there is a great amount of work showing that humor creation tasks tend to be rated as similar, in terms of creative ability, to tasks explicitly designed to examine creativity (Schmidt, 1969). In other words, when people engage in a task to produce a joke, for example, that joke is typically granted a certain degree of creativity, just as a piece of artwork. Were we to then attempt to study, say, the effect of humor creation on creativity as part of an experimental design, we would in essence be studying the effect of one creativity task on another. Discussions of this dilemma have suggested that the danger of practice effects and the general muddying of pure creativity components in such a case could confound the operationalization of the variables (Galloway, 1994). Furthermore, keeping both the humor component and the thinking style component aligned as observable products, we manage a more (both conceptually- and practically-speaking) equitable comparison between the two.

A second reason for only looking at humor appreciation is that this half of the sense of humor construct is the one that has been most widely researched (see Ruch, 1998, for a wonderful review). Relating the present study’s distinct approach to the subfield's growing mass is empirically vital. Once this more widely comparative investigation has been done, the findings may suggest more complex questions which can be addressed.
Common approaches to studying sense of humor include: self report scales of how often people "get" jokes told by friends, are told they have a good sense of humor, make jokes themselves, or laugh at certain types of jokes (e.g., aggressive, sexual, ethnic, etc.); peer ratings of similar characteristics; personality inventories linking behavior tendencies to the appreciation of certain types of humor (again, aggressive, etc.); humor production tasks requiring people to write funny captions for cartoons or supply punch lines to unfinished stories; and, humor appreciation tasks requiring people to rate the "funniness" of a variety of content and forms, from published, newspaper cartoons to simple, verbal knock-knock jokes (see Ruch, 1998, for in depth classifications of past and current humor assessments). In focusing specifically on humor appreciation, the common usage of rating cartoons has been oddly problematic, for as easy as it is to obtain the stimuli by scouring the local newspaper or bookstore, publishing them in journal articles in order to put forth a valid and reliable measure that other researchers can borrow carries enormous copyright difficulties. With this in mind, this study draws upon two empirical sources for its stimuli set: an established humor appreciation assessment, the Antioch Sense of Humor Inventory (ASHI) (Mindess, 1985), and a selection of items from the British Association’s (BA’s) (2002) scientific search for the "world’s funniest joke". This avoids copyright issues and facilitates study replication.

The Case of Creativity

There is still some debate as to what criteria should be used when attempting to judge a behavior or product as creative, and the literature is slightly clogged with overlapping terminologies and references to the kind of “genius” creativity of Einstein or Picasso that few of us actually experience on an everyday level (see Getzels & Csikszentmihalyi, 1967; Richards, Kinney, Benet, & Merzel, 1988; and Torrance & Presbury, 1984, for distinct descriptions of creative people ranging from the most lofty and rarely attainable — such as the incredible insights into
physics that Einstein had—to the more “mundane” and typical—such as innovative strategies found by parents to get children to clean their rooms). However, there are some characteristics which many agree seem to be critical in the much romanticized creative process—that magical place where ideas are born, churned, and molded by insight and experience into something inspirational for the observer and creator (Murdock & Ganim, 1993).

From One to Many

The most cited of these characteristics, at least in terms of scientific attention, is that of divergent thinking. Made popular by Guilford in 1957, divergent thinking can be summarily described as moving from one idea or thing to many ideas or things. It refers to a cognitive style favoring multiple possible “correct” answers to a problem (or multiple interpretations of a situation) as opposed to a single one, thereby facilitating the laurels of innovation and uniqueness often awarded to creative products. By thinking of things that most people typically do not (or viewing them from different perspectives or connecting ideas in uncommon ways), divergent thinkers are quite engaged in the creative process. The divergent thought process can be broken down into three distinct pieces in order to be thoroughly assessed: fluency (the ability to rapidly produce a large number of ideas or solutions to a problem), flexibility (the capacity to consider a variety of approaches to a problem or offer multiple categories of responses), and originality (the tendency to produce ideas different from those of most other people). Common divergent tasks encourage people to think of, say, as many uses for a brick as possible, as many endings for a fictional story as possible, or as many solutions to a problem (such as how to determine whether someone has been on the Moon in the past month) as possible. Sometimes referred to as “lateral thinking” or “thinking outside the box,” divergence is the most common and well-replicated assessment criterion of creativity to date (Runco & Sakamoto, 1999).
The interrelatedness of these concepts is great, which speaks to the power of examining divergent thinking when speaking of creativity (Torrance & Presbury, 1984). In the case of the present study, though admittedly an incomplete definition of the creative process, divergent thinking, being the best single representation available to empiricists at this time, is used as a specific cognitive style to address what is ultimately a cognitively-based empirical question.

From Many to One

As opposed to divergent thinking, *convergent thinking* is the process known for moving from many ideas or things to one, and refers to a cognitive style favoring a single correct solution to a problem (or single interpretation of a situation). Common convergent tasks require a narrowing of options, such as that which occurs in a multiple choice test or a reduction of many ideas into a single thematic category. For example, presenting people with a drawing of an unfinished house and asking them if a bird, a cloud, or a brick could be used to finish building the house, the brick would be scored as the correct choice because it is the single sensible solution presented. Completing jigsaw puzzles, math problems, and organizing tasks (putting a list of multiple objects under a single hierarchical category) are some of the more popular convergent thinking tasks, all of them starting with multiple options or parts and moving toward a single resolution (Cropley, 1965).

There is a small, but noteworthy section of the literature that claims to find convergent thinking also to be related to creative behavior (e.g., Cropley, 1965; Morse & Morse, 1995). At first glance, this sounds contradictory to the evidence presented above. However, this issue is likely due to a mislabeling of product and process with regard to convergent thinking. Offering a single solution to a problem obviously allows for only one product, but the process by which people arrive at that solution may very well include some divergent components as they generate, consider, and discard ideas along the way toward choosing “the one” that they will offer as their
answer. For the purposes of this study, using the distinction of one to many versus many to one (here, products are used) allows for the simplest design. Including convergent thinking tasks in the study allows a direct comparison of the two styles with regard to their impact on subsequent activities, explained shortly.

The Case of Process Versus Product

As mentioned above, this study uses observable products in order to address an empirical question concerning cognitive processes. This is actually more appropriate than it may first sound. It is reasonable to assume that when a person is asked to provide (a product of) a single correct answer to a mathematical logic problem, for instance, that person goes through a convergent thinking process in order to accomplish that goal. In fact, it is difficult to assume otherwise, given that this product and this process are both extensions of the same definition: moving from many possible solutions to one. While it may be argued that over the entire time the person is allowed to work on this task, there are likely to be moments of both divergence and convergence (as possible responses are considered and either accepted and written down or rejected and never seen by the experimenter), the overall goal in the mind of the person is to find that single solution to the logic problem. Therefore, given the clear and singular goal of convergence, and given that such a product (a single response) is offered to us at the end of the task, we can safely assume that the person was engaged in a convergent thinking process. If the experimenter did not express the goal as finding a single solution or were there several answers listed by the participant as a solution, it would be clear that the overall thought process (whether due to confusion of the instructions or a blatant refusal to only give a single response) would not be convergent. A similar assumption can be made for a divergent thinking example.

In this study, the experimental tasks were carefully designed to elicit specific types of products by having participants engage in thinking processes appropriate to the experimental
condition. In effect, each task serves as a priming mechanism, or situational cue, which allows the participant to then elicit a product for comparison. For example, in order to obtain divergent products, participants are given a chance to actually create them by working on a task that asks them to generate many possible responses to a problem. To meet the two criteria mentioned above for drawing the link between process and product, explicit instructions are given to the participants about the goal of the task (whether single correct answers or multiple possibilities are expected), and the actual products the participants elicit are examined for meeting that goal.

The practice of priming, or encouraging specific kinds of responses by way of first manipulating perspective, is a common and effective practice in experiments ranging in topic from memory to stereotypes (e.g., Graham & Lowery, 2004; Sebel, Bonke, & Winogard, 1993). One of its more interesting characteristics is that it need not be explicitly noticeable to the participant, and can therefore be implemented without great concern for demand characteristics (Sebel et. al., 1993). In the current study, priming is simply used as a way to encourage specific cognitive styles (divergent or convergent thinking processes) which then serve as the experimental conditions used to compare responses to the humor appreciation task. Since the goal of the study is to examine the cognitive processes at work, there is actually no need for extensive analyses of the divergent or convergent products elicited (e.g., having judges score the fluency, flexibility, etc. of divergent responses or the “correctness” of convergent ones), other than a manipulation check, making sure that participants really responded with multiple versus single solutions when asked to do so.

While participants are asked to create products, then, these serve only as a tangible and verifiable extension of the process in which they were engaged.

The Case of Mood

The link between humor and positive mood is probably an obvious one, as it seems that humor can cheer people up when they are in a negative mood (sad, anxious, etc.) and can facilitate
or enhance positive moods (happy, excited, etc.) (Ruxton & Hester, 1987). With regard to divergent thinking, it too is susceptible to changes in mood. Positive moods facilitate it, while negative ones deteriorate it, possibly because people in positive moods are more likely to be willing to try new things, to think from different perspectives, and to take risks than those in negative moods (Yuen & Lee, 2003). Thus, the relationship between humor and divergent thinking, moving explicitly in that causal direction, carries with it some amorphous baggage. If divergence is often dependent on a person's mood (e.g., Galloway, 1994; Schmidt, 1969), how are we to view the relationship as anything involving a thinking component? That is precisely the void in the current literature. Partialing out mood has been of little use to researchers attempting only to maximize divergent output, and, finding positive moods to have an enhancing effect, they have relegated themselves solely to studying positivity and negativity.

