DOES EXPLICIT ATTRIBUTION MODERATE THE INFLUENCE OF TEXT FLUENCY ON JUDGMENTS OF AUTHOR COMPETENCE?

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ABSTRACT

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This study examined the moderating influence of explicit attribution on the effects of fluency on judgments of an author's intelligence. In three experiments and a combined analysis participants recruited from the online recruiting database Amazon Mechanical Turk were asked to complete a survey. They were asked to rate an author's intelligence based on a single passage presented in high or low fluency font paired with one attribution condition. The attribution conditions consisted of two possible explicit attributions (to the author or experimenter) or up to two possible unspecified attributions. Previous research results were replicated. Additionally a significant main effect of fluency and attribution were found in two experiments as well as the combined analysis. Post hoc testing revealed the fluency effect was restricted mainly to conditions in which the font choice was attributable to the author rather than being unattributed or attributable to the experimenter.

This thesis is dedicated to my advisor Dr. Richard Anderson, and to my family especially my parents Julie and Karl Yeager.

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CHAPTER I. INTRODUCTION

Processing fluency is the ease with which information is processed (Alter & Oppenheimer, 2009), and perceptual fluency is a subtype of processing fluency (Lanska, Olds, & Westerman, 2014). Manipulations that affect the readability of a passage of text—even nonsubstantive changes like font—can influence evaluations of the intelligence of the presumed author of the text (Oppenheimer, 2006). Such manipulations of perceptual fluency can also affect other types of judgments including judgments of frequency (Tversky & Kahneman, 1973), duration (Witherspoon & Allan, 1985), risk (Rothman & Schwarz, 1998), attractiveness (Reber, Winkielman, & Schwarz, 1998), familiarity (Monin, 2003), categorization (Oppenheimer & Frank, 2008), morality (Laham, Alter, & Goodwin, 2009), truth (Scholl, Greifeneder, & Bless, 2014), and effort (Sanchez & Jaeger, 2015).

Previous work has suggested that the effect of perceptual fluency on people's judgments may be mediated by the source to which people attribute the fluency or disfluency (Oppenheimer, 2006). The present study manipulated source attribution more directly and more explicitly than had been done in previous research, in order to clarify the role of such attribution in the effects of perceptual fluency.

Attribution Theory

Attribution theory works to explain the process whereby individuals provide explanations, i.e., attributions, for the causes of events and behavior. According to attribution theory, people have a need to explain behaviors and events happening to and around them. Different people have different explanations of events or behaviors. Generally explanations fall into one of two categories: internal or external (Heider, 1958; Malle, 2008). An internal attribution is one in which an individual attributes the cause of a behavior or event to internal personal characteristics such as personality or ability. In contrast, an external attributions is one in which a person attributes the cause of a behavior or event to the situation in which the behavior occurred. Examples of such external attributions include luck, chance, or another individual (Malle, 2008).

A recent study by Brown, Houghton, Sharples, and Morely (2015) applied attribution theory to people's attitudes regarding use of geographic navigational aids. Participants in the experiment were asked to describe either their own experiences or the experiences of others and to attribute successes or failures either to an individual or to a navigational aid. The experimenters found that when participants were asked to describe their personal experiences, they tended to attribute successes to the skill of the individual, whereas they tended to attribute failures to the navigation aid. However, when asked to describe the navigational experiences of others, the reverse results were found. This study (Brown et al., 2015) exemplifies both the selfserving bias and the fundamental attribution error. The self-serving bias is the behavioral tendency to take credit for personal success but to deny responsibility for personal failure (Coleman, 2011; Heider, 1958). The fundamental attribution error on the other hand, is the tendency to over emphasize dispositions and personality traits over situational factors when explaining the reasons for other's behavior (Moran, 2014; Ross, 1977).

When an element of risk is introduced, the perceived controllability of risk affects attribution judgments of responsibility (Rickard, 2014). Three United States national parks provided the settings for a survey study that considered park visitor's perceptions of a hypothetical visitor accident. The experimenters found that the more control the fictitious individual was perceived to have, the more they were held responsible, and the less other people, or external conditions, were held as responsible. Therefore, controllability appears to be a mediating factor in attributions of culpability.

Fluency Theory

Fluency theories attempt to explain how people use processing fluency—the ease with which information is processed in the human mind—as a cue for judgment. A principal account is the theory of aesthetic pleasure. The theory operates on the principle of processing fluency: Objects differ in their processing fluency such that some objects are easier to process (i.e., have higher processing fluency), whereas other objects may be more difficult to process (i.e., have low processing fluency). There are many aesthetic influences on processing fluency, including goodness of form (Liu, Zhang, Ren, & Yu, 2011), symmetry (Orth & Wirtz, 2014), contrast (Sanchez & Jaeger, 2015), previous experience with the object or construct (Duke, Fiacconi, & Köhler, 2014), and prototypicality (Ellis, O'Donnell, & Römer, 2014).

One principle of the aesthetic pleasure theory is that high fluency is subjectively experienced as aesthetically positive (Forster, Leder, & Ansorge, 2013). A study by Makin and colleagues (2012) investigated whether the positive responses to visual symmetry are automatic. Using an implicit association task (rather than overt judgments) to measure the valence of visual symmetry, the experimenters found that responses were faster when the participants had to use the same button to characterize a stimulus as symmetrical and to characterize it as positive, than when the two characterizations required different response buttons. The researchers took the association to indicate an implicit preference for symmetrical patterns, and concluded that the positive affective responses to perceptual fluency are automatic.

According to the second principle people use their subjective experience of ease to draw conclusions and to make judgments or attributions (Duke et al., 2014). Forster and colleagues

(Forster et al., 2013) conducted experimental research to determine how these feelings of ease affect judgments. On every trial, the experimenters asked their participants to explicitly judge how easy it was for them to perceive a presented stimulus. The experimenters manipulated processing fluency by means of subliminal priming. During subliminal priming, an image (the prime) is presented briefly enough to remain below the level of awareness and is presented prior to a visible target stimulus. A congruent prime that resembles the target in appearance or meaning facilitates processing (i.e., increasing processing fluency). The experimenters found that high ease of processing (i.e., congruent-prime condition) was perceived as more fluent than incongruent trials and tended to be liked more than incongruent, low ease of processing trials. This demonstrates that higher fluency, even when processed below the threshold of consciousness positively affects judgments.

The final principle of the processing fluency theory of aesthetic pleasure is the most pertinent to the present study. The principle states that the effects of processing fluency are mediated by expectations and attributions concerning the source of the fluency. The processing fluency/attribution model proposes that prior exposure to a stimulus increases perceptual fluency when it is encountered at a later time (Bornstein & D'Agostino, 1994; Janiszewski, 2001). However, when asked to make judgments involving previously seen stimuli, individuals often fail to recognize that their ease of processing is a result of prior exposure. Instead, they often misattribute the increased processing fluency to liking or truth.

However, when fluency is correctly attributed to prior exposure, it is perceived to be irrelevant to the judgment, and therefore has a lesser effect (Bornstein & D'Agostino, 1994). Thus when the source of fluency is unknown (or forgotten), it is likely to elicit higher ratings in judgments than when the source is considered irrelevant. A remaining question is: If the source

of fluency is known and perceived as relevant, how might it affect judgments in relation to the other attributional categories?

Problem Statement, Rationale, and Predictions

Oppenheimer (2006) found that when fluency was manipulated by the complexity of words, and by the selected font, high fluency elicited high intelligence ratings and low fluency elicited low intelligence ratings. The experimenters found the reverse trend when fluency was manipulated by means of the clarity of the printer toner. Oppenheimer's explanation for this reversed trend was that "if the source of reduced fluency becomes obvious, participants will discount their lack of fluency, which reverses the direction of the effect" (p. 13).

Oppenheimer's account raises a number of questions. Why would it be that toner is an obvious source of fluency while font is not obvious? Perhaps it is not obviousness that caused the reversed trend. Perhaps instead it was the amount of control the subject of judgment had over the fluency source, such that font is within the control of the author while low toner is beyond the author's control. To address these issues, the present study explicitly attributed the font to the author or the experimenter. In that way, one set of judgments was based on information explicitly within the author's control and another set was based on information explicitly outside the author's control.

If the claim were true, that obvious information can cause a reversed effect of fluency (Oppenheimer, 2006), it would suggest that in the attribution-to-experimenter and attribution-to-author conditions, the ratings should be higher when fluency is low than when fluency is high. This is because the source of fluency is obvious in those conditions. Alternatively, if obviousness does not affect the judgments, the ratings should always be lower in the low fluency condition than in the high fluency condition.

However, a reversal trend is possible in the interaction. Previous research (Rickard, 2014) indicates that perception of controllability can mediate social attributions. Thus, in the present study, if high fluency elicits positive judgments and low fluency elicits negative judgments, then the degree of positivity or negativity of the judgment may be mediated by the perception of controllability. Essentially, the individual with the most control will have the greatest effect of positivity such that in the high fluency condition the ratings of intelligence will be the highest. Similarly the author will have the greatest effect of negativity such that in the low fluency condition the ratings of intelligence will be the lowest.

Because the author is not perceived to have control in the attribution-to-experimenter condition the degree of positivity and negativity will be lessened. In the high fluency condition the positive effect will be less and the ratings should be lower than those in the attribution-toauthor condition. Similarly in the low fluency condition the negative effect should be less and the ratings should be higher than those in the attribution-to-author condition.

In addition to comparing the two groups, a control condition was presented in which attribution is unspecified. This was a replication of Oppenheimer's (2006) study in which no information is explicitly stated regarding the attribution of the fluency condition. Oppenheimer (2006) attempted to implicitly create the perception that the fluency choice was the experimenters. If it was successful it should have elicited responses similar to those in the low toner condition such that both fluency choices would have been out of the author's control. However the results were not the same. One conclusion would be that at least some participants were attributing the fluency choice to the author regardless of the experimenter's attempts to imply otherwise.

The following are my hypotheses.

Hypothesis 1: Replicating previous findings, when the attribution is unspecified, the ratings should be higher in the high fluency than in the low fluency condition

Hypothesis 2: There should be an interaction. For the author attribution condition, ratings should be higher in the high fluency than in the low fluency condition, but this effect should be reduced in the experimenter-attribution condition and reduced slightly less in the unspecified control condition.

This study aimed, in three experiments, to answer the following questions: Does the effect of the fluency manipulations depend on whether or not the participants attribute the font to the author's choice? If the attribution manipulation does interact with font fluency, how will this interaction effect judgments of author intelligence?

CHAPTER II. METHODOLOGY

The web-based survey software Qualtrics was utilized to create a survey that included relevant demographic questions, relevant directions, the passage to be read, and one question regarding the author's intelligence. For the explicit attribution manipulations an additional sentence explained the choice of font as the author's or experimenter's respectively. In the unspecified attribution conditions a sentence explained the font or only the passage appeared. Figure 1 shows examples of the two fonts:

This is the high fluency font: Times New Roman This is the low fluency font. Juice ITC

Figure 1. Illustration of the high and low fluency fonts.

The passage was an excerpt from personal statement essays for admission to graduate studies in English Literature (Oppenheimer, 2006). The excerpt is as follows:

"I want to go to Graduate School so that I can learn to know literature well. I want to explore the shape and the meaning of the novel and its literary antecedents. I want to understand what the novel has meant in different literary periods, and what is likely to become. I want to explore its different forms, realism, naturalism, and other modes, and the Victorian and Modernist consciousness as they are revealed."

An image was uploaded of the passage to maintain uniformity between font conditions. The author intelligence question was "How would you rate the intelligence of the author?" And a 5-point Likert scale was provided.

Experiment 1

Overview. In Experiment 1 fluency and attribution manipulations were done to determine the effects of explicit attributions of fluency on judgments of author intelligence. A replication condition in which explicit attribution or font information was left unspecified as a control condition.

The design of Experiment 1 was a 2 (font fluency) x 3 (attribution condition) betweensubjects design. The levels of font fluency were high (Times New Roman) and low (Juice ITC). The attribution conditions were attribution-to-author, attribution-to-experimenter, and the unspecified (replication condition). In the attribution-to-author condition participants were informed of the font and told that the font choice was the author's. They were asked to read a passage printed in either the high fluency font or the low fluency font. In the attribution-toexperimenter condition participants were also informed of the font, but they were told that the font choice was the experimenter's. In the unspecified condition participants were given no additional information before reading either the high or low fluency passage.

Procedure. For Experiment 1 potential participants saw a brief description of the study and if interested were able to mouse click a link that brought them to the survey. They were shown the informed consent page and told by mouse clicking a "next" button they had consented to participate in the experiment. They were then exposed to one of 6 conditions and asked to answer the relevant demographic questions as well as data checks in which they were instructed to respond in a specific manner. Participants were then directed to read the passage and indicate they had finished reading by mouse clicking a button. The next page directed them to the intelligence rating question which they indicated on a Likert-scale with a mouse click. After answering the questions they were given contact information should they have any questions regarding the study as well as a numerical code to be used to receive compensation. They were then thanked for their participation.

Experiment 2

Overview. The method of Experiment 2 replicated that of Experiment 1 with two modifications. The first modification was an added parenthetical sentence to explicitly differentiate the author and the experimenter. The second modification was an additional attribution condition in which the font attribution was unspecified but in which participants were explicitly informed of the font. This was done to create an attribution unspecified condition that was more comparable to the author- and experimenter-attribution conditions in Experiment 1. Experiment 2 provided the opportunity to replicate the Experiment 1 effects—including the null effect of font in the unspecified-attribution condition of Experiment 1—and to more fully examine the consequences of the unspecified attribution of font choice.

The design of Experiment 2 was a 2 (font) x 4 (attribution condition) between-subjects design. The fonts were identical to Experiment 1. The attribution conditions included two explicit attribution conditions, author and experimenter, in which a sentence was provided that stated the font type and a second sentence that stated the attribution. In the new, attribution unspecified but *font mentioned* condition, the sentence that stated the attribution was omitted. Finally, and similar to Experiment 1, there an *attribution unspecified* condition in which both sentences were omitted referred to as attribution unspecified condition. The passage read was identical to the passage in Experiment 1. The materials used in Experiment 2 were identical to those used in Experiment 1 with modifications stated above.

Procedure. The procedure of Experiment 2 was identical to the procedure of Experiment1.

Experiment 3

Overview. Experiment 3 was a more direct replication of Oppenheimer's work to determine what differences between the original Oppenheimer study and my own might cause the lack of replication effect previous found. In addition to a direct replication a question was added that asked the degree to which participants were confident the author or experimenter had chosen the font.

The design of Experiment 3 was between-subjects design with one independent variable (font fluency). There were two dependent variables: the rating of the author's intelligence and the rated attribution. The levels of font fluency were identical to those in the previous experiments. Participants read instructions, and a passage, as well as were asked a question regarding the author's intelligence all printed in congruent font. No explicit information regarding font type or attribution was provided.

Experiment 3, consistent with the previous 2 experiments utilized the software Qualtrics to create a survey that included relevant demographic questions, instructions, the passage to be read, and two questions regarding the passage. One question asked about the author's intelligence and the second question asked the degree to which the participant believed the author or the experimenter had chosen the font. The author intelligence question was identical to the one used in the previous experiments. The question regarding the degree to which participants believed the author or the experimenter had chosen the font regarding the degree to which experiments believed the author or the experimenter had chosen the font was provided as a 7-point Likert scale ranging from "very sure the author had chosen the font" to "very sure the experimenter had chosen the font".

The instructions, passage to be read, and question regarding the author's intelligence were all printed in congruent font. Images were uploaded in the three cases to maintain uniformity between font conditions. The passage was identical to that used in the previous experiments.

Procedure. The procedure for Experiment 3 was identical to the procedure in the previous experiments with the manipulations indicated above.

CHAPTER III. RESULTS

Experiment 1

Two hundred and sixty-four participants from Amazon Mechanical Turk online human resource marketplace participated in Experiment 1. The sample was 40.9% female ranging in age from 18-67 (M = 33.67, SD = 9.92). Participants were randomly exposed to one of six font and attribution conditions. Participants were compensated \$0.30 for participation and informed consent was obtained from all participants.

For Experiment 1 a two-way analysis of variance was conducted that examined the effect of font and attribution of font on ratings of the intelligence of the author. There was a statistically significant main effect of font F(1, 264) = 11.941, p = .001. There was no main effect of attribution. However, there was a statistically significant interaction between the effects of font and attribution on intelligence ratings, F(2, 264) = 3.652, p = .027.

In order to conduct planned comparisons of the effect of font for each level of the attribution factor, the data were reorganized into six conditions (groups) and submitted to a one-way analysis of variance, which included an LSD (least significant difference) paired-comparisons procedure. The six groups were as follows: high fluency attributed to the author (N = 56), the experimenter (N = 41), and unspecified (N = 37) and low fluency attributed to the author (N = 52), the experimenter (N = 33), and unspecified (N = 45). There was a statistically significant difference between groups as determined by the one-way analysis of variance, F(5, 264) = 4.453, p = .001. Planned comparisons assessed the effect of fluency under each of the three attribution conditions. Only the author attribution condition produced a significant effect of fluency, with author intelligence ratings being higher in the high fluency condition (M = 3.70, SD = .89) than in the low fluency condition (M = 2.94, SD = .94), p < .001. The unspecified and the

experimenter-attribution conditions produced non-significant effects of fluency (ps = .841 and .075 respectively), though the effect in the experimenter-attribution condition was marginal with respect to $\alpha = .05$.

I additionally ran a 2 x 2 analysis of variance using only the explicit attribution conditions (N = 182) to determine if the effect of font was significantly smaller in the experimenter attribution condition than in the author-attribution condition. It was not. There was only a main effect of font F(1, 182) = 17.20, p < .001.



Figure 2. Mean rating of intelligence as a function of attribution

and font, in Experiment 1.

Experiment 2

Five-hundred and twenty nine participants from Amazon Mechanical Turk online human resource marketplace participated in Experiment 2. The sample was 35.5% female ranging in age from 20 to 83 (M = 34.77, SD = 11.04). Participants were randomly exposed to one of eight font

and attribution conditions. Participants were compensