

4-2014

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## Recommended Citation

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Punchline Predictability, Comprehension Speed, and Joke Funniness:  
Investigating Incongruity Theories of Humour

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Honors Psychology Thesis  
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April, 2014

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### Abstract

Surprise is an important element of many cognitive theories of humour (e.g., Suls, 1972): the less predictable the punchline, the funnier a joke is expected to be. Many theories also predict a curvilinear relationship between speed of joke comprehension and funniness: jokes that are too easy or too difficult should be less funny than those that require an intermediate amount of processing. This study was designed to investigate these two assumptions of past theories. Undergraduate psychology students ( $N = 183$ ) participated online and completed two tasks. The Joke Completion Task required the participants to read the joke stem of a series of jokes and predict the punchlines. Each predicted punchline was rated for its similarity to the actual punchline. In the Joke Rating Task, participants rated the funniness of a different series of complete jokes. The participants' speed of comprehension (reaction time) was also measured during this task. As expected, the results were contrary to the predictions of past humour theories. Predictability of punchlines was found to be positively correlated with joke funniness, and the reaction time for comprehension of a joke was negatively correlated with funniness. These findings suggest that previous theories may be incorrect, and a new cognitive conceptualization of joke processing may be needed. A general outline for a new conceptualization of humour is presented using the framework of System 1 and System 2 thinking from Kahneman's (2011) research.

## **Association between Punchline Predictability, Comprehension Speed, and Joke Funniness: Investigating Incongruity Theories of Humour**

It is rare to go through a day and not encounter humour in some form. Humour is a common mode of communication used in media and incorporated in daily social interactions. Laughter has been found to occur on average 18 times a day in response to various types of humour (Martin & Kuiper, 1999). The prevalence of humour has important implications for many different aspects of human social interaction. Humour has been found to be a successful way to probe a social situation, build group identity (Robinson & Smith-Lovin, 2001; Vinton, 1989), an ingratiation tactic (Kane, Suls, & Tedeschi, 1977) and even a sexual interest signal (Walle, 1976). The benefits of humour extend into psychological health as well. Correlational research has found a moderate relationship between humour, decreased scores of depression and anxiety and increased self-esteem (Deaner & McConatha, 1993; Kuiper & Martin, 1993). Experimental research on the use of humour has also found effects on physical health, specifically pain-reducing effects and increased tolerance of pain (Cogan, Cogan, Waltz & McCue, 1987). These studies indicate only a small subset of possible implications that can result from the use of humour in a variety of situations.

Researching humour in various situations is difficult since humour is often incidental or spontaneous and therefore difficult to investigate in controlled laboratory experiments (Martin & Kuiper, 1999). The use of jokes is a solution to this problem due to the fact that each joke is a self-contained unit of humour that requires no specific context. By using jokes as objects of study, researchers can break down the mechanisms involved to determine what makes a joke funny. Once there is a greater understanding of

the characteristics of a successful joke, it may be possible to generate a greater understanding of the cognitive mechanisms involved in humour more generally. The purpose of this study is to investigate two characteristics that have been incorporated as assumptions in most cognitive theories of humour: (1) the central importance of surprise or unpredictability, and (2) the inverted-U relationship between speed of comprehension and funniness of a joke.

### **Unpredictability**

Many cognitive theories of humour have emphasized the central importance of surprise or unpredictability in jokes. A review of past theories of humour by Keith-Spiegel (1972) revealed 35 theories that incorporated surprise and characteristics of unpredictability. In his widely-cited and influential Incongruity-Resolution theory of humour, Jerry Suls (1972) explained the necessity of surprise, using the following joke to illustrate his two-stage model:

O'Riley was on trial for armed robbery. The jury came out and announced, "Not guilty."

"Wonderful," said O'Riley, "does that mean I can keep the money?"

As shown in Figure 1, the first stage of Suls' model is the "identification of the incongruity". When a listener of a joke hears the joke stem (the initial part of the joke before the punchline) they will logically make a prediction about what the ending, or punchline, will be. In the example above, the listener hears the man on trial is found not guilty, therefore the listener logically concludes that he has not committed a crime and predicts that he will now be set free. The next step depicted in the model is the comparison of the predicted ending to the actual punchline. When the actual punchline of

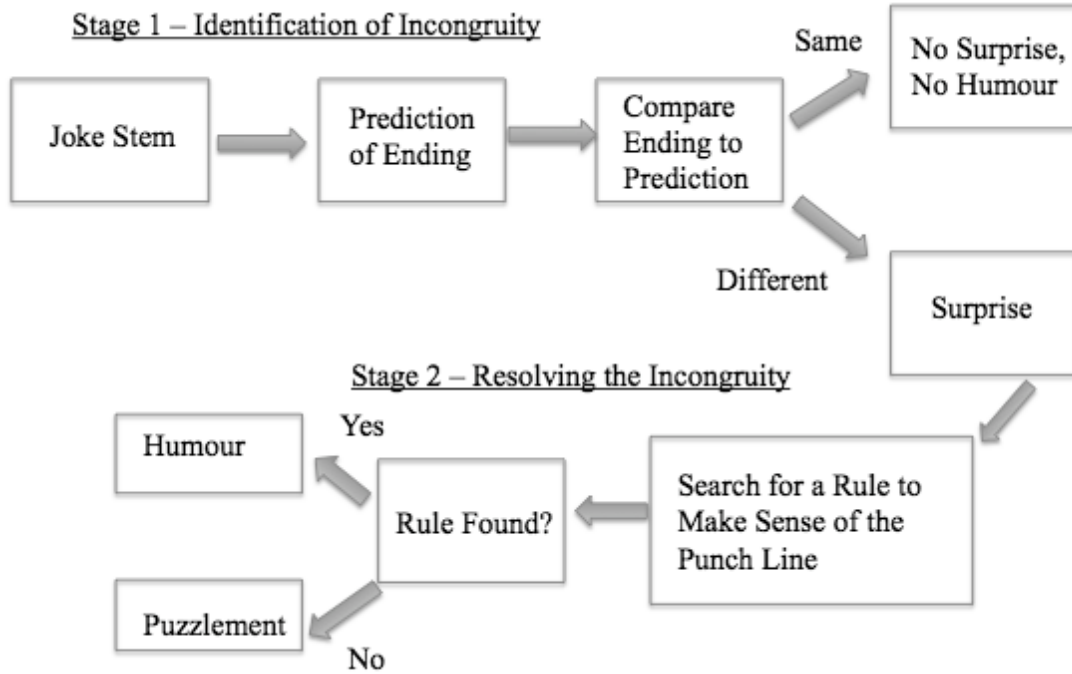


Figure 1. Two-stage model of humour processing, adapted from Suls (1972).

the joke is heard (i.e., the man asks if he can keep the money), it is compared to the listener's prediction. If the prediction of the joke ending and the actual ending turn out to be the same, there is no surprise and therefore the listener has heard a logical statement. A logical statement is not found to be funny by the listener. If the actual punchline of the joke is different from the predicted punchline, as shown by the example, the listener is surprised and it is this surprise that drives the second stage of the model. The "resolution of the incongruity" stage requires the listener to search for a possible logical rule that can incorporate the new information provided by the punchline that initially caused the incongruity. In this case, the listener must search for other possible interpretations that can be used to understand the comment made by the man on trial. If the listener is able to realize that the punchline implies the man did in fact commit the robbery then humour is elicited, resulting in laughter. If this new piece of information is not found to resolve the incongruity, then only confusion is elicited. The essential element in Suls' model is therefore the requirement of surprise or unpredictability. If the punchline is not unpredictable, then there is no chance for the joke to be funny. Thus, Suls viewed the comprehension and appreciation of jokes as a sort of problem-solving process, similar to the way an individual processes serious forms of information. Since the listener is logically reasoning through the presented information, the incongruity is unexpected and leads to surprise, which triggers a search for an alternative explanation to resolve the incongruity (Suls, 1972).

Researchers have found some support for Suls' view about the relationship between surprise and funniness. Rather than using jokes and punchlines, Nerhardt (1970, 1976) developed a weight judgment paradigm to investigate whether surprise by itself

can generate laughter and mirth. In this methodology participants lift a series of weights, and are instructed to judge whether each one is heavier or lighter than a standard reference weight. After being presented with a series of weights that are only slightly different from the standard, the participant unexpectedly lifts a weight that is greatly different, either much lighter or heavier than the standard. This research revealed that when the participants lifted the vastly different weight, they frequently smiled and even laughed, and later reported that the experience was funny or amusing. Nerhardt hypothesized that, while lifting the similar weights, participants build up an expectation or implicit prediction about subsequent weights, and when the greatly discrepant weight is lifted it is unexpected and incongruous, generating surprise. On the basis of these findings, Nerhardt argued that resolution of incongruity is not necessary to generate funniness but instead it is the surprise itself that is essential to humour (Deckers 1993; Nerhardt, 1976). This series of studies suggested that surprise and funniness are closely related even without the use of verbal jokes, implying a relationship that is generalizable to other forms of humour.

Further support for the necessity of surprise in a successful joke is provided by the work of Thomas Herzog and colleagues (Herzog & Bush, 1994; Herzog & Hager, 1995; Herzog & Karafa, 1998). These researchers had groups of participants rate series of jokes on several different dimensions, including the degree of surprise and funniness. The results revealed that there was a significant positive correlation between ratings of the amount of surprise that was incorporated in the joke and the participant's rated funniness of that joke (Herzog & Bush, 1994). However, an earlier study utilizing a similar methodology found the opposite pattern of results (Kenny, 1955). In this study, one group



of participants provided ratings of surprise and another group provided funniness ratings of a series of jokes. Surprisingly, a negative correlation was found between surprise and funniness, contrary to Herzog's findings. The less surprising the punchline was rated to be, the funnier the joke was. The inconsistent pattern of findings across these studies indicates that the relationship between funniness and unpredictability of a joke needs further investigation.

An important methodological weakness of these findings is that the participants were given the joke in its entirety before providing their various ratings. Asking participants to retrospectively assess how surprising a joke is after they have already heard the punchline may lead to demand characteristics. For example, participants may have preconceived opinions about the association between funniness and surprise, and may engage in backwards reasoning when rating the jokes on surprise, judging the degree of surprise on the basis of how funny they found the joke to be. A better approach would be to assess participants' expectancies before they actually hear the punchline, to determine the degree of discrepancy between the two.

In an attempt to clarify the relationship between surprise and funniness, Pollio and Mers (1974) improved on the methods of the research described above. In this study a group of participants were initially presented with the first part of the joke, the joke stem. The participants then had to record their prediction of what they thought the punchline was going to be. The predictions were scored for similarity to the actual punchline. The jokes that were used were taken from two, recorded stand-up comedy routines, one from Bill Cosby and the other from Phyllis Diller. A separate group of participants viewed the comedy acts in their entirety and the amount of group laughter generated in response to

the jokes was used as a measure of funniness. The methods that were used in this study provide a creative way to avoid the possible demand characteristics involved in previous research. However, the jokes that were used were taken from only eight segments of the stand-up routines (four from each comedian) and the punchline was defined based on when the audience laughed. This method generates jokes that are less self-contained and less easily broken down into the joke stem and joke punchline. The use of group laughter to measure funniness could be confounded with the social aspects of laughter. Since multiple participants were watching the stand-up routines together, a participant may laugh only because others are laughing. It is also the case that a participant may laugh at another individual's type of laugh itself. Despite these possible limitations, the results supported Kenny (1955), revealing that the more predictable the punchline of a joke, the more laughter was elicited. This study, along with that of Kenny (1955), casts doubt on the assumption of the importance of surprise in jokes.

More recently, these early cognitive theories of humour have been refined in order to incorporate more contemporary conceptualizations of cognitive information processing. In particular, several schema-based theories have been developed to describe the processing of jokes (Apter, 1982; Attardo & Raskin, 1991; Wyer & Collins, 1992). Each of these theories incorporates slightly different aspects and elaborations of the mechanisms involved in the processing of jokes, but they all have in common the idea that humour involves a sudden shifting from one schema to another. Wyer and Collins (1992) describe a joke taken from Mindess, Miller, Turek, Bender, and Corbin (1985):

A blind man enters a department store, picks up his dog by its tail and begins swinging it over his head. A clerk hurries over and says, "Can I help you, sir?" "No thanks," the man replies, "I'm just looking around."

In this example the joke stem is heard and an initial schema is activated. The activated schema incorporates a blind man and a dog and an element of strangeness (swinging the dog around). When the punchline is heard (ie. "I'm just looking around") a new schema is activated, and one that is very different from the initial schema. The punchline activates the schema related to a normal shopping activity, as it is a common thing to say when dealing with a store clerk. Wyer and Collins suggest that the simultaneous activation of these schemas, as opposed to replacing the initial schema with the second, allows for the enjoyment of the joke. Only when both schemas are activated is the juxtaposition of a strange, blind man with his seeing-eye dog and a commonplace activity fully realized and enjoyed.

These theories provide an alternative view to the Incongruity-Resolution model that was proposed by Suls (1972). In particular, these theories no longer view surprise as such a necessary factor for a joke to be funny. Instead, it is the searching for an alternative schema that can generate funniness. Contrary to Suls (1972), the simultaneous activation of two incongruous schemas is what generates the mirth and funniness of the joke (Apter, 1982; Attardo & Raskin, 1991; Koestler, 1964; Wyer & Collins, 1992). These theories suggest that, while hearing the joke, the listener of a joke is actively looking for the incongruity and possible other schemas, rather than waiting for the incongruity to present itself. Incongruity is therefore not surprising, but is expected.

Indeed, it may be the case that the funniest jokes are the ones in which the alternative schema is easiest to find, and therefore the punchline is most predictable.

The more recent schema-based conceptualizations of the cognitive processes involved in joke-processing lead to the first hypothesis of the present study:

**Hypothesis 1.** The funniest jokes will be the ones in which the punchlines are the most predictable.

The current study used a methodology similar to the methods developed by Pollio and Mers (1974). However, the methods were improved by using a larger number of jokes taken from several joke books. These jokes included traditional self-contained jokes as well as stand-up acts, rather than only the two stand-up routines used by Pollio and Mers (1974). *Stand-up* style of jokes traditionally are more anecdotal in nature and provide greater supporting details as compared to *canned jokes*, which are more simplistic and often use linguistic aspects such as puns within the joke. It was expected that the improved methods would provide more reliable and generalizable results to more accurately assess the earlier cognitive theories of humour, and whether or not a joke must be surprising to be funny.

### **Speed of Comprehension**

The second research question in the present study concerned the assumption of many incongruity theories of humour, which state that there is an inverted-U relationship between the speed of comprehension and the funniness of a joke. According to this view, the jokes that require a moderate amount of cognitive processing will be the funniest. As one example of this assumption, Wyer and Collins (1992) argued that the amount of humour that will be elicited is a curvilinear function of time and effort to reinterpret the

information presented by the punchline. This function implies, if a joke was understood too easily it is not funny, and if it takes the listener too much effort to understand the joke it will also not be funny. The difficulty of comprehension is therefore nonmonotonic and creates an inverted-U relationship. In many studies, the difficulty of comprehension is operationalized through the use of speed of comprehension. The easier a joke is the faster it will be understood. The reaction time is assumed to be a measure for the amount of cognitive processing that is being done. The premise of an optimal amount of processing has been incorporated into other theories of humour and also supported in some research (Berlyne, 1971; Wyer & Collins, 1992).

Support for an inverted-U relationship between difficulty of comprehension and funniness has been produced predominately in studies of children (Zigler, Levine & Gould, 1967), and alternative materials other than jokes (Hoppe, 1976; Wilson, 1979). Working with child participants, Zigler, Levine and Gould (1967) showed cartoons of varying difficulty and recorded preference scores for the cartoons. The results revealed that the moderately difficult cartoons elicited the most amount of mirth from the children supporting the inverted curvilinear relationship. Further support has been provided by studies showing that children enjoy jokes and humour that are congruent with the level of their cognitive development (McGhee, 1976). Children do not find jokes funny if they are above or below their cognitive processing level, therefore creating an inverted-U relationship. However, children are a unique population due to their limited language, humour exposure and skill; generalizing their findings to adult populations may therefore not be reliable.

Additional support for the inverted-U relationship has used more contrived stimuli to generate humour. Hoppe (1976) used strings of words, not generated specifically to be funny, to investigate how much humor participants found in the stimuli. The strings of words varied on the degree that each word tends to follow other words in the English language. The stimuli ranged from seemingly normal sentences to nonsensical word strings. Again, there was evidence of an inverted-U relationship. The word strings that were moderately unlikely to appear in common English generated the most humour (Hoppe, 1976). The use of words and sentences that are not jokes can create misleading results, as these are more serious forms of information. Serious forms of information are likely processed differently than jokes, suggesting that further study of jokes may indicate a different relationship.

There has also been research that casts doubt on the hypothesized inverted-U relationship, suggesting the relationship between funniness and speed of processing is linear (Derks, Staley & Haselton, 1998; Raskin, 1998). Herzog and Bush (1994), as described above, had participants score jokes on various dimensions. In addition to the previously mentioned dimensions, they investigated rated difficulty. It was found that there was a negative linear relationship. The less difficult the joke was rated, the funnier it was. Derks, Staley and Haselton (1998), using the same methodology as Herzog and colleagues found a strong negative correlation between comprehension difficulty and amusement of a joke. The more difficult a joke was to understand, the less enjoyment or humour was created. However, as noted previously, the methods used in these studies were problematic. Having participants provide self-report ratings of how difficult a joke is could be confounded with the participant's desire to avoid appearing incompetent.

Therefore, the relationship between comprehension difficulty and funniness of a joke needs to be investigated with more thorough methods.

Cunningham and Derks (2005), through the use of reaction time, further analyzed the relationship in terms of speed of comprehension and funniness. Participants were presented with a short passage and had to indicate whether it was a joke or a non-joke. Response time for a participant to make a correct identification for the passage was recorded. Response time for participants was interpreted as a measure of comprehension difficulty; to quickly make a decision about a passage, it must be easily understood. Response time was negatively correlated with joke funniness. The faster the participants identified the passage as a joke the funnier it was (Cunningham & Derks, 2005).

Cunningham and Derk's findings are supportive of the possibility of a linear relationship, but are not without their limitations. The use of both jokes and non-jokes in the study could be measuring two separate cognitive processes at once. The point of emphasis is that jokes are processed differently than other types of information.

Overall, the studies that have found a linear relationship have described it in terms of expertise (Derks, Staley & Haselton, 1998; Cunningham & Derks, 2005). The authors theorized that expertise was an important contributor to the relationship, also that the use and comprehension of jokes is a skill that improves with use. This theory would explain why a different relationship was found in studies using children as they have had less exposure and practice with jokes (McGhee, 1976; Zigler, Levine & Gould, 1967). The ability of the listener to quickly understand the joke requires experience and skill with jokes in general. Therefore, the second hypothesis of the present study is:

**Hypothesis 2.** There will be a negative linear relationship between the comprehension reaction time and funniness of a joke.

The current study did not use jokes and non-jokes, but instead, presented participants only with jokes. Response time of comprehension was measured as the amount of time it takes for the participant to understand the joke. It was expected that the use of an objective measure, rather than self-report, would avoid confounds in the investigation of the concept of speed of comprehension.

The investigation of unpredictability, speed of comprehension and funniness of jokes together allowed us to examine the relationship among all three of these concepts. A third research question, which was more exploratory in nature, was to investigate the relationship among the three concepts. We were interested in the possibility of a mediating relationship between the predictability of jokes, speed of comprehension and funniness of the joke. A possible mechanism of the processing of jokes can be demonstrated by the relationship between these concepts. It is expected that the results will be consistent with the view that when an individual hears a joke, it is not processed in a serious problem-solving way. Instead, the listener is aware that it is a joke being heard and initiates an expectation of incongruity, leading to faster comprehension of the joke and greater funniness overall.

## **Method**

### **Participants**

Undergraduate students ( $N = 183$ ) at the University of Western Ontario, enrolled in an introductory psychology course, completed the study as part of their course requirements. There were 54 males and 129 females ( $M_{\text{age}} = 18.8$  years, age range: 16-58



years) who completed the study. Although prospective participants were informed that a requirement of the study was having English as their first language, four participants indicated that English was their second language. However, because they had been speaking English for a considerable period of time ( $M = 13$  years speaking English, range: 7-17 years), none of the four participants were excluded from the study.

### **Materials**

Ninety-six jokes were used in total, 48 *canned jokes* and 48 *stand-up jokes* (see Appendix A). The canned jokes, which are more self-contained with less supporting details, were taken from the book *Small Medium at Large: How to Develop a Powerful Verbal Sense of Humor* (McGhee, 2004). The stand-up jokes, were taken from *Jokes to Go* (Brown, 2003). The jokes were chosen through a random criterion-based selection procedure. That is, jokes were selected at random but were retained for inclusion in the study only if they met the following criteria: (1) ethically appropriate (did not contain any sexist, racist or vulgar content), (2) at least minimally funny, (3) not too long (maximum length: 60 words). This procedure was followed iteratively with each of the two joke books until a total of 48 jokes had been selected from each book. The 96 jokes were then randomly divided into four sets of 24 jokes, each set containing 12 of the canned jokes and 12 of the stand-up jokes.

### **Study Tasks**

**Joke rating task.** In the Joke Rating Task, the participant was presented with one of the four sets of 24 jokes (selected at random). The jokes from this set were presented individually in randomized order. Each joke was displayed in its entirety on the computer screen, and the participant was required to click an “okay” button with the computer

mouse once the joke was read and understood. Comprehension reaction time was measured in milliseconds by taking the time that elapsed from the presentation of the joke on the screen until the participant clicked the “okay” button. Once the participant clicked “okay” a funniness rating scale appeared, consisting of a 7-point Likert scale ranging from 0 (*Not at all funny*) to 6 (*Very funny*). The participant also indicated whether or not they had heard the joke before (YES/NO). If the participant indicated “YES”, then their rating for that particular joke was omitted from the subsequent analyses. The same process was followed for each of the 24 jokes in the set.

**Joke completion task.** In the joke completion task, the participant was presented with another randomly selected set of 24 jokes, which was different from the set used in the Joke Rating Task. These jokes were presented in randomized order in a series of 24 trials. In each trial, the stem of the joke (the beginning of the joke that excludes the punchline) was presented on the computer screen, and the participant was asked to predict what they thought the punchline would be. Once the prediction was typed into the designated box, the participant clicked “okay” and the entire joke with the actual ending was shown. The participant clicked “okay” again once the actual joke had been read, and a rating scale appeared. The participant rated the similarity of their predicted punchline to the actual punchline on a 7-point Likert scale ranging from 0 (*Completely different*) to 6 (*Exactly the same*). Finally, the participant indicated if they had heard the joke before (YES/NO). As with the previous task, if the participant had heard the joke before their responses for that joke were omitted from the subsequent analyses. Once this process was repeated for all 24 jokes in the set the task was complete.

## **Procedure**

Each participant gained access to the study website over the Internet from their personal computer by using their identification number. The participants responded anonymously as no names or student numbers were collected. After participants entered the study website, they were first presented with a letter of information (Appendix B), and consent form. By clicking the “I agree to participate” button they provided their electronic signature. Once participants had given consent they were taken to the demographic questionnaire (Appendix C) where they recorded their age, gender (male/female), and indicated whether English was their first language (yes/no). If participants answered “no” for English as their first language, an additional question appeared asking them to record how many years they have been speaking English. The participant was then randomly assigned to complete either the Joke Rating Task or the Joke Completion task first. After completing the first task, they were presented the other task. Once both tasks were complete, the participant was presented with a debriefing page (Appendix D), which provided an explanation of the rationale for the study as well as additional reading resources and researcher contact information. The participant was then given course credit for their participation.

### **Procedure for Mediation Analyses**

To test for a potential mediating effect, we used the recently developed bootstrap sampling procedure described by Preacher and Hayes (2008). This bootstrap procedure uses sampling with replacement to draw a large number of samples (2,000 in the present study) from the data set and calculate path coefficients for each sample. Then, using the estimates based on these 2,000 bootstrap samples, the mean direct and indirect effects and their confidence intervals (CIs) are calculated. These CIs are used to determine if

each effect is statistically significant. For each effect, the 95% CI is examined and, if this range does not include zero, then this effect is statistically significant at  $p < .05$ . In a similar fashion, CIs can also be set at 99%, resulting in significance levels of  $p < .01$  if zero does not fall within the calculated CI range. Preacher and Hayes (2008) articulate several advantages of using this bootstrap-driven CI statistical test for direct and indirect effects, compared to product-of-coefficient approaches such as the Sobel test. One important advantage of this approach is that it does not impose the assumption of normally distributed variables.

We conducted these analyses with SPSS 21 using the macro provided by Preacher and Hayes (2008) for carrying out the bootstrap procedure. In order to compare the results across analyses and variables, all variables used in these analyses were standardized ( $M = 0$ ,  $SD = 1.0$ ). Path coefficients can therefore be interpreted in a manner similar to correlation coefficients.

## Results

### Data Preparation

To test our hypotheses, data analyses were conducted using jokes rather than participants as units of analysis. The similarity ratings, reaction time, and the funniness ratings are the three variables of interest for each joke. Before conducting these analyses, however, it was necessary to compute mean scores for each joke on each of the three variables. These variables were compiled by taking the mean for each joke across all participants who had been presented with that joke in the relevant task. Recall that each joke was seen by approximately 25% of the participants (~45) in each task. In computing these joke means, data were omitted for each variable from any participant who indicated

they had seen the joke previously. These omitted values were then replaced by the mean value for that joke from all remaining participants who had not previously seen the joke.

Given the concern that some participants may not have responded conscientiously, we also deleted data from participants whose scores did not correlate adequately with those of the other participants across the jokes. To determine these correlations, we conducted reliability analyses on each variable within each of the four sets of jokes separately. Thus, for each reliability analysis there were 24 jokes and approximately 45 participants. To conduct these reliability analyses we transposed the data file so that jokes were treated as “participants” and participants were treated as “items on a scale”. Reliability analyses were conducted on these data, and item-total correlations were examined to identify any participants whose data did not contribute to the reliability. We interpreted low item-total correlation as a lack of conscientious responding. In cases of low item-total correlation ( $< 0.20$ ) we deleted the data of that participant, similarly to the way one would remove a bad item from a scale (see Figure 2). The final scores from each joke were therefore the mean values of those participants who were presented with that joke in the relevant task, who indicated that they had not previously heard the joke, and whose data showed item-total correlations greater than .20.

In the Joke Rating Task funniness ratings as well as reaction time were recorded. Within the funniness ratings 11.25 participants were removed on average from each of the four data sets, producing a final mean reliability of  $\alpha = .91$ . When computing reaction times, all participants with times over 25000 ms (average 3.25 participants per data set) were removed as any greater length of time was assumed to indicate the participant was

Joke #	PARTIC1	PARTIC2	PARTIC3	PARTIC4	...	PARTIC45
JOKE1	4	6	4	5	...	5
JOKE2	3	6	2	3	...	3
JOKE3	1	6	1	0	...	1
JOKE4	4	6	4	4	...	4
...	...	...	...	...	...	...
JOKE24	1	6	1	1	...	2

Figure 2. Example data to demonstrate the process of identifying and eliminating unreliable participants from the averaging of ratings, in this case, participant 2 would be removed.

not paying attention or currently working on the task. The resulting mean reliability of the reaction time of participants was  $\alpha = .96$ .

In order to control for differences in the lengths of the jokes, which could also strongly affect reaction times, we computed residual reaction time scores. This was done by conducting regression analyses with the mean reaction time for each joke as the outcome and number of words in the joke as the predictor. A residual reaction time was then calculated for each joke by taking the difference between the actual and predicted reaction times. This residual reaction time was used in the subsequent data analyses.

For the similarity ratings in the Joke Completion Task, an average of three participants were removed from each of the four sets. The resulting reliability of the similarity ratings across the four sets was  $\alpha = .95$ . In order to ensure the reliability of the participants' self-rated similarity ratings, two independent judges rated the similarity of predicted and actual punchlines for all participant responses in the Joke Completion Task. For each of the two raters, mean similarity ratings were computed for each joke across the participants who had seen the joke in the task. Further reliability analyses were then conducted on the similarity ratings using the mean scores from each of the two independent raters and the mean scores of the participants' self-ratings. This resulted in a mean Cronbach alpha of .98, indicating very strong reliability for the similarity ratings.

### **Correlational Analyses**

The descriptive statistics for the funniness ratings, similarity scores, and residualized reaction time are presented in Table 1. It is worth noting that, the funniness ratings of the jokes overall were not very high, but there was still an acceptable range of

Table 1

*Descriptive Statistics for the Three Variables of Interest*

Variable	Mean ( <i>M</i> )	Standard Deviation ( <i>SD</i> )	Minimum	Maximum
Funniness	2.23	.79	.80	4.16
Similarity	1.63	1.20	.02	5.18
Residualized Reaction Time	0.00	1284.11	-2385.48	3978.78



responses. If there was a much smaller range, further analyses would unlikely yield significant results.

The results from the correlational analyses among the variables are presented in Table 2. As expected, there is a significant positive correlation between the funniness ratings and the similarity scores ( $r(94) = .39, p < .01$ ), indicating that jokes that were perceived as funnier in the Rating Task had better predicted punchlines in the Completion Task. The funniness ratings from the Rating Task were also negatively correlated with residualized reaction time ( $r(94) = -.45, p < .01$ ), indicating that the funnier a joke was, the more quickly a participant comprehended it.

In order to determine if there is a curvilinear relationship between speed of comprehension and funniness, we conducted a regression analysis with funniness as the outcome variable, entering first residualized reaction time and then the square of the residualized reaction time to test the quadratic component. This analysis revealed that the regression coefficient for the quadratic component was not significant indicating that there is no curvilinear relationship ( $\beta = -0.03, t = -.29, ns$ ). A similar, exploratory, analysis was conducted to investigate whether a curvilinear relationship exists between the similarity rating and the funniness of a joke. Again, it was found that there is no curvilinear relationship between the two variables ( $\beta = -0.11, t = -.35, ns$ ).

### **Mediation Analyses**

Finally, using the bootstrapping procedure described earlier, analyses were conducted to examine potential mediating relationships among the funniness ratings, similarity ratings and residualized reaction times. Initial, informal hypotheses led to Model 1, with similarity as the predictor, reaction time as the potential mediator and

Table 2

*Correlations among the Three Variables of Interest*

	Similarity	Residualized Reaction Time
Funniness	.39**	-.45**
Similarity		-.25*

*Note.* \*  $p < .05$ ; \*\*  $p < .01$

funniness as the outcome variable. The results of this analysis are presented in Figure 3. A significant indirect effect of reaction time on funniness was found ( $p < .01$ ), indicating that reaction time mediates the process of predicting a punchline and finding it funny. However, the direct effect of similarity on funniness was also significant ( $c' = .29, p < .01$ ). This direct relationship indicates that reaction time only partially mediates the relationship between similarity of predicted and actual punchline and the funniness of the joke. In an attempt to better describe the relationship among the three variables a second model was analyzed. In Model 2, similarity was still the predictor variable, but now funniness was the potential mediator and reaction time was the outcome variable. The results of this analysis are presented in Figure 4. A significant indirect effect of funniness on reaction time was found ( $p < .01$ ). Furthermore, the direct effect of similarity on reaction time was nonsignificant ( $c' = -.09, ns$ ), indicating that the association between the predictability of joke punchlines and the comprehension reaction time is fully mediated by the rated funniness of the joke.

### Discussion

The current study was conducted to investigate previous cognitive theories of humour, specifically two key assumptions that are described within many of these theories. The first assumption is that surprise is an essential element to a successful joke. This assumption states that the punchline of the joke needs to be unpredictable for a joke to be funny (Suls, 1972). The second assumption investigated states that the funniest jokes are those that require an intermediate amount of cognitive processing. In the present study it was hypothesized that both of these assumptions are incorrect. The first hypothesis of the current study stated that there would be a positive correlation

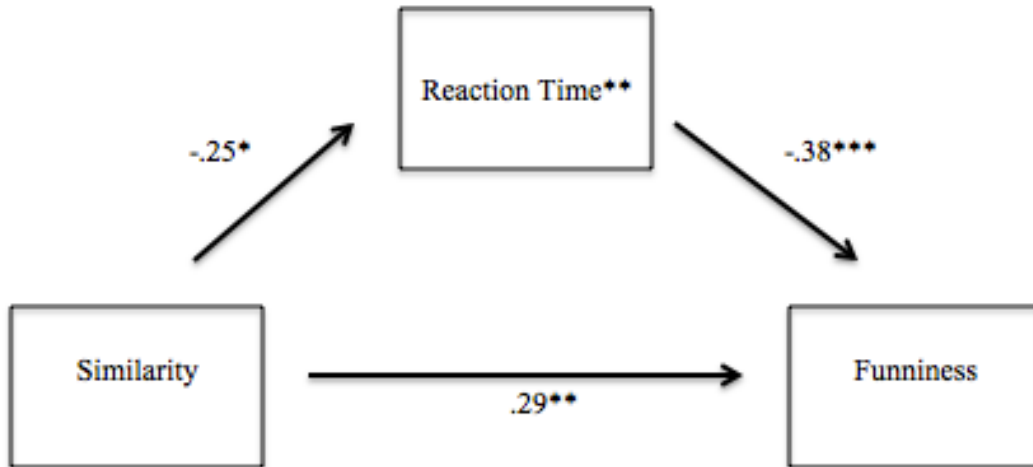


Figure 3: Mediating effects of reaction time on the relationship between similarity of predicted punchlines and the funniness of the joke. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

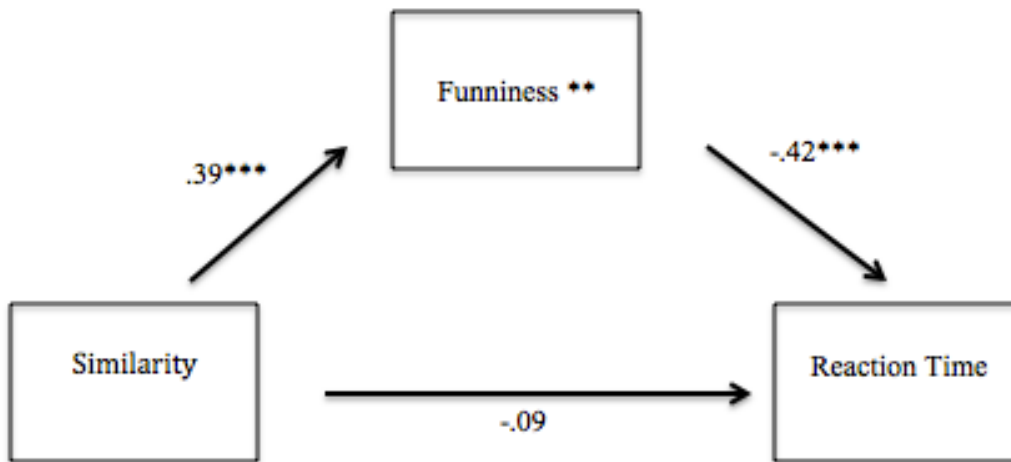


Figure 4: Mediating effects of funniness on the relationship between similarity of predicted punchlines and reaction time to comprehend the joke. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

between the predictability of the punchline and the rated funniness of the joke. This hypothesis was based on the findings of an earlier study by Pollio and Mers (1974), which cast doubt on the assumption of past cognitive theories that surprise is a central element of humour. This hypothesis was supported in the present study, and contradicts the two-stage model described by Suls (1972). Rather than surprise being a central component to elicit laughter in the recipient of a joke, the opposite appears to be the case. The more predictable the punchline of a joke, the funnier the joke is perceived to be. This finding is consistent with, and helps strengthen, the previous study by Pollio and Mers (1974). The methods of that earlier study, while creative, did leave room for improvement. By increasing the number of jokes overall, and modifying the method used to assess the funniness of the jokes, the methodology of the present study adds further confidence to their original findings.

The second hypothesis of the present investigation predicted that there would be a negative linear relationship between comprehension reaction time and the funniness of the joke. Again, this hypothesis was supported by the results. The faster participants indicated that they understood a given joke the funnier it was rated. This linear relationship is consistent with previous studies that also found a linear, rather than a curvilinear, relationship between the speed of processing and funniness of a joke (Cunningham & Derks, 2005; Derks, Staley & Haselton, 1998; Raskin, 1998).

By using reaction time to measure participants' speed of comprehension, similar to Cunningham and Derks (2005), these results contradicted the predictions of Wyer and Collins (1992). Wyer and Collins asserted that the funniest jokes would be those that involve a moderate level of comprehension difficulty, as opposed to those that are too

easy or too difficult. By using reaction time to operationally define speed of comprehension, a more objective measure was used which avoided weaknesses of other studies that employed a self-report measure of comprehension difficulty. Wyer and Collins (1992), along with other studies, utilized rated difficulty measures from participants (Derks, Staley & Haselton, 1998; Herzog & Bush, 1994). These self-report ratings from participants may be influenced by the preconceived ideas they may have about what are the components of a funny joke. The use of reaction time as a measure of comprehension speed limits the influence of the participants' individual thoughts on the relationships under investigation.

The final objective of the investigation was to explore a mediation relationship among the predictability of punchlines, speed of comprehension and the funniness of jokes. There was little theoretical framework to guide these analyses when deciding how to model the relationships among the three variables. Initially, the question that began the analyses was, what makes a joke funny? With this line of thinking the outcome of the mediation equation was initially set as funniness with similarity of the punchlines as the predictor and speed of comprehension as the mediator. As shown in Figure 3, the model was significant but speed of comprehension was found to be only a partial mediator of the relationship between similarity and funniness. Once the second model (Figure 4) was analyzed, with speed of comprehension as the outcome and funniness as the mediator, a stronger result was found, with funniness fully mediating the relationship between similarity and speed of comprehension. These results suggest that, rather than conceptualizing funniness of a joke as the outcome resulting from speed of processing, which in turn results from predictability of the punchline, it may be more appropriate to

think of speed of processing as the outcome resulting from the perception of funniness, which in turn results from the predictability of the punchline. In this way of thinking about the mediation process, a joke is not funnier because it is processed more quickly, but rather it is processed more quickly because it is funnier, due to the fact that the punchline is more predictable.

In an effort to more fully describe the cognitive mechanisms that are at work when processing a joke, it may be helpful to think about how information is processed generally. Daniel Kahneman (2011) described fast and slow thinking which he labeled System 1 and 2 respectively. Kahneman describes these two systems as follows:

*System 1* operates automatically and quickly, with little or no effort and no sense of voluntary control.

*System 2* allocates attention to the effortful mental activities that demand it, including complex computations. The operations of System 2 are often associated with the subjective experience of agency, choice and concentration. (p. 20-21)

More simply, System 1 is a system that is based on heuristics (rough, general rules), which are often seen as cognitive shortcuts. This faster process is also more prone to errors, however. Kahneman used the example of inferring emotion from an individual's facial expressions to depict System 1. This process is done almost instinctively and without much effort. System 2 uses more systematic thinking, which may even come to a different conclusion than the one generated by System 1. Another example presented by Kahneman (2011) was attempting to mentally multiply two-digit numbers. This process requires much more attention and cognitive effort to generate an answer, either correct or not.

The distinction between System 1 and System 2 has proven to be very useful for understanding many aspects of information processing. This distinction may also be very

useful for understanding the cognitive processes involved in humour and jokes. Viewing the cognitive mechanisms through the framework of fast and slow thinking may provide a clearer understanding and possible steps to the process of understanding jokes. In particular, one could argue that the present study was able to access both Systems 1 and 2 at different stages in the processing of a joke.

Based on this framework, one could hypothesize that when the listener of the joke begins to hear the joke stem (i.e., the beginning of the joke before the punchline), System 1 is activated. The listener of the joke, through the use of System 1 thinking, would have an initial schema activated based on what information is already available. This initial schema would be an attempt at interpreting the situation being described within the joke, based on the heuristics that are used when fast, System 1 thinking is used. Once the punchline is heard, it introduces new information that does not fit the initial interpretation by System 1 thinking. The listener then must switch to System 2 to recognize the incongruity, which consists of two alternative and incompatible explanations to the information presented in the punchline. This recognition of the incongruity will simultaneously activate the two interpretations created by the punchline. Koestler (1964) referred to this process as bisociation, stated that it occurs when two normally incompatible perspectives are taken simultaneously. Applying bisociation to jokes, the activation of multiple interpretations of the punchline at once generates pleasure and mirth. Therefore, the more accessible these alternative interpretations of the punchline are to System 2 thinking, the funnier the joke is. It must be easy for the listener to find the alternative explanations in System 2 or otherwise the joke will begin to be processed more slowly as a form of problem-solving rather than a joke, limiting the enjoyable play



involved in jokes. The hypothesized process can be depicted through the following joke, which was used in the present study:

When the nudist colony opened just outside town, everyone expected a great deal of media attention, but there was very little coverage.

When the listener hears the joke stem (which in this joke consists of everything but the final word), System 1 is initially activated. The listener is activating possible schemas based on what information is already available, such as terms “nudist” and “media”. The listener then develops some form of interpretation of the situation based on this information. When the punchline is heard “...there was very little coverage” the listener uses System 2 to realize that there are two possible interpretations of the meaning of the word “coverage.” The faster the listener is able to recognize that coverage can mean both media attention as well as clothing, the funnier the joke will be.

This potential model is demonstrated through the tasks that the participants had to complete in the present study. The Joke Rating Task is essentially the processing of a joke in the normal manner. A listener must hear the joke, make fast and error-prone conclusions, and then switch to a more thoughtful process quickly to recognize the alternative, incompatible interpretations that exist. By completing this process the listener now understands the joke. The easier it was to recognize the incongruity, the funnier the joke was rated to be, and the faster the resulting reaction time.

The Joke Completion Task, and its requirement of the participant to make a thoughtful prediction, changes the natural flow from System 1 to System 2. The nature of the task requires the listener to use System 2 immediately to generate their best prediction for the joke stem. This forced prediction requires the participant to attempt to identify the

incongruity (i.e., multiple opposing interpretations) before they hear the punchline. Rather than eventually switching to System 2, participants are attempting to recognize the incompatible meanings immediately. If the incongruity is easy to identify through the use of System 2, it is assumed that when the joke is processed normally (System 2 being activated after the punchline is heard), the joke will be easily understood and will quickly lead to the perception of funniness.

In the current investigation, as in all research, there are limitations that need to be taken into account. The predominant limitation is the limited types of humour used in the study, possibly restricting the external validity and generalizability to other types of jokes and humour overall. By studying both canned and stand-up jokes, unlike other previous research (Pollio & Mers, 1974), this study did expand the breadth of material that was studied. However, within the entire scope of jokes and humour this is still only a small subset of all possible materials that could have been used. The use of such simplified types of jokes was ideal for this investigation because having the self-contained units of humour with clear joke stems and punchlines allowed for easy division and analysis. Simplifying the content under investigation allowed the basic relationships between the variables of interest to be understood with the most clarity. There are many types of jokes with varying complexity and different components, but it is appropriate to begin by seeking to understand the relationships at a more basic level.

Another possible limitation relates to the population of participants that was utilized. The use of English-speaking university students is a specific population and can limit generalizations to other groups. There are no current theoretical models that would suggest using a younger and student sample would affect the variables of interest, but the

possibility remains that the relationships may only be found within the specific, educated population.

There are many potential ways to continue the line of research that has been initiated by the current study. The next step would be to broaden the range and types of jokes even further to see if the same relationship exists between punchline predictability, speed of comprehension and funniness. Initially it would also be easy to use puns (another simple self-contained joke). By studying puns and their variations (i.e., words that sound similar, words that look similar or words that have similar meanings) it may be possible to find linguistic factors that can affect the relationships (Attardo & Raskin, 1991). Another factor that is commonly associated with jokes is tendentiousness, or the amount of aggression that is related to the joke. The tendentiousness of jokes often leads into the social aspects of humour, as there is often a target or “butt” of the joke. In future studies researchers can get ratings of the tendentiousness of the jokes to investigate if it influences the predictability of the punchline or the funniness of the joke. To fully test the use of jokes in many situations jokes naturally occurring in social situations would need to be included. It would also be beneficial to conduct similar investigations using a broader range of participants. Replicating the findings of the current study with either older or younger populations would increase generalizability of the results. Using languages other than English would also be a great asset in furthering the findings and support for the potential model.

Another step to be taken in future research would be to provide further support for the proposed process of System 1 and System 2 in the processing of jokes. Within Daniel Kahneman’s writings (2011), he suggested an objective measure of the system currently

being used by an individual. Kahneman described how pupil dilation can be affected by the intensity of thought a participant is engaging in. Based on this finding pupils dilate while using System 2, and the effect is not created while using the faster (and easier) System 1. Knowing this, it may be possible to track pupil dilation while an individual completes the Joke Rating Tasks and Joke Completion Tasks, to test whether transitioning from one system to the other actually occurs, and in the order proposed above.

The findings of the current study show that there may have been several faulty assumptions in past incongruity theories of humour as well as the assumptions of laypersons about jokes. Suls' (1972) model was based on the assumption that people process jokes in the same way that they process serious forms of information. The predictions made by the listener are made as though the joke was serious information, and the listener is then surprised by the incongruity. In contrast, the present study suggests that people are aware that they are listening to a joke and are therefore anticipating the inevitable incongruity. The anticipation leads to an immediate search for the appropriate schemas that relate to the incongruity. Therefore, jokes may be better viewed as a collaborative form of cognitive play, where the listener of a joke is an active participant in the process rather than passively waiting for a punchline. Consequently, the funniest jokes will be those in which the incongruity is easy to identify, which in turn leads to the listener understanding the joke more quickly. The findings are consistent with the view that the more predictable a punchline, the funnier the joke is and the funnier the joke is the faster it is understood. There has been some earlier support for these findings but they have been few and over several decades (Pollio & Mers, 1974; Herzog & Bush,

1994; Cunningham and Derks 2005). Overall, these findings suggest a need for a new framework of how the cognitive processing of a joke is conceptualized. The process proposed above has the ability to clarify the apparent inconsistencies in the previous literature and is a stepping-stone to continue to develop and clarify. Viewing humour as a type of cognitive play, we suggest that a listener of a joke is able to take the cognitive tools that are normally used for the processing of ordinary, serious information and use them playfully in a way that generates incongruity and mirth. The ease of this cognitive play may be the determining factor in the amount of mirth elicited, but further research is required.

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## Appendix A

### List of all Jokes Used in the Present Study

(Note; \*\*\* indicates break between joke stem and punchline)

#### Canned Jokes

1. When the nudist colony opened just outside town, everyone expected a great deal of media attention, but there was very little \*\*\* coverage.
2. Dr. Oliver Wendell Holmes once said that as a physician, he was grateful for small \*\*\* fevers.
3. Why wouldn't the skeleton cross the road? He didn't have the \*\*\* guts.
4. A man bought a two-story house. 'The real estate agent told me \*\*\* one story before I bought it and another story afterward.'
5. A guy walks into a psychiatrist's office and says, 'Doctor, you've got to help me! I keep thinking I'm a deck of cards!'  
The doctor says, 'Sit over there. I'll \*\*\* deal with you later.'
6. Lawyer to client: 'Have you ever been up before this judge?'  
Client: 'Well, I don't know, what \*\*\* time does he get up?'
7. A doctor made a terrible mistake, and left a sponge inside the patient after surgery. There were no side effects, except the patient was always \*\*\* thirsty.
8. Sign in a pharmacy: 'We \*\*\* dispense with accuracy.'
9. Teacher: 'If you had 17 dollars and you asked your father for two more, how many dollars would you have?'  
Student: 'Seventeen.'  
Teacher: 'You don't know arithmetic very well.'  
Student: \*\*\* 'You don't know my father!'
10. A kindergarten class was taking a field trip to a zoo. The teacher said they would see a 10-foot snake.  
One girl seemed puzzled by this, and the teacher asked her what was wrong and if she was afraid of the snake.  
The girl said, 'No, I just never \*\*\* saw a snake with any feet before.'
11. A mother and her young son returned from the grocery store and began putting groceries away. He opened a box of animal crackers and spread them out on the table. 'What are you doing?' his mother asked.

'The box says you can't eat them if the seal is broken. I'm \*\*\* looking for the seal.'

12. An honest seven-year-old girl calmly explained to her parents that an older boy had kissed her after class. Her mother gasped, 'How did that happen?'

'Well, it wasn't easy,' said the girl, 'three girls \*\*\* helped me catch him.'

13. How are a duck and an icicle alike?

They both grow \*\*\* down.

14. A man got his blonde wife a toy poodle for her birthday. But she almost killed it trying to \*\*\* put batteries in it.

15. 'Doctor, my husband thinks he's a chicken.'

'How long has this been going on?'

'About five years.'

'Well why haven't you brought him in sooner?'

'Well, to tell you the truth, we \*\*\* needed the eggs.'

16. My daughter thinks I'm too nosy. At least that's what she \*\*\* wrote in her diary.

17. Young son: 'Dad, I heard that in some parts of the world, a man doesn't even know his wife before he marries her.'

Dad: 'That is \*\*\* true everywhere, son.'

18. 'Say, I heard Mrs. Cargle in Room 324 had triplets.'

'Yes they say it happens once in 10,000 times.'

'Amazing! How does she find \*\*\* time to get her work done?'

19. They let commercial pilots start flying these days with almost no experience.

Last week, the pilot of the plane I flew in was so new at the job the plane had \*\*\* training wheels.

20. What does 'paradox' mean? Two \*\*\* doctors.

21. What do you call a clairvoyant little-person on the run from the law? A \*\*\* small medium at large.

22. Friend: 'How'd you come out in the argument with your wife?'

Husband: 'Oh, she came crawling to me on hands and knees.'

Friend: 'Is that so?'

Husband: 'Yes, she said, 'Come \*\*\* out from under that bed you coward!'

23. What do you get when you cross a parrot with a hyena?

An animal that can \*\*\* tell you what it's laughing at.

24. A blonde went into a store, and someone stole her car while she was inside.

The police asked her, 'Did you see what the thief looked like?'  
She said, 'No but I got \*\*\* the license number.'

25. In my teens my mother always said, 'The way you put things off you'll never amount to anything.'  
I said, 'Oh yeah, just \*\*\* wait.'

26. A woman who wanted to improve her self-concept went to a bookstore and asked the manager where the self-help section was.  
The manager said, 'If I told you, \*\*\* that would defeat the purpose.'

27. 'My wife and I were happy for 25 years.'  
'Then what happened?'  
'We \*\*\* met.'

28. A woman rushes into her house and yells to her husband, 'Sam, pack your things! I just won the lottery!'  
He says, 'Should I pack for warm weather or cold?'  
She answers, 'I don't care, as long as \*\*\* you're out of the house by tonight.'

29. A mother takes her seven-year-old son to the doctor. The boy says, 'It hurts when I press here (pressing his side), and here (his other side), and here (pressing his leg), and here, here and here (pressing his other leg and arms).'  
The doctor examined him and finally discovered that he had a broken \*\*\* finger.

30. Sign on Adam and Eve's house: 'We're never \*\*\* clothed.'

31. How do you get down from an elephant?  
You don't get down from an elephant. You get \*\*\* down from a goose.

32. A couple was having an argument over family finances. The husband finally exploded, 'If it weren't for my money, the house wouldn't be here!'  
The wife answered, 'Honey, if it weren't \*\*\* for your money, I wouldn't be here.'

33. A woman gets on a bus with her young daughter. The rules are that children ride free until age five.  
The girl just walks by the driver, who says, 'Just a minute little girl, how old are you?'  
'Four and a half.'  
'And when will you be five?'  
'As soon as \*\*\* I get off the bus.'

34. Did you hear that NASA has established a new restaurant on the moon? It has great food, and low prices, but no \*\*\* atmosphere.

35. Timmy: 'Teacher, would you punish me for something I didn't do?'  
Teacher: 'Of course not.'

Timmy: 'Good, because I \*\*\* didn't do my homework!'

36. There are three kinds of people, those who can count and \*\*\* those who can't.

37. When an alligator goes on welfare, what does he get?  
\*\*\* Gatorade.

38. A neutron goes into a bar and asks, 'How much for a beer?'  
The bartender says, 'For you, \*\*\* no charge.'

39. On the first day of school, the kindergarten teacher said, 'If anyone has to go to the bathroom, hold up two fingers.'  
A little voice in the back of the room asked, 'How will \*\*\* that help?'

40. A little girl asked her mother, 'Can I go outside and play with the boys?'  
Her mother replied, 'No, you can't play with the boys. They are too rough.'  
The girl thought about it for a few seconds and asked, 'If I can find a \*\*\* smooth one can I play with him?'

41. Teacher: 'Didn't you promise to behave?'  
Student: 'Yes ma'am.'  
Teacher: 'And didn't I promise to punish you if you didn't?'  
Student: 'Yes ma'am. But since I didn't \*\*\* keep my promise, I don't expect you to keep yours.'

42. A woman complains to a friend, 'My husband just can't be trusted. He cheats so much that I'm not even sure this baby I'm carrying \*\*\* is his.'

43. What happened to Johnny when he fell through the screen door?  
He got a \*\*\* strained muscle.

44. A woman was fired from her job at a frozen orange juice company. They said she just couldn't \*\*\* concentrate.

45. Two fish are in a tank. One turns to the other and says, 'Do you know how to \*\*\* drive this thing?'

46. What do you call a monkey in a minefield? A \*\*\* baboom.

47. Two women are talking. 'Do you ever wake up grouchy?'  
'No, I usually \*\*\* let him sleep.'

48. Two Eskimos sitting in a kayak got very cold, so they lit a fire in their little boat.  
The boat sank, proving once and for all you can't \*\*\* have your kayak and heat it too.

Stand-Up Jokes

49. Last Halloween was bad for me. I got real beat up. I went to a party dressed as \*\*\* a piñata.
50. I made out my will the other day. I'm still in it. If I die, I \*\*\* get everything.
51. If most accidents happen within five miles of home, why not \*\*\* move ten miles away?
52. I'm descended from a very long line my mother \*\*\* once foolishly listened to.
53. I got into an argument with my girlfriend inside a tent. A tent is not a good place for an argument.  
I tried to walk out on her and had to slam \*\*\* the flap.
54. Cops have arrested Miss Teen Texas for disorderly conduct after being involved in a drunken brawl at a bar. She was in a fight with another girl, but the strange thing is that they both wanted \*\*\* world peace.
55. There's always one of my uncles who watches a boxing match with me and says, 'Sure. Ten million dollars. You know, for that kind of money, I'd fight him.'  
As if someone is going to pay \$200 a ticket to see a fifty-seven-year-old carpet salesman get \*\*\* hit in the face once and cry.
56. I know a lot about cars. I can look at a car's headlights and tell you exactly \*\*\* which way it's coming.
57. Not all chemicals are bad. Without chemicals such as hydrogen and oxygen, for example, there would be no way to make water, a vital ingredient in \*\*\* beer.
58. They built a tunnel from England to France. The English drive on the left side of the road and the French on the right, so that's \*\*\* one busy lane.
59. On the other hand, you have different \*\*\* fingers.
60. Condoms aren't completely safe. A friend of mine was wearing one and got \*\*\* hit by a bus.
61. 'Take our daughters to work' day. This is when girls nine to fifteen go to work. Or, as it's called at the Nike factory in Bangladesh -- \*\*\* Thursday.
62. One of my big fears in life is that I'm going to die and my parents are going to have to clear out my apartment and find that porno wing I've been adding to for years. There'll be more than one \*\*\* funeral that day.

63. My doctor gave me two weeks to live. I hope they're \*\*\* in August.
64. A new study shows that drivers who listen to fast-tempo music while driving have more accidents, while drivers listening to slow music have \*\*\* sexier accidents.
65. I have been on an emotional roller coaster lately. The other day my mood ring \*\*\* exploded.
66. You never hear a man say, 'I'm so embarrassed. There's another man wearing a black tuxedo.'  
They're happy if they all look alike. It means they haven't \*\*\* made a mistake.
67. I believe that my decision to remain unfit at the age of thirty-four will serve me well in the future, as I'll never have to endure people whispering that I've really \*\*\* let myself go.
68. I think Pringles' original intention was to make tennis balls. But the day the rubber was supposed to show up they got a \*\*\* big load of potatoes instead.
69. I went to a cigarette factory in Kentucky a few years ago, took the tour. The employees there get free smokes. Which pretty much cuts down the \*\*\* pension plan.
70. You have to wait ten days to buy a gun in L.A. I can't \*\*\* stay mad that long.
71. Joined a health club last year, spent four hundred bucks. Haven't lost a pound. Apparently, you have to \*\*\* show up.
72. Hotels are tired of getting ripped off. I checked into a hotel and they had towels \*\*\* from my house.
73. My husband is not good at shaving. He goes into the bathroom a man with light stubble. He comes out of the bathroom the victim of a \*\*\* shark attack.
74. It was tragic. They arrested an Amish man and put him in jail. Think about it. It's terrible.  
It's worse than for me and you. Take him down there, give him that one phone call. Who the hell is he going to call? None of his friends \*\*\* have telephones.
75. According to statistics, it's a lot easier to get hit by lightning than to win a Lotto jackpot. The good side: you don't hear from \*\*\* your relatives.
76. My daughter overlooked such big things in her fiancé. He was on probation for a marijuana arrest and drunk driving.  
The honeymoon was house arrest. I think he just married her for \*\*\* a designated driver.

77. According to new medical studies, exposure to secondhand smoke dramatically increases a nonsmoker's risk of getting heart disease and lung cancer. Jubilant tobacco executives say the new study proves without a shadow of a doubt that \*\*\* nonsmoking can kill you.
78. If the cops arrest a mime, do they have to inform him of \*\*\* his right to remain silent?
79. It amazes me that people still go to wax museums. Pay twenty-five dollars to see a six-foot-tall Winston Churchill candle. And they always say, 'It's so lifelike.' Lifelike and motionless cancel each other out. I'd only find a wax museum amusing if it was \*\*\* on fire.
80. A beautiful woman moved in next door. So I went over and returned a cup of sugar. She said, 'You didn't borrow this.' I said, 'I \*\*\* will.'
81. I'm kinda depressed right now because we had to put Grandpa in a rest home. Well not actually: We didn't have the money. So we drove down the turnpike and \*\*\* put him in a rest area.
82. I bought a twenty-dollar pen because I always lose pens and I got sick of not \*\*\* caring.
83. I'm against picketing, but I don't know \*\*\* how to show it.
84. I love to shop after a bad relationship. I buy a new outfit and it makes me feel better. It just does. Sometimes when I see a really great outfit, I'll \*\*\* break up with someone on purpose.
85. My favourite health club is the International House of Pancakes. Because no matter what you weigh, there will always be someone who \*\*\* weighs 150 pounds more than you.
86. My high school was so tough even the teachers \*\*\* took my lunch money.
87. My last girlfriend was pretty wild in bed. She used to cover me from head to toe in oil and then \*\*\* set me on fire.
88. I went into this one dress shop that was so exclusive, I didn't know you had to call ahead. The saleswoman asked, 'Do you have an appointment?' I said, 'No. Do the dresses \*\*\* have something else to do today?'
89. Scientists have announced that the sun is five billion years old. It just looks older because it's spent so much time \*\*\* in the sun.



90. I got a tip from my stock adviser today. He said for thirty-nine cents I could get my fries \*\*\* supersized.

91. I always look for a woman who has a tattoo. I see a women with a tattoo and I'm thinking, 'Okay, here's a gal who's capable of making a decision she'll \*\*\* regret in the future.'

92. According to a study, 25% of people use television to enhance their love life. Unfortunately, for the remaining 75%, TV \*\*\* is their love life.

93. My psychologist was terrible. He couldn't even validate my parking. He said I was sarcastic and in denial. I was like, \*\*\* 'Yeah, right.'

94. I rode a bus cross-country and there were some people passing a joint around in the middle seats. I sat in the back and took out my deodorant and tried \*\*\* passing that around too.

95. I got so caught up in the recent election that this morning I got in the shower, pulled the curtain behind me, and \*\*\* voted for hot.

96. I wanted to look good for my wedding pictures. You might be looking at those things for \*\*\* four or five years.

## **Appendix B**

### **Joke Rating Study**

#### **Letter of Information**

**Project Title:** Joke Rating Study

**Investigators:** Robert Fearman (Honors student) and Dr. Rod Martin

In this on-line study, you will be asked to complete a questionnaire followed by two tasks. One of the tasks will involve reading jokes and rating how funny they are. In the other task, you will read the beginning of a joke and then type in your predicted ending. You will then be given the actual ending of the joke and will rate how similar it is to your ending and also how funny the actual joke is. The entire study will take 30 minutes, and you will receive 0.5 credits for participating.

All information obtained in this study will be kept confidential and will be used for research purposes only. The only place your name will appear is on the list of participants, and this is kept separate from the data file containing your responses to the questionnaire and tasks. You may terminate the experiment at any time or refuse to answer any questions without the loss of the promised research credits.

There are no known risks to participating in this study. You will receive written feedback at the end of the session.

By clicking on the button below you indicate that you have read and understood this letter of information and give consent to participate in the study.

### Appendix C

#### Demographic & General Information Questionnaire

Please tell us a bit about yourself by completing the following questionnaire:

1. Current age in years: \_\_\_\_\_
2. Gender (check one):        Male        Female
3. Is English your first language? (check one)        no        yes  
    If “no”        a) How long have you been speaking English? \_\_\_\_\_  
    (years)

**Appendix D**  
Joke Rating Study

**Feedback Sheet**

**Project Title:** Joke Rating Study

**Investigators:** Robert Fearman (Honors student) and Dr. Rod Martin

Thank you for completing the study! You will now receive 0.5 research credits.

This study is being conducted by Robert Fearman, under the supervision of Dr. Rod Martin. The purpose of this study is to examine the relationship between the predictability of jokes and how humorous they are. This will allow us to test cognitive theories of humour and assist in the conceptualization of the cognitive processes involved in understanding and enjoying humour. Many theories of humour involve the element of surprise or unpredictability as a key component of what makes a joke funny. However, very little research has been done to test whether the funniest jokes are the most unpredictable. In fact, what little research has been conducted has yielded the opposite relationship to that expected based on the theories (Pollio & Mers, 1974). In the current study we are using various types of jokes from multiple sources in the hopes of investigating the relationship more thoroughly than in the past. Incongruity-resolution jokes and nonsense jokes were used. Incongruity-resolution jokes are ones that contain an incongruity or unexpected element that can be resolved or makes sense in some way. Nonsense jokes are more anecdotal and also contain some incongruous elements but do not require the listener to make sense of something or “get the joke.” We expect that funniness ratings and predictability will be positively correlated in nonsense jokes, but negatively correlated in incongruity-resolution jokes.

A second purpose for the study is to see if scores on the Humor Styles Questionnaire (HSQ; Martin et al., 2003) are correlated with how much people enjoy various jokes and how well they are able to predict the endings of the jokes. The HSQ assesses four styles of humour, or ways people use humour in their daily life. Two of these are positive (affiliative and self-enhancing) and two are negative (aggressive and self-defeating). This measure has been widely used in examining the relationship between these humour styles and aspects of psychological well-being such as self-esteem, moods, optimism, and relationship satisfaction (Martin, 2007).

Thank you again for participating! Your involvement is greatly appreciated. If you have any questions, please do not hesitate to contact Robert Fearman ([rfearman@uwo.ca](mailto:rfearman@uwo.ca)) or Dr. Rod Martin ([ramartin@uwo.ca](mailto:ramartin@uwo.ca)).

If you would like to learn more about this topic, please refer to the following resources:

Martin, R. A. (2007). *The psychology of humor: An integrative approach*. San Diego, CA: Academic Press.

- Martin, R. A., Puhlik-Doris, P., Larsen, G., Gray, J., & Weir, K. (2003). Individual differences in uses of humor and their relation to psychological well-being: Development of the Humor Styles Questionnaire. *Journal of Research in Personality, 37*, 48-75.
- Pollio, H. R., & Mers, R. W. (1974). Predictability and the appreciation of comedy. *Bulletin of the Psychonomic Society, 4*, 229-232.

If you have questions about your rights as a research participant, you should contact the Director of the Office of Research Ethics at [ethics@uwo.ca](mailto:ethics@uwo.ca) or 661-3036.

## **Appendix E**

### Joke Rating Study

#### **Sign-up Poster**

#### **Joke Rating Study – (0.5 credits)**

Abstract: Want to participate in a half-credit humour research study investigating the predictability of jokes?

Description: This study is **completed online**. You will be asked to complete a questionnaire and two tasks. The tasks will involve rating how funny various jokes are and also attempting to complete the endings of jokes after being given the beginning of the jokes. The study will take 30 minutes in total and you will receive 0.5 credits for participating. Only those with **English as their first language** may participate.

**Appendix F**



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**Use of Human Subjects - Ethics Approval Notice**

<b>Review Number</b>	13 07 11	<b>Approval Date</b>	13 07 26
<b>Principal Investigator</b>	Rod Martin/Robert Fearman	<b>End Date</b>	14 03 31
<b>Protocol Title</b>	Joke rating study		
<b>Sponsor</b>	n/a		

This is to notify you that The University of Western Ontario Department of Psychology Research Ethics Board (PREB) has granted expedited ethics approval to the above named research study on the date noted above.

The PREB is a sub-REB of The University of Western Ontario's Research Ethics Board for Non-Medical Research Involving Human Subjects (NMREB) which is organized and operates according to the Tri-Council Policy Statement and the applicable laws and regulations of Ontario. (See Office of Research Ethics web site: <http://www.uwo.ca/research/ethics/>)

This approval shall remain valid until end date noted above assuming timely and acceptable responses to the University's periodic requests for surveillance and monitoring information.


During the course of the research, no deviations from, or changes to, the protocol or consent form may be initiated without prior written approval from the PREB except when necessary to eliminate immediate hazards to the subject or when the change(s) involve only logistical or administrative aspects of the study (e.g. change of research assistant, telephone number etc). Subjects must receive a copy of the information/consent documentation.

Investigators must promptly also report to the PREB:

- a) changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
- b) all adverse and unexpected experiences or events that are both serious and unexpected;
- c) new information that may adversely affect the safety of the subjects or the conduct of the study.

If these changes/adverse events require a change to the information/consent documentation, and/or recruitment advertisement, the newly revised information/consent documentation, and/or advertisement, must be submitted to the PREB for approval.

Members of the PREB who are named as investigators in research studies, or declare a conflict of interest, do not participate in discussion related to, nor vote on, such studies when they are presented to the PREB.

  
 \_\_\_\_\_

Clive Seligman Ph.D.

Chair, Psychology Expedited Research Ethics Board (PREB)

The other members of the 2012-2013 PREB are: Mike Atkinson (Introductory Psychology Coordinator), Rick Goffin, Riley Hinson Albert Katz (Department Chair), Steve Lupker, and Adam Piraino (Graduate Student Representative)

CC: UWO Office of Research Ethics

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