To address this issue, mood was monitored consistently in the present study. If we are to be able to look at cognitive explanations which may be underlying a relationship between humor appreciation and divergent thinking, mood must be controlled. As for the other causal direction, the effect of divergent thinking on humor appreciation, few studies have troubled themselves with this problem. Again, because most of the work in the field is dedicated to exploring and improving divergent output, a closer look at this direction is lacking. After all, while schools, businesses, and self-improvement courses can benefit from knowledge of how to be more divergent, few realms of human experience would be willing to pay big money for an improved appreciation of humor. Since a cognitively-based discussion of the relationship between divergent thinking and humor appreciation is largely absent from the literature, the present study will address the two shortcomings noted above: controlling for mood, and asking whether divergent thought can encourage humor appreciation.
Hypotheses

To summarize, the primary goal of this study is to examine whether there are common underlying cognitive processes between divergent thought and humor appreciation. Specifically, does engaging in divergent thinking encourage or facilitate an increased appreciation for humor? The hypothesis is that indeed it would. By controlling for the impact of mood, this study places the search for a common cognitive process at the forefront of the investigation.

Based on the idea that the relationship between divergent thinking and humor appreciation stems from a shared indulgence in exploring multiple avenues of thought and interpretation, it is hypothesized that convergent thinking will provide precisely the opposite result, with decreased humor appreciation levels following a convergent task.
CHAPTER 2

METHOD

Experimental Design

In this between-subjects design, participants were randomly assigned to one of three experimental conditions, the task orders of which were: 1) Divergent-Humor, 2) Convergent-Humor, and 3) Control-Humor.

Participants

The participants were 140 undergraduate Psychology majors (92 females, 48 males) at the University of Massachusetts at Amherst who received course credit for their help with the study. The mean age for participants was 19.6 years, having been in college for an average of 1.9 years.

Measures

A brief description of each of the assessments used in the study is presented below. Basic demographics (gender, age, year in school, and native English speaking ability) were also obtained. To view all of the actual items in their entirety, see the Appendices.

Mood Scales

Watson, Clark, and Tellegen's (1988) Positive And Negative Affective Schedule (PANAS-20)

A shortened, 10-item version (5 positive, 5 negative) of this set of 20 adjectives measured the base rate affective mood of the participants, as well as any changes in that mood across the tasks of the study (see Appendix A). Participants were asked to rate how well adjectives such as interested, afraid, and irritable described their mood “right now, at this exact moment” on a 1 to 7 scale with anchors of does not describe my mood very well and describes my mood very well. Items were extracted from the original 20-item scale based on the experimenters' judgment of the appropriateness of the adjectives for this particular study so as to make the scale as simple and non-invasive as possible.
Overall mood rating

In order to assess the general affective mood of the participants, they were asked to describe their mood "right now, at this exact moment" on a 1 to 7 scale with anchors of extremely bad mood and extremely good mood. This was simply added to the above PANAS scale.

Divergent Thinking Tasks

Participants completed three tasks (order randomized across experimental sessions) based on the Torrance Tests of Creative Thinking (Torrance, 1966) and Guilford's (1967) collection of divergent thinking tasks, two of the most widely accepted assessments of divergent thinking in the field (see Appendix B).

Task 1: Product Improvement

A picture of a toy stuffed dog was presented to the participants, along with a blank sheet of paper and these instructions, asking them to write out as many ideas as possible in the time allotted (5 minutes):

In the next 5 minutes, try to think of ways to improve the toy stuffed dog shown here. Write out ideas that are clever, interesting, and unusual ways of changing the toy so that it will be more interesting and more fun for children to play with, and that you think no one else will be able to think of. Be creative.

Task 2: Alternate Uses

Participants were given a blank sheet of paper and these instructions, asking them to write out as many ideas as possible in the time allotted (5 minutes):

In the next 5 minutes, try to see how many unusual uses of a shoe you can think of. Write out ideas that you think no one else will be able to think of. Be creative.

Task 3: Things Category Test

Participants were given a blank sheet of paper and these instructions, asking them to write out as many ideas as possible in the time allotted (5 minutes):

In the next 5 minutes, try to think of as many things as you can that are round. Write out ideas that you think no one else will be able to think of. Be creative.
Convergent Thinking Tasks

Participants completed three tasks based on revised variants of the Torrance Tests of Creative Thinking (goals of divergent tasks were changed and stimuli was altered to make them convergent in nature) and Mednick’s (1968) Remote Associates Test (see Appendix C). Again, the order in which tasks were presented was randomized.

Task 1: Maze puzzle

Participants were given a set of 4 moderately difficult maze puzzles and these instructions, asking them to solve as many items as they could in the time allotted (5 minutes):

In the next 5 minutes, complete as many of the following four mazes as you can by drawing a line from start to finish.

Task 2: Hidden Words Test

Participants were given a word search puzzle and these instructions, asking them to solve as many items as they could in the time allotted (5 minutes):

In the next 5 minutes, find and circle as many of the following 4-letter words in the word puzzle below as you can. Words may be found vertically (up-down) or horizontally (left-right).

Task 3: Categorization problem

Participants were given a set of 18 moderately difficult categorization problems and these instructions, asking them to solve as many items as they could in the time allotted (5 minutes):

In the next 5 minutes, solve as many of the word problems below as you can by reading the group of three words and deciding on a fourth word commonly associated with all of the words in that group. Then, write out the fourth word that makes their common association clear. Some associations are more obvious than others, but each group of three words does have a fourth word that is related in some way. Try to figure out what it is.

Control Task

The task for the control condition was designed to be neutral in nature, both with respect to having neither overly divergent nor convergent aspects, and in terms of supporting a continuity of their mood throughout, being neither overly frustrating nor enjoyable (see Appendix D).
Memorization Task

Participants were given a series of three sets of 20 words and these instructions, asking them to memorize and recall as many items as they could in the time allotted (15 minutes):

In the next 15 minutes, you will be memorizing three lists of words (A, B, and C) and testing your memory of them. You will be presented with one list at a time, given time to memorize it, and then given time to write down the words that you remember on another sheet of paper.

Humor Appreciation Ratings (HARs)

Participants were given a set of 45 jokes extracted from an empirically tested set of jokes submitted and rated by people around the world (British Association, 2002), as well as from the Antioch Sense of Humor Inventory (Mindess, 1985) (see Appendix E). The content categories of the jokes included: nonsense, philosophical, and social satire. All jokes had the form of a brief story, scenario, or cartoon. Jokes were from all over the world and have associated ratings for how funny people found them. Participants were given the set of jokes and these instructions, asking them to rate the items for “funniness” in the time allotted (20 minutes):

Please rate your enjoyment of each joke or cartoon from 1 (not at all funny) to 7 (very funny) by filling in the bubble of the appropriate number next to that item. Circle the question mark if you don’t understand the joke. Please try to compensate for the fact that you may have seen or heard some of these before by responding as you imagine you responded the first time.

An example of a joke included is shown below:

When NASA first started sending up astronauts, they quickly discovered that ballpoint pens would not work in zero gravity. To combat the problem, NASA scientists spent a decade and $12 billion to develop a pen that writes in zero gravity, upside down, underwater, on almost any surface including glass and at temperatures ranging from below freezing to 300 degrees. The Russians used a pencil.

Individual Differences Scales

In order to gain a slightly more comprehensive view of the personality characteristics which might be relevant to the primary thrust of this study, a set of three individual differences scales was included at the end of the experiment, with the items randomized and presented together (see Appendix F).
Kelly's (2004) Scale of Creative Attributes and Behavior (SCAB)

This 20-item scale included statements concerning creative attitudes and behaviors which participants rated according to how characteristic of them the statements were. Items were rated on a 1 to 7 scale with anchors of strongly disagree and strongly agree.

Svebak's (1974) Sense of Humor Questionnaire (SHQ)

This 6-item scale included statements concerning attitudes toward and behaviors involving humor which participants rated according to how characteristic of them the statements were. Items were rated on a 1 to 7 scale with anchors of strongly disagree and strongly agree.

The International Personality Item Pool's (2001) Cognitive Complexity Scale (CCS)

This 10-item scale included statements concerning attitudes toward and behaviors involving engagement in cognitively complex situations which participants rated according to how characteristic of them the statements were. Items were rated on a 1 to 7 scale with anchors of strongly disagree and strongly agree.

Procedure

Participants were informed that paying attention to their mood would be important for this study, so it was vital to be as accurate as possible. They were informed that some people change their mood as they progress through the study, and others do not, but both possibilities were equally normal. The important thing, though, was that we had a record of either one, so that we could accurately understand the other parts of the study. The experimenter told them that they would complete a few short tasks looking at how people think about problem solving and humor.

The experimenter divided participants randomly into one of three predetermined conditions: divergent thinking, convergent thinking, or control. Participants were first given a questionnaire with the PANAS mood scale (Mood Scale Time 1). These materials were collected
upon completion. They were then given the instructions and materials for their appropriate thinking task (depending on what condition – divergent, convergent, or control – they were in), which were collected when finished.

Participants next completed another set of the PANAS mood scale (Mood Scale Time 2) (ordering of items was scrambled for each presentation) and submitted them when finished.

Participants were then given the materials and instructions for the Humor Appreciation Ratings (HARs) and allowed to complete them.

Participants finally completed a third version of the PANAS mood scale (Mood Scale Time 3), along with the three individual differences scales (SCAB, SHQ, CCS).

When finished, participants were debriefed concerning the purpose of the study and thanked for their time.

**Scoring**

The mood scales, Humor Appreciation Ratings, and individual differences scales were simply Likert-type measures that could be easily scored (calculation of means). As discussed in a previous section, no actual scoring was done for the divergent, convergent, or control tasks. Since their use was only to prime a certain thinking style and not to obtain judgments of actual creative or logical ability of some kind, responses to these tasks were only reviewed as a manipulation check to be sure that participants followed the instructions for the tasks and gave condition-appropriate solutions. Those which did not (e.g., multiple answers given to a categorization problem) were to be excluded from analyses since the effect of the attempted prime cannot be trusted. No participants were excluded on this basis, however.
CHAPTER 3

RESULTS

The findings from this study are presented in several sections, first addressing the initial support for the hypotheses through the individual differences scales, the mood scales, and the Humor Appreciation Ratings. Results from the experimental manipulations themselves are then presented, followed by a more exploratory look at the data, given post hoc concerns. In brief, the main hypotheses were not supported by this study, however some interesting related findings are discussed.

Individual Differences

The purpose of introducing the individual differences scales into the study was to first gain a more informed view of the relationships among the broader constructs of cognition, creativity, and humor, and to then use these relationships to direct more complex investigations of the specific hypotheses. The data suggest that these three scales are indeed related.

Internal consistency estimates of reliability were computed for the three individual differences scales: the Cognitive Complexity Scale (CCS), the Scale of Creative Attributes and Behaviors (SCAB), and the Sense of Humor Questionnaire (SHQ). All the measures had moderate to high coefficient alphas, as can be seen in Table 1, suggesting good reliability.

The distribution of mean ratings for each of the three scales did not differ significantly from normal, and no outliers emerged. On average, participants’ responses on the measures were significantly above the midpoint of 3.5 on the 7-point scales. However, the results of this study are similar to those of the authors of these scales, so this finding is not troublesome and is not discussed further. Table 2 provides a brief view of relevant descriptives.

Significant bivariate correlations among the three scales revealed common associations of cognition, creativity, and humor, which are the larger constructs from which the specific
hypotheses for this study were drawn. Being moderate to high in strength, these correlations were further examined with partial correlations in order to control for any possible interactive effects of one scale upon another and gain a direct view of the relationships. Results from these two sets of analyses are presented in Table 3.

Two of the three partial correlations indicated that the direct relationships between the scales were still moderately strong. When controlling for the SCAB, however, the relationship between the CCS and the SHQ dropped to non-significance, suggesting that this creativity scale accounts for a large part of the connection between the measures of cognitive complexity and sense of humor.

Mood

The purpose of introducing a set of mood scales into the study was to control for any confounding effects that might have been present when trying to understand the relationship between divergent thinking and humor appreciation. The data suggest that the mood scale functioned reliably and revealed some intuitive relationships.

Internal consistency estimates of reliability were computed for the mood scales at Time 1, Time 2, and Time 3. In doing so, the ten items extracted from the PANAS-20 were combined with the one overall mood rating item (refer to the earlier Measures section for details). Each administration of the scale had moderate to high coefficient alphas, as can be seen in Table 4, suggesting good reliability.

Much like the individual differences scales, the distribution of mean ratings for each of the three mood scale administrations did not differ significantly from normal, and no outliers emerged. Again, participants' responses on the measures were significantly above the midpoint of 3.5 on the 7-point scales. However, the results of this study are similar to those of the authors of
the PANAS-20, so this finding is not troublesome and is not discussed further. Table 5 provides a brief view of relevant descriptives.

To identify the existence of any possible trends in the mood fluctuations throughout the course of the experiment, a one-way repeated measures (within-subjects) analysis of variance (ANOVA) was conducted with the factor being the time at which the mood scale was administered (1, 2, or 3), and the dependent variable being the scores of the scale itself (refer to the earlier Procedures section for task order details). The results for the ANOVA did indicate a significant effect of time, Wilks's $\Lambda = .83$, $F(2, 138) = 14.06$, $p < .001$, multivariate $\eta^2 = .17$. Subsequent contrast tests revealed a significant linear effect with mood scale means increasing over time, $F(1, 139) = 18.57$, $p < .001$, partial $\eta^2 = .12$. This finding was distinctly due to mood scores at Time 3 being significantly higher than at either Time 1 or 2. Time 1 scores were not significantly different from Time 2 scores. This makes practical sense since mood levels would likely be elevated after reading through a series of jokes. This also provides some indirect validity for the effectiveness of the humor rating task as an appropriate dependent variable representing humor appreciation.

**Humor Appreciation**

The purpose of the Humor Appreciation Ratings (HARs) was to have a dependent measure which tapped into this specific half of the sense of humor construct (humor creation being the other half). The rating of jokes and cartoons was the most obvious method to use, as many previous studies have also found. The data in this study suggest that this was a very reliable dependent measure and did (as noted in the previous section) have an association with elevated mood.

The HARs were obtained via a collection of 45 items (verbal jokes and cartoons), which, like all the measures in the study, allowed participants to respond on a 7-point Likert-type scale.
A unique characteristic, however, as compared to the other measures, was that it also provided an eighth response option, a question mark (?), which was meant to indicate that the participant did not understand the joke or cartoon and could not judge its level of funniness. A boxplot of the frequency with which specific items were not understood was produced and six items were found to be extreme outliers (more than three interquartile box lengths from the upper box edge, suggesting these items were just not very comprehensible as jokes). This is the equivalent of a minimum of 27 people (in the sample of 140) not understanding a particular item. These six items (listed in the Appendix as 4, 7, 10, 20, 26, and 43), along with an accidental duplicate item (22) were dropped from the measure when computing reliability. Dropping these items did not affect the humor measure’s reliability coefficient ($\alpha$), which remained at a very high .95 for the 38 items. In all analyses involving the HARs, instances in which participants chose the question mark as a response were replaced by the mean score from the remainder of their ratings. After accounting for these issues, the mean HARs score (representing level of funniness) was 3.49 ($SD = .95$), which was right at the midpoint of the measure, and the mean number of items not understood by participants was .81 ($SD = 1.42$).

The Humor Appreciation Ratings (HARs), despite their high reliability, correlated with only one of the individual difference measures, the Scale of Creative Attributes and Behaviors (SCAB), at a modest .26 ($p = .002$). Pearson correlations were not significant with the Cognitive Complexity Scale (CCS), nor, surprisingly, with the Sense of Humor Questionnaire (SHQ). The HARs did have moderate correlations with each of the three mood scale administrations, however: $r$ (Time 1) = .35, $r$ (Time 2) = .30, and $r$ (Time 3) = .49 (all $p$-values were < .001 and significant after Bonferroni corrections). The association with the Time 3 mean makes intuitive sense, given that those who found the jokes funniest had the highest elevation in mood.
Since the HARs were based on items extracted from two separate sources (refer to the earlier Measures section for details), in addition to the reliability computation, a factor analysis was conducted to understand the dimensionality of the 38 items. The eigenvalues and scree plot from a principal components analysis indicated that the measure was unidimensional, so no further division was appropriate.

**Experimental Effects**

Before conducting any analyses involving the experimental conditions (divergent, convergent, and control thinking tasks), a view of the measures across those conditions was warranted. Table 6 gives a breakdown of the means and highlights just how similar the values are. While not a focus of the study, (non-significant) gender descriptives are also provided for reference. Correllational analyses among the individual differences scales, mood scale administrations, and Humor Appreciation Ratings (HARs) compared across the three conditions did not produce any significant relationships, and are thus not presented here.

The hypotheses in this study were then tested. The first hypothesis, that participants in the divergent condition would produce higher scores on the Humor Appreciation Ratings (HARs) than participants in either the convergent or control conditions, and the second hypothesis, that those in the convergent condition would have lower scores than either condition, were tested with a one-way analysis of covariance (ANCOVA). The independent variable, type of thinking task, included three levels: divergent, convergent, and control. The dependent variable was the subsequent score from the HARs. The mood scale score at Time 2 was used as the covariate, in order to control for possible differences in mood after the completion of the thinking tasks and before beginning the HARs. A preliminary analysis evaluating the homogeneity-of-slopes assumption indicated that the correlation between mood and the HARs was not significantly different as a function of the experimental condition. The ANCOVA itself was not
significant, \( F(2, 136) = .06, \text{MSE} = .89, p = .95 \), partial \( \eta^2 < .01 \), nor was the interaction of condition and mood.

Having tested for the existence of a relationship between thinking style and humor appreciation while controlling for the variable of initial primary concern, mood, a logical next step, given the aforementioned correlation between the HARs and the Scale of Creative Attributes and Behaviors (SCAB), was to conduct another ANCOVA, this time controlling for the influence represented by the SCAB. Again, the independent variable was the type of thinking task, and the dependent variable was the score from the HARs. An evaluation of the homogeneity-of-slopes assumption was found to be non-significant, so the ANCOVA was computed. It was also found to be non-significant, \( F(2, 136) = .03, \text{MSE} = .02, p = .97 \), partial \( \eta^2 < .001 \).

Neither mood nor the measured individual differences contributed a sizeable amount of variance to the thinking task–humor appreciation equation, nor did controlling them elicit a significant relationship. After reconsidering the methodology implemented in this study, however, there were some additional analyses that needed to be conducted in order to make a stronger claim that the hypotheses were not supported.

**Additional Exploration**

At a very basic level, this experiment was a priming experiment. Each of the three thinking task conditions (divergent, convergent, and control) served as an interactive prime, encouraging participants to adopt that specific thinking style. What was difficult to know for certain, though, was exactly how long that prime lasted once the participants were asked to begin rating the jokes and cartoons. The time it took for participants to give all 45 humor ratings may have been too long or contained too much interference from the items themselves to be sure that the prime was functioning through the entire task. Two additional analyses were conducted in order to investigate this possibility.
First, to identify any trend in participants' responses across the three conditions, the first five humor items were selected as the best to use, given their close proximity to the priming tasks. Unsure of how many items might be influenced by the prime before any decay, the first five seemed like a reasonable and conservative estimate (note that humor item 4 was dropped as an extreme outlier from all analyses for being especially confusing, so the first five useable items were actually: 1, 2, 3, 5, and 6). A two-way repeated-measures analysis of covariance (ANCOVA) was conducted to evaluate the effect of type of thinking task (divergent, convergent, or control) and the number of humor items rated (one to five items) on the actual humor ratings given by the participants. The within-subjects factor was the number of items rated and the between-subjects factor was the thinking task condition, while once again the mood scale at Time 2 served as the covariate. The main effect of the number of humor items rated was significant, Wilks's $\Lambda = .87$, $F(4, 107) = 3.88, p = .006$. However, the interaction effect between the number of humor items rated and the thinking task condition was not significant, $\Lambda = .92, F(8, 214) = 1.10, p = .37$. The interaction with mood was also non-significant. When further examining the significant main effect of the number of humor items rated, the means of the five items (2.99, 4.23, 1.85, 3.12, and 2.60, respectively) clearly indicated that there was no meaningful trend present, but only a random fluctuation in the perceived level of funniness of the jokes. In essence, then, while Humor Appreciation Ratings (HARs) rose and fell over those five items, there was no indication that this was influenced by the thinking task condition in which participants found themselves.

This provided stronger evidence that the study's hypotheses were unsupported, but another issue also requires mentioning. If the theory underlying these hypotheses was correct, that divergent thinking was positively correlated with humor appreciation (and convergent thinking was negatively correlated with humor appreciation) because of a shared cognitive component, then in addition to seeing elevated HARs after being involved in divergent thinking
tasks, the exposure to humor itself should mean elevated divergence of thought. In short, while participants’ HARs toward the beginning of the humor rating task should depend on the priming condition in which they were involved, HARs toward the end of the humor rating task should be elevated regardless of thinking task condition because the humor would be encouraging divergent thought.

To assess whether there was a positive linear trend in HARs (and if that trend might differ according to condition), a two-way repeated-measures analysis of covariance (ANCOVA) was conducted to evaluate the effect of type of thinking task (divergent, convergent, or control) and exposure to the humor items (little exposure versus a lot of exposure) on the actual humor ratings given by the participants. In this case, the within-subjects factor was created by using the mean of the first five (non-outlier) items as one level (items 1, 2, 3, 5, and 6) and the mean of the last five (non-outlier) items as another level (items 40, 41, 42, 44, and 45). The first five items were deemed as “little exposure” to humor, and, since participants would have then spent at least 15 minutes reading jokes, the last five items were deemed as “a lot of exposure,” which was a reasonable breakdown to create if any differences between the start and end of the humor task existed. Again, the between-subjects factor in this analysis was the thinking task condition, and the mood scale at Time 2 was the covariate. The main effect of exposure to humor was significant, \[ \Lambda = .65, F(1, 137) = 75.08, p < .001. \] The interaction between exposure to humor and thinking task condition was not significant, \[ \Lambda = .99, F(2, 137) = .91, p = .41. \] The interaction with mood was also non-significant. Examining the means of the two humor exposure levels indicated that scores for the last five items were significantly higher than for the first five items. While condition, then, did not play a significant role in the joke ratings at the start of the humor task, there was a noticeable positive linear trend such that HARs were higher at the end of the task than at the start. This at least introduces the possibility that divergent thought had increased at
that later point for participants across all conditions, although the limitations of this study do not allow a more definitive statement about this.
CHAPTER 4
DISCUSSION

The exploration of the meaning of this study’s findings is presented in several sections, including a brief summary of the results, an interpretation of the results, a discussion of the possible limitations of the experimental design, and some suggestions for future research in this area.

Summary of Results

Two main hypotheses were put forth in this study: 1) engaging in divergent thinking is thought to encourage or facilitate an increased appreciation for humor likely because of a common cognitive component and not solely because of mood enhancement, and 2) engaging in convergent thinking, being an opposing process, is thought to encourage or facilitate a decreased appreciation for humor because of that same cognitive component. The data obtained in this experiment did not support either of these ideas. While correlational findings among the individual differences scales did indicate a relationship among cognitive complexity, creativity, and sense of humor, which did bolster the reasoning for presenting these hypotheses, these results were too broad to draw the specific connections among divergent and convergent thinking styles and humor appreciation. In the course of seeking answers to the hypotheses, however, a highly reliable, unidimensional humor appreciation measure was developed, which may serve as a boon for future investigations.

Interpretation of Results

Divergence versus Convergence

Understanding what non-significant findings indicate about a question of interest is just as important as understanding what significant ones can offer. The easiest explanation for why the data looked as they did might be that there simply is no difference in how (or how much)
divergent or convergent thinking impacts humor appreciation. There could be at least three reasons for this: 1) divergent and convergent processes both contribute to humor appreciation, but for separate, specific reasons, 2) both divergent and convergent processes are needed in tandem in order to appreciate humor effectively, and 3) the distinction between divergent and convergent thought is only a philosophical one, and no practical, task-oriented categorization can be made, resulting in no true difference between the experimental conditions in the first place.

First, divergent and convergent processes could achieve similar ends via quite different routes. The reason why divergent thinking was thought to be related to increased humor appreciation is that incongruency is a leading theory of what makes jokes funny (the setup is incongruent with the punchline, and the surprise felt when noticing this is experienced as pleasure), and having a divergent thought process might make it more likely for people to notice this incongruency in the first place and have a better chance at seeing it as humor, rather than simply an illogical story, for example. Granted, that may be the case. But when it comes to people thinking convergently, this supposed lack of insight may be offset by a larger impact being felt when the incongruency eventually is noticed. In other words, if what makes something funny is noticing the discrepancy between setup and punchline and feeling pleasurable surprise as a result, perhaps, after being primed to think convergently, when people encounter a joke, the surprise they feel at the incongruency is much larger than for divergent thinkers and therefore, the joke can still be funny. With regard to individual jokes, then, divergent thinkers might understand incongruency more frequently, while convergent thinkers might feel more impact when they do understand it. Over the course of many jokes, a mean humor appreciation rating could look similar for the two groups.

Alternatively, as discussed in the introduction to this study, most problem-solving scenarios involve a fluctuating combination of divergent and convergent processes in order to come
to an effective solution or set of solutions. Initial brainstorming about all of the details relevant to
the issue is a very divergent process, while the narrowing and rejecting of inappropriate details is a
convergent one. In any given problem-solving situation, there may be one or several iterations of
moving from divergent to convergent processes before the situation is resolved properly. To even
say that there is a proper solution or set of solutions is likely a limiting nomenclature which
ignores the natural progression of problem-solving. With regard to humor appreciation, it may be
that people fluctuate between divergent and convergent processes, needing a combination of them
in order to make sense of the “logic” of the joke and understand the punchline. Priming one
process over the other, then, may not give either group an advantage, and could be similar to not
priming anything at all (effectively, the control condition).

A third possibility could be that the distinction between divergent and convergent
thinking is really not a practical, meaningful one. If, as discussed above, elements of both
processes appear in a task, then attempting to prime people with one or the other may not be
completely possible. The end product may indeed be categorized easily with the criteria of one to
many or many to one presented in this study, but whether that constitutes a successful priming of a
specific thinking style is uncertain.

Which of these three avenues might explain the findings in this study, then? Excluding
the first reason, that divergent and convergent processes might provide the same result by different
routes, is possible to do with the data at hand. If it was the case that divergent thinkers
understood jokes more frequently, but that convergent thinkers, when they did understand them,
enjoyed them much more, then we would expect to see humor ratings for individual jokes be
relatively moderate and stable (low variance) for divergent thinkers. Convergent thinkers, though,
should have highly fluctuating ratings across individual jokes (high variance). Looking back at
Table 6 and examining the variances across experimental conditions, we can see that this is not the case at all. In fact, the standard deviations are almost identical.

Addressing the second option, that both divergence and convergence are needed for effective humor appreciation, is something that the design of this study cannot accommodate. If it is the case that priming only one thinking style would not offer an advantage at understanding or finding the humor in jokes, and that only priming one style would be as effective as letting people read jokes in a non-manipulated condition, then there is no way that the current study can exclude this reason as an explanation for the data. All conditions, in that instance, would end up having similar humor ratings, which is exactly what occurred in this study.

As for the notion that the line between divergent and convergent thought is more blurry than originally expected, this would be testable given the assumption that a thinking style void of either of these two processes (a control condition) would fare differently in terms of humor appreciation level. A contrast of divergent/convergent thinking and non-divergent/convergent thinking was possible in this study, but the similarity of means found across all three conditions does not support this argument. Again, this is assuming the control condition involves a unique thinking process that would not produce humor ratings equivalent to what divergent or convergent thinking could.

If we are to say, then, that the reason for this study's findings is that there simply is no difference in how (or how much) divergent or convergent thinking impacts humor appreciation, the most likely explanation is that both thinking styles, functioning cooperatively, are needed, and that priming one style over the other serves no benefit. It is still possible, however, that a difference does exist, but this particular experimental design was unable to expose it. The forthcoming Limitations section will explore this avenue more thoroughly.
Humor

One finding from this study that was of concern was the lack of a strong positive correlation between the Sense of Humor Questionnaire (SHQ) and the Humor Appreciation Ratings (HARs) made by the participants. It seems obvious that the two should be related, but there are at least two possible explanations for why they are not. First, the internal reliability for the 6-item SHQ was the lowest among all of the measures used in this study ($r = .67$). While still respectable for an individual differences scale, especially one that attempts to capture a personality dimension in so few items, it does introduce more error variance than desired. Second, and more importantly, the SHQ is a self-report measure being compared to a “performance” measure of sorts. While self-reports of things such as creativity (Scale of Creative Attributes and Behaviors – SCAB), preferences for certain kinds of conversations or subject matter (Cognitive Complexity Scale – CCS), or mood can be very reliable and immune to social desirability effects, people’s judgments of their own sense of humor can be notoriously exaggerated such that most will claim to have ones much above average (see Kelly 2004; and IPIP 2001 for information on social desirability of the SCAB and CCS, respectively; and see Lefcourt & Martin 1986 for information on sense of humor judgments). Here, then, may be a case of some participants rating themselves very highly on the SHQ ($M = 5.32$ on 7-point scale), yet fluctuating when rating jokes ($M = 3.60$ on 7-point scale).

The Humor Appreciation Ratings (HARs) were found to be a very appropriate measure, not only because of the high internal reliability, but also because of good convergent validity as shown by its strong correlation with the mood scale at Time 3 ($r = .49$). With the mean of the Time 3 mood scale significantly higher than Times 1 or 2, it is reasonable to assume that moods were elevated by reading through the jokes. This makes obvious sense.
Something of more theoretical interest, though, is the result from the repeated-measures ANCOVA finding that mean humor ratings from the last part of the humor task were significantly higher than means from the first part. This may indicate one of two things. First, as mentioned in the Results section, if it is the case that there is a cognitive link between divergent thinking and humor appreciation, then being exposed to humor could mean an increase in divergent thinking as participants progressed along through the humor rating task. Increased divergent thinking could then snowball into higher humor ratings. Given that humor ratings at the start of the humor task were not any higher than ratings in the other thinking style conditions (and thus no link between divergence and humor appreciation is shown), however, there is not a convincing argument to believe that this is the case. A second possibility is that exposure to humor itself is self-perpetuating when it comes to humor appreciation. The more jokes participants encounter, the more they enjoy them and the higher ratings they provide, at least over a moderate length of time. Although this option is the more likely of the two based on the data, the current study’s design does not allow a direct investigation of this idea.

Limitations

This was a very simple study design, meant to answer very specific questions about the nature of the relationship between thinking styles and humor. It is not without some limitations, which, if addressed, may provide insight into the post hoc exploratory questions posed in previous sections.

If we are not yet convinced that the thinking style conditions (divergent, convergent, and control) have no influence on humor appreciation, then we must assume that the manipulations did not (or, in the case of an inability to separate divergent and convergent processes, could not) work appropriately. Each of the thinking style conditions was 15 minutes in length and was composed of three interactive tasks, so it is difficult to say that the primes were not long enough or
strong enough to have made an impact. It is certainly possible that this impact decayed too rapidly to remain effectual over the course of the entire humor rating task, but a repeated-measures ANCOVA revealed that differences in humor ratings across conditions could not even be found within the first five humor items. So, this problem does not seem to be one of priming decay.

Resorting back to our discussion of the potential difficulty in separating divergent and convergent thinking processes in the performance of a task, it is possible that divergence and convergence were not actually being primed at all. To the extent that it was at least possible to create tasks that allowed for one thinking style to dominate over another, though, this study did provide some indicators that participants had adopted the prescribed style. First, and most simply, the participants were given explicit instructions about how to complete the tasks, and inherent in this was the knowledge that a response with either one solution (in the convergent condition) or many solutions (in the divergent condition) was appropriate. Second, when checking their responses, it was noted that all participants followed this goal. A singular product was extrapolated to be a convergent process; multiple products were seen as a divergent one.

Judging process from product is not foolproof, however. While arguments in favor of the implemented design are given in the Introduction, it is true that there are no verifiable manipulation checks of the actual thinking styles of the participants. Typical thought-listing techniques (in which participants “think out-loud” while engaging in the assigned task) can be informative for this purpose, but were not implemented in this study because of the large time investment (thought-listings are usually done in a one-on-one interview setting) and the additional complication to the methodology and analyses (which can require training of the participants and complex qualitative analysis).

In addition to the difficulty with using tasks which would effectively prime only divergent and only convergent thinking, the implementation of the control task is a very problematic issue.

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In terms of problem-solving or product creation, situations which are divergent tend to not sound very convergent, and vice-versa; situations, on the other hand, which are neither divergent nor convergent are more slippery to grasp. The memorization task used in this study was the best approximation apparent (based on the one to many and many to one distinction, since memorization only involves a one to one transfer of information without problem-solving, per se), but there may be more appropriate ways to develop a control condition, especially if a contrast is to be made between divergent/convergent thinking and non-divergent/convergent thinking styles.

One final limitation of theoretical importance deals with the concept of domain-specificity commonly cited in creativity research. People who are creative in one domain (such as painting) are not necessarily creative in another (such as poetry-writing). This domain-specificity may also be at work with regard to divergent and convergent thinking. The thinking tasks given to participants were very generic in nature and had nothing to do with humor. If the tasks had been tailored to involve humor content, the link to humor appreciation may have been more apparent.

Future Directions

Building on these study limitations, a more effective design could be implemented to better explore the original hypotheses. One important improvement would be the inclusion of an experimental manipulation check to be sure that participants in the divergent condition, for instance, are in fact thinking divergently. To do so, a future study could utilize the thought-listing technique, an open-ended self-disclosure revealing thinking patterns and behavioral considerations, made popular by its original incarnation, the Critical Incident Technique (Flanagan, 1954). This thought-listing task requires participants to write out their thoughts as they consider how to approach a problem to be solved, how to change behavioral courses of action, and what aspects of the situation appear to affect their goals. Think-aloud and thought-listing techniques are two of the most effective methods available for understanding what is going on in
the mind of a person, but their usage is controversial. Typical think-aloud paradigms, while laudable for their moment-by-moment insights as a person talks through a problem-solving scenario, have been criticized for interfering with the very thought process they are trying to record by inserting demand characteristics (participants may look to the experimenter for clues as to whether or not they are on the right solution path) or by simply cluttering the natural problem-solving process with the constant need to evaluate or explain decisions or actions (Smagorinsky 1998). Thought-listings, which do not necessarily occur precisely while the subject is working, can be just as informative, but appear to be less intrusive, as they are captured at key moments only, such as before and after a problem-solving session (e.g., Cacioppo, von Hippel, & Ernst, 1997). To obtain the most informative responses with the smallest impact on the thinking process itself, a future study could use a thought-listing technique, implemented just before and just after the divergent/convergent/control thinking tasks.

To circumvent the fear that the thinking style prime itself would decay too rapidly, two alterations could be made: the creation of a shorter humor rating task, and the inclusion of a measure of prime decay. Having participants rate 45 humor items does take a fair amount of time, and the use of a briefer measure would increase the chances that the prime’s influence lasts through the entire humor task and that no other influences from within the humor task itself are arising. A measure of the length of time the prime lasts, perhaps conducted in a pilot study, could provide valuable insight into deciding the length of the humor task.

Although the jokes and cartoons used in this study’s humor task were unidimensional in nature, it might prove useful to categorize criteria of interest and then choose appropriate humor task items. Specifically, it may be the case that most of the verbal jokes we encounter rely on the incongruency theory of humor mentioned in a previous section. If indeed these tend to pull for divergent thinking, it would be advantageous to also have humor items which rely more heavily on
congruent thinking for their “funniness.” For example, while divergent items might include jokes with puns or other word play techniques requiring a branching-out of people’s general expectations, convergent items might actually include video clips of slapstick (pie-in-the-face) humor, where people know exactly how a joke is going to unfold, even given a realm of possibilities, and still find it funny. A similar extrapolation might be done with jokes with which participants either are or are not familiar, treating familiar ones as convergent (one correct, known outcome) and unfamiliar ones as divergent (multiple possible outcomes). Comparisons could then be made to see if convergent thinkers found convergent jokes to be more funny than divergent jokes, and vice-versa.

A more elaborate experimental investigation of this study’s hypotheses might very well include tasks administered in both causal directions (thinking followed by humor, as in this study, as well as humor followed by thinking). If participants had thinking tasks following joke ratings, the responses to those tasks could be judged on their level of either divergence or convergence. This would indicate if exposure to humor could act as a prime for thinking more divergently (or less convergently).

Humor appreciation was chosen as the dependent variable in this study because of the complication in comparing humor creation (making up jokes or funny captions) with divergent thinking, since both are often popularly associated with creativity in general. It would be interesting to uncover, however, if humor creation was sensitive to the influence of either divergent or convergent thinking. Careful consideration would have to be given to the danger of merely studying the practice effects of one potentially creative act upon another, but the findings could prove to be quite different from those concerning humor appreciation. It is often all too apparent that people who can appreciate a good joke do not necessarily know how to create one.
With the results from this study and the prudent implementation of some of the suggestions offered above, it is hoped that future research will be able to break through the current lack of unambiguous, useful theories in the realm of humor. Whether or not a link exists between divergent thinking and humor appreciation, this study has been a first step for the field in even begging the question.
Notes

1. The common idea that depressed people are sometimes more creative than non-depressed people (as in the case of noteworthy poets who suffer from major affective disorders and suicide attempts) is hotly debated and may be due to an improper analysis of the cycles of depression and creativity they experience. A current suggestion, still being researched, is that while in the downward throws of depression, people are, in fact, less creative than the average person; however, while on the upswing (sometimes towards mania, other times, simply “coming out” of the depression), their level of creativity is quite high. It is guessed that when depressed, people can make a great many observations about life, etc. that are commonly overlooked by emotionally “neutral” others, and when they surface from the depression, they are able to have unique insights judged to be creative (see Eysenck, 1994, for a brief introduction to this idea). Of course, the relationship between creativity and depression is likely multifaceted and no all-encompassing explanation has yet been offered empirically.

2. It should be noted here that although concerns may be raised about the instructions for completing the mood questionnaires, and about the number of mood checks in this study in general, previous studies have shown that this, in fact, does not need to be a problematic aspect of the design. The authors of the PANAS have been able to successfully validate and reliably use this scale whether asking participants to complete it every two months, or even multiple times in one hour to monitor subtle changes in mood. Its instructions can be appropriately modified to pay attention to your mood now, or over the past week, or just in general. Similarly, explaining to participants that our observations of mood are not of prime importance in and of themselves, yet it is still important to have accurate measurements, has been shown to be a reasonable method of obtaining mood ratings without excessive bias or demand characteristics either for raising (as in the case of rating mood after a humor task) or keeping mood constant (as it is thought some participants might try to do if they have access to previous ratings they have made). For more information, please see Watson, Clark, and Tellegen, 1988.
Table 1

Internal Reliability of Individual Differences Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number of Items</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Complexity Scale (CCS)</td>
<td>10</td>
<td>.80</td>
</tr>
<tr>
<td>Scale of Creative Attributes and Behavior (SCAB)</td>
<td>20</td>
<td>.85</td>
</tr>
<tr>
<td>Sense of Humor Questionnaire (SHQ)</td>
<td>6</td>
<td>.67</td>
</tr>
</tbody>
</table>

*Note. N = 140.*
Table 2

Mean Ratings on Individual Differences Scales

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Complexity Scale (CCS)</td>
<td>5.04</td>
<td>.90</td>
</tr>
<tr>
<td>Scale of Creative Attributes and Behavior (SCAB)</td>
<td>4.80</td>
<td>.72</td>
</tr>
<tr>
<td>Sense of Humor Questionnaire (SHQ)</td>
<td>5.32</td>
<td>.83</td>
</tr>
</tbody>
</table>

Note. N = 140. Means are on a 7-point scale.
Table 3

Bivariate and Partial Correlations among the Individual Differences Scales

<table>
<thead>
<tr>
<th></th>
<th>SCAB</th>
<th>SHQ</th>
<th>Partial Correlations Controlling for:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>CCS - SCAB</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CCS - SHQ</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>SCAB - SHQ</td>
</tr>
<tr>
<td>CCS</td>
<td>.64 (&lt;.001)*</td>
<td>.31 (&lt;.001)*</td>
<td>.59 (&lt;.001)*</td>
</tr>
<tr>
<td>SCAB</td>
<td>.43 (&lt;.001)*</td>
<td>.32 (&lt;.001)*</td>
<td>.05 (531)</td>
</tr>
</tbody>
</table>

Note. N = 140. Cells include Pearson correlation coefficients and (p-values). CCS = Cognitive Complexity Scale; SCAB = Scale of Creative Attributes and Behavior; SHQ = Sense of Humor Questionnaire.

* Finding is statistically significant after Bonferroni correction.
Table 4

Internal Reliability of Three Mood Scale Administrations

<table>
<thead>
<tr>
<th>Scale</th>
<th>Number of Items</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood Scale Time 1</td>
<td>11</td>
<td>.71</td>
</tr>
<tr>
<td>Mood Scale Time 2</td>
<td>11</td>
<td>.80</td>
</tr>
<tr>
<td>Mood Scale Time 3</td>
<td>11</td>
<td>.81</td>
</tr>
</tbody>
</table>

>Note. N = 140.
Table 5

Mean Ratings on Three Mood Scale Administrations

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mood Scale Time 1</td>
<td>4.64</td>
<td>.75</td>
</tr>
<tr>
<td>Mood Scale Time 2</td>
<td>4.56</td>
<td>.84</td>
</tr>
<tr>
<td>Mood Scale Time 3</td>
<td>4.85</td>
<td>.80</td>
</tr>
</tbody>
</table>

*Note. N = 140. Means are on a 7-point scale.*
Table 6

Mean Ratings on Individual Differences, Mood, and Humor Appreciation Measures across Conditions and Genders

<table>
<thead>
<tr>
<th>Scale</th>
<th>Divergent (n=48)</th>
<th>Convergent (n=47)</th>
<th>Control (n=45)</th>
<th>Female (n=92)</th>
<th>Male (n=48)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>CCS</td>
<td>5.06</td>
<td>.84</td>
<td>5.09</td>
<td>.97</td>
<td>4.95</td>
</tr>
<tr>
<td>SCAB</td>
<td>4.78</td>
<td>.67</td>
<td>4.85</td>
<td>.82</td>
<td>4.73</td>
</tr>
<tr>
<td>SHQ</td>
<td>5.37</td>
<td>.95</td>
<td>5.32</td>
<td>.69</td>
<td>5.24</td>
</tr>
<tr>
<td>Mood 1</td>
<td>4.67</td>
<td>.62</td>
<td>4.64</td>
<td>.77</td>
<td>4.57</td>
</tr>
<tr>
<td>Mood 2</td>
<td>4.66</td>
<td>.86</td>
<td>4.45</td>
<td>.86</td>
<td>4.53</td>
</tr>
<tr>
<td>Mood 3</td>
<td>4.94</td>
<td>.77</td>
<td>4.89</td>
<td>.85</td>
<td>4.72</td>
</tr>
<tr>
<td>HARs</td>
<td>3.61</td>
<td>.92</td>
<td>3.59</td>
<td>.90</td>
<td>3.60</td>
</tr>
</tbody>
</table>

Note. Means are on a 7-point scale. CCS = Cognitive Complexity Scale; SCAB = Scale of Creative Attributes and Behavior; SHQ = Sense of Humor Questionnaire; Mood 1 = Mood Scale at Time 1; Mood 2 = Mood Scale at Time 2; Mood 3 = Mood Scale at Time 3; HARs = Humor Appreciation Ratings.
APPENDIX A

MOOD SCALE

Participants were given a sheet with these instructions, along with an area for responses (a series of empty, numbered bubbles, not shown here to conserve space):

Please rate how well each of the following words describes your mood right now, at this exact moment, from 1 (does not describe my mood very well) to 7 (describes my mood very well), by filling in the bubble of the appropriate number next to that word.

1. Interested
2. Afraid
3. Inspired
4. Distressed
5. Upset
6. Nervous
7. Enthusiastic
8. Excited
9. Alert
10. Irritable
11. Now, describe your overall mood right now, at this exact moment, from 1 (extremely bad mood) to 7 (extremely good mood), by filling in the bubble of the appropriate number.
APPENDIX B

DIVERGENT THINKING TASKS

Product Improvement Task

Participants were given a sheet with these instructions, along with an area for response below them:

In the next 5 minutes, try to think of ways to improve the toy stuffed dog shown here. Write out ideas that are clever, interesting, and unusual ways of changing the toy so that it will be more interesting and more fun for children to play with, and that you think no one else will be able to think of. Be creative.

Alternative Uses Task

Participants were given a sheet with these instructions, along with an area for response below them:

In the next 5 minutes, try to see how many unusual uses of a shoe you can think of. Write out ideas that you think no one else will be able to think of. Be creative.

Category Task

Participants were given a sheet with these instructions, along with an area for response below them:

In the next 5 minutes, try to think of as many things as you can that are round. Write out ideas that you think no one else will be able to think of. Be creative.
APPENDIX C

CONVERGENT THINKING TASKS

Maze Task

Participants were given a sheet with these instructions, along with the mazes pictured here (reduced to 75% size to conserve space) and area to provide their responses within them:

In the next 5 minutes, complete as many of the following four mazes as you can by drawing a line from start to finish.

1. START

![Maze 1](image1)

FINISH

2. START

![Maze 2](image2)

FINISH
Participants were given a sheet with these instructions, along with the word search pictured here:

In the next 5 minutes, find and circle as many of the following 4-letter words in the word puzzle below as you can. Words may be found vertically (up-down) or horizontally (left-right).
Remote Associate Task

Participants were given a sheet with these initial instructions, along with the word groups below (solutions are in parentheses) and an area to write their responses (not shown here to conserve space):

In the next 5 minutes, solve as many of the word problems below as you can by reading the group of three words and deciding on a fourth word commonly associated with all of the words in that group. Then, write out the fourth word that makes their common association clear. Some associations are more obvious than others, but each group of three words does have a fourth word that is related in some way. Try to figure out what it is.
One example item was given to participants, presented after these instructions, to help them understand the task. This example is shown here:

In the group of three words below, all of the words have a common association with the word glass, as in the phrase broken glass, the phrase glass eye, and the fact that glass is clear.

EXAMPLE: Broken
Eye
Clear

Solution: Glass

Participants were then given these final instructions:

Now, try to solve as many of the problems below as you can in this same way. Be sure to write out your answer like in the example. If you are unsure of an answer, make your best guess.

1. Coin
Quick
Spoon
(Silver)

2. Gold
Stool
Tender
(Bar)

3. Time
Hair
Stretch
(Long)

4. Stick
Light
Birthday
(Candle)

5. Manners
Round
Tennis
(Table)

6. Off
Trumpet
Atomic
(Blast)

7. Playing
Credit
Report
(Card)

8. Rabbit
Cloud
House
(White)

9. Salt
Deep
Foam
(Sea)

10. Square
Cardboard
Open
(Box)

11. Water
Tobacco
Stove
(Pipe)

12. High
Book
Sour
(Note)

13. Square
Telephone
Club
(Book)

14. Barrel
Root
Belly
(Beer)

15. Notch
Flight
Spin
(Top)

16. Strap
Pocket
Time
(Watch)

17. Color
Numbers
Oil
(Paint)

18. Sandwich
Golf
Foot
(Club)
APPENDIX D

CONTROL TASK

Memorization Task

Participants were given a sheet with these instructions, along with the word lists shown below (one at a time) and a separate area to provide their responses (not shown here to conserve space):

In the next 15 minutes, you will be memorizing three lists of words (A, B, and C) and testing your memory of them. You will be presented with one list at a time, given time to memorize it, and then given time to write down the words that you remember on another sheet of paper. Please read all of the instructions that follow carefully.

[Presented to participants before each word list:] Below is a list of 20 words. You will have 3 minutes to memorize as many of them as you can, in any order. Just do your best.

[Presented to participants after each memorization phase:] In the next 2 minutes, write down as many words from List A [or B or C] as you can remember, in any order. Just do your best.

<table>
<thead>
<tr>
<th>LIST A</th>
<th>LIST B</th>
<th>LIST C</th>
</tr>
</thead>
<tbody>
<tr>
<td>WITCH</td>
<td>SKUNK</td>
<td>WRECK</td>
</tr>
<tr>
<td>JELLY</td>
<td>POLE</td>
<td>RIDE</td>
</tr>
<tr>
<td>GRAPH</td>
<td>BATH</td>
<td>POWDER</td>
</tr>
<tr>
<td>COW</td>
<td>LEADER</td>
<td>RESUME</td>
</tr>
<tr>
<td>PUNCH</td>
<td>SEA</td>
<td>SHOVE</td>
</tr>
<tr>
<td>THUMB</td>
<td>TOMB</td>
<td>TERM</td>
</tr>
<tr>
<td>BRIGHT</td>
<td>MIRROR</td>
<td>CHILDHOOD</td>
</tr>
<tr>
<td>WORK</td>
<td>FAIRY</td>
<td>HAPPEN</td>
</tr>
<tr>
<td>FACTORY</td>
<td>MATCH</td>
<td>PLATE</td>
</tr>
<tr>
<td>SUBMARINE</td>
<td>DRESS</td>
<td>COPY</td>
</tr>
<tr>
<td>SHADOW</td>
<td>BOOM</td>
<td>TERROR</td>
</tr>
<tr>
<td>THUNDER</td>
<td>CLEAN</td>
<td>STRETCH</td>
</tr>
<tr>
<td>AIR</td>
<td>DELAY</td>
<td>EXCITED</td>
</tr>
<tr>
<td>CHEER</td>
<td>LOCK</td>
<td>TAILOR</td>
</tr>
<tr>
<td>MOVIE</td>
<td>TOUGH</td>
<td>GRAPHIC</td>
</tr>
<tr>
<td>RANG</td>
<td>ADVERTISE</td>
<td>CRACKS</td>
</tr>
<tr>
<td>DIAMOND</td>
<td>BLACK</td>
<td>SPIRAL</td>
</tr>
<tr>
<td>SALT</td>
<td>QUOTE</td>
<td>INSECT</td>
</tr>
<tr>
<td>INK</td>
<td>REASON</td>
<td>CAUTION</td>
</tr>
<tr>
<td>SPONGE</td>
<td>ACTION</td>
<td>SIGH</td>
</tr>
</tbody>
</table>
APPENDIX E

HUMOR APPRECIATION TASK

Participants were given a sheet with these instructions, the humor items, and an area for responses (a series of empty, numbered bubbles, not shown here to conserve space):

Please rate your enjoyment of each joke or cartoon from 1 (not at all funny) to 7 (very funny) by filling in the bubble of the appropriate number next to that item. Circle the question mark if you don't understand the joke. Please try to compensate for the fact that you may have seen or heard some of these before by responding as you imagine you responded the first time.

1. Two ducks are sitting in a pond. One turns to the other and says, "Quack." The other one says, "I was going to say that!"

2. A magician worked on a cruise ship. The audience was different each week, so he did the same tricks over and over again. One problem: The captain's parrot saw the shows each week and began to figure out how the magician did every trick. Once he understood, he started shouting in the middle of the show, "Look, it's not the same hat!" "Look, he's hiding the flowers under the table!" "Hey, why are all the cards the ace of spades?" The magician was furious but couldn't do anything. It was, after all, the captain's parrot. Then, during a fierce storm, the ship sank. The magician found himself on a piece of wood in the middle of the sea with, as fate would have it, the parrot. They stared at each other with hatred but did not utter a word. This went on for a day, and then another, and then another. Finally, on the fourth day, the parrot could not hold back, "OK, I give up. Where's the ship?"

3. What's green and likes snow?
   Ski-weed.

4. A wise old teacher is dying. His disciples line up next to his deathbed, from the most brilliant one at the head of the line to the most stupid one at the end. The brilliant one leans down and says, "Master, master, what are your final words?" "My final words," murmurs the ancient, "are — life is a river." The disciple repeats these words to the person next to him, and the message travels like wildfire down the line. "The master says life is a river. The master says life is a river." When it reaches the oaf at the end, however, he says, "What does the master mean, life is a river?" That message travels back up the line. "What does the master mean, life is a river?" The brilliant disciple leans over again, for the teacher is breathing his last. "What do you mean, life is a river?" he pleads. And the teacher shrugs, "So it's not a river!"

5. While sliding along through the forest one day, a snail was overturned by a gang of turtles. He lay under a bush, dazed, until another snail happened by and helped him up. "What happened?" asked his rescuer. "I don't know," replied the snail. "It all happened so fast!"

57
6. O FE dear, what XTC
I MN8 when U IC!
Once KT 1 with me with her I's;
2LN I O countless sighs;
T was MLE while over C's;
Now all 3 R nonNTT's,
4 U XL them all UC
U suit me, FE, 2 a T.

7. A man orders a pair of pants from the tailor. It takes him six weeks to complete the job. Incensed, the customer berates him. "God it took only six days to create the world, and you it takes six weeks to make a pair of pants." "Yes," replies the tailor. "But look at these pants — and look at the world!"

8. I used to snore so loud that I would wake myself up. But I solved the problem. Now I sleep in the next room.

9. If a wheel falls off a bus while traveling down a river, how long will it take to shingle a dog house?
None, because there's no bones in cottage cheese!

10. A couple of New Jersey hunters are out in the woods when one of them falls to the ground. He doesn't seem to be breathing; his eyes are rolled back in his head. The other guy whips out his cell phone and calls the emergency services. He gasps to the operator, "My friend is dead! What can I do?" The operator, in a calm soothing voice says, "Just take it easy. I can help. First, let's make sure he's dead." There is a silence, then a shot is heard. The guy's voice comes back on the line. He says, "OK, now what?"
13. I want to die peacefully in my sleep like my grandfather. Not screaming and yelling like his passengers.

14. A man comes into a bar with his dog and orders two martinis. He drinks one and the dog drinks the other. The next day the same thing, the next day the same. Finally, the dog comes in alone, so the bartender serves him a drink without even asking. The next day the man comes in with a box under his arm. "I brought you a present for being so nice to my dog," he says. "It's a king crab." "Oh, thanks," says the bartender. "I'll take him home for dinner." "No," says the man. "He's already had his dinner. Why don't you take him out to a movie instead?"

15. What do you call a ferocious nude?
   A grizzly bare.

16. What does a grape say when you step on it?
   Nothing. It just gives a little whine.

17. Some tourists in the Chicago Museum of Natural History were marveling at the dinosaur bones. One of them asked the guard: "Can you tell me how old the dinosaur bones are?" The guard replied: "They are three million, four years, and six months old." "That's an awfully exact number," said the tourist. "How do you know their age so precisely?" The guard answered: "Well, the dinosaur bones were three million years old when I started working here, and that was four and a half years ago."
19. A doctor gives a patient a check-up and looks very concerned.  
   Patient: "Okay doc, break it to me... how long do I have to live?"  
   Doctor: "Ten."  
   Patient: "Ten what? Years? Months?"  
   Doctor: "...nine...eight...seven...six..."

20. It's not what you don't know that hurts you. It's the things you know for sure that aren't true.

21. A man and his wife were having some problems at home and were giving each other the silent treatment. The next week, the man realized that he would need his wife to wake him at 5:00 a.m. for an early flight to Sydney. Not wanting to be the first to break the silence, he finally wrote on a piece of paper, "Please wake me at 5:00 a.m." The next morning, the man woke up, only to discover it was 9:00 a.m., and that he had missed his flight. Furious, he was about to go and see why his wife hadn't awakened him when he noticed a piece of paper by the bed. It said, "It's 5:00 a.m. Wake up."

22. A couple of New Jersey hunters are out in the woods when one of them falls to the ground. He doesn't seem to be breathing; his eyes are rolled back in his head. The other guy whips out his cell phone and calls the emergency services. He gasps to the operator, "My friend is dead! What can I do?" The operator, in a calm soothing voice says, "Just take it easy. I can help. First, let's make sure he's dead." There is a silence, then a shot is heard. The guy's voice comes back on the line. He says, "OK, now what?"
23. Knock Knock
Who's there?
Boo
Boo who?
Don't cry

24. The following program contains material some viewers may find offensive. Parental discretion is advised.

25. The trouble with political jokes is that they often get elected.

26. Two parrots are sitting on a perch. One says to the other: “Can you smell fish?”

27. Two guys walk into a bar.
The third guy ducks.

28. Teacher: “Dennis, if you had a dollar and you asked your mother for another dollar, how many dollars would you have?”
Dennis: “One.”
Teacher: “You don’t know your arithmetic.”
Dennis: “You don’t know my mother.”

29. A man and a friend are playing golf one day at their local golf course. One of the guys is about to chip on to the green when he sees a long funeral procession on the road next to the course. He stops in mid-swing, takes off his golf cap, closes his eyes, and bows down in prayer. His friend says: “Wow, that is the most thoughtful and touching thing I have ever seen. You truly are a kind man.” The man then replies: “Yeah, well, we were married 35 years.”
31. If I eat three cakes in the morning and three for lunch, what will I have? A tummy ache.

32. A woman gets on a bus with her baby. The bus driver says: "That's the ugliest baby that I've ever seen. Ugh!" The woman goes to the rear of the bus and sits down, fuming. She says to a man next to her: "The driver just insulted me!" The man says: "You go right up there and tell him off. Go ahead, I'll hold your monkey for you."

33. Military intelligence is a contradiction in terms.

34. Bob received a parrot for his birthday. The parrot was fully grown, with a very bad attitude and worse vocabulary. Every other word was an expletive; those that weren't expletives were, to say the least, rude. Bob tried to change the bird's attitude by constantly saying polite words, playing soft music, anything he could think of. Nothing worked. He yelled at the bird, and the bird got worse. He shook the bird, and the bird got madder and more rude. Finally, in a moment of desperation, Bob put the parrot in the freezer. For a few moments he heard the bird swearing, squawking, kicking, and screaming and then, suddenly, there was absolute quiet. Bob was frightened that he may have actually hurt the bird, and quickly opened the freezer door. The parrot calmly stepped out on to Bob's extended arm and said: "I'm sorry that I offended you with my language and my actions, and I ask your forgiveness. I will endeavor to correct my behavior." Bob was astounded at the changes in the bird's attitude and was about to ask what had changed him, when the parrot continued: "May I ask what the chicken did?"

35. When NASA first started sending up astronauts, they quickly discovered that ballpoint pens would not work in zero gravity. To combat the problem, NASA scientists spent a decade and $12 billion to develop a pen that writes in zero gravity, upside down, underwater, on almost
any surface including glass and at temperatures ranging from below freezing to 300 degrees. The Russians used a pencil.

36. Simplified IRS form:

![1040 U.S. Individual Income Tax Return]

- Name: __________________________
- Address: _________________________
- Social Security number: ___________
- How much money did you make? ______
- Send it in.

Dept. of the Treasury—Internal Revenue

37. Why do ducks have webbed feet?
To stamp out fires.
Why do elephants have flat feet?
To stamp out burning ducks.

38. Sherlock Holmes and Dr. Watson were going camping. They pitched their tent under the stars and went to sleep. Sometime in the middle of the night, Holmes woke Watson up and said, "Watson, look up at the stars, and tell me what you see." Watson replied, "I see millions and millions of stars." Holmes said, "And what do you deduce from that?" Watson replied, "Well, if there are millions and millions of stars, and if even a few of those have planets, it's quite likely there are some planets like Earth out there. And if there are a few planets like Earth out there, there might also be life." And Holmes said, "Watson, you idiot, it means that somebody stole our tent."

39. Two fish are in a tank.
One turns to the other and says: "Do you know how to drive this?"

40. A grasshopper walks into a bar. The bartender says: "Hey, we have a drink named after you!" The grasshopper replies: "Why'd you name a drink Bob?"
41. The patient replies: “But doctor, I am ninety!”
   The doctor responds: “Well, that’s it then.”

42. The doctor says to the patient: “You’re in excellent health. You’ll live to be ninety.”
   The patient replies: “But doctor, I am ninety!”
   The doctor responds: “Well, that’s it then.”

43. Why can’t a scientist tell a joke timing.

44. A duck walks into a post office and asks the postman: “Do you have any corn?” The postman answers politely: “No, we don’t have any corn here.” The next day the duck enters the post office again and asks: “Do you have any corn?” A bit annoyed, the postman answers: “No! We don’t have any corn.” On the third day, the duck again enters and asks: “Do you have any corn?” The postman gets so upset, he yells: “NO! For the last time, we don’t have any corn, and if you ask again, I’ll nail your beak to the counter!” The next day, the duck returns to the post office and asks: “Do you have any nails?” The postman answers: “No.” Then the duck asks: “Do you have any corn?”

45. A guy gets home from work one night and hears a voice. The voice tells him: “Quit your job, sell your house, take your money, go to Vegas.” The man is disturbed at what he hears and tries his best to ignore the voice.
   The next day when he gets home from work, the same thing happens. The voice tells him: “Quit your job, sell your house, take your money, go to Vegas.” Again the man ignores the voice, though he is very troubled by the event. Every day, day after day, the man hears the same voice when he gets home from work. Each time the man hears the voice, he becomes increasingly upset.
   Finally, after two weeks, he succumbs to the pressure. He quits his job, sells his house, takes his money, and heads to Vegas. The moment the man gets off the plane in Vegas, the voice tells him: “Go to a casino.” So, he hops in a cab and rushes over to the nearest casino. As soon as he sets foot in the casino, the voice tells him: “Go to the roulette table.” The man does as he is
told. The voice then tells him: "Put all your money on number 17." Nervously, the man cashes in his money for chips and then bets them all on 17. The dealer wishes the man good luck and spins the roulette wheel.

Around and around the ball goes. The man anxiously watches the ball as it slowly loses speed until finally it settles onto number... 21. The voice says: "Damn."
APPENDIX F

INDIVIDUAL DIFFERENCES SCALES

Participants were given a sheet with these instructions, the scale items, and an area for responses (a series of empty, numbered bubbles, not shown here to conserve space):

Please rate how much you agree with each of the following statements, in general, from 1 (strongly disagree) to 7 (strongly agree) by filling in the bubble of the appropriate number next to that statement.

The items are presented here in one version of the order they were to participants. For ease of reference, the specific scale to which an item belongs, as well as its positive (+) or negative/reverse (−) scoring follows the item in parentheses according to these abbreviations:

Cognitive Complexity Scale (CCS), Sense of Humor Questionnaire (SHQ), and Scale of Creative Attributes and Behavior (SCAB). Demographic items are at the end and are self-explanatory.

1. I spend much of my time creating things. (SCAB +)
2. I believe in the importance of art. (CCS +)
3. I dabble in many different hobbies. (SCAB +)
4. I easily recognize a hint like a twinkle or a slight change in emphasis as a mark of humorous intent. (SHQ +)
5. I enjoy creating new things. (SCAB +)
6. I avoid philosophical discussions. (CCS −)
7. I work on some type of creative project on a daily basis. (SCAB +)
8. It would be easy for me to find something comical, witty, or humorous in most situations if I really tried. (SHQ +)
9. I am often able to see the “big picture” where others can’t. (SCAB +)
10. I love to think up new ways of doing things. (CCS +)
11. I am often able to make connections between seemingly unrelated things or situations. (SCAB +)
12. I would say that I have much cause for amusement during an ordinary day. (SHQ +)
13. I have an ability to find the hidden potential of ideas that others often can’t see. (SCAB +)

14. I rarely look for a deeper meaning in things. (CCS –)

15. When someone asks me to solve a difficult problem, I usually find creative solutions. (SCAB +)

16. Persons who are always out to be funny are really irresponsible types not to be relied upon. (SHQ –)

17. I am somewhat mischievous. (SCAB +)

18. I enjoy hearing new ideas. (CCS +)

19. I am very spontaneous. (SCAB +)

20. Humorists irritate me because they so blatantly revel in getting others to laugh. (SHQ –)

21. I am impulsive. (SCAB +)

22. I am not interested in theoretical discussions. (CCS –)

23. I am a “risk taker.” (SCAB +)

24. It is my impression that those who try to be funny really do it to hide their lack of self-confidence. (SHQ –)

25. I am flexible in my thinking. (SCAB +)

26. I carry the conversation to a higher level. (CCS +)

27. I like new ideas. (SCAB +)

28. I am not interested in abstract ideas. (CCS –)

29. I am very tolerant of other people. (SCAB +)

30. I prefer variety to routine. (CCS +)

31. I am accepting of other people’s ideas. (SCAB +)

32. I try to avoid complex people. (CCS –)

33. I often fantasize. (SCAB +)

34. I don’t like to waste my time daydreaming. (SCAB –)
35. I would have difficulty just letting my mind wander without control or guidance. (SCAB -)

36. I like to imagine going to new places. (SCAB +)

37. I have a good appreciation of humor. (SCAB +)

38. I consider myself to be creative. (SCAB +)

39. Gender: [Female or Male options]

40. Age: [blank space to fill in a number]

41. Number of years in college: [blank space to fill in a number]

42. I am a Native English speaker. [Yes or No options]
BIBLIOGRAPHY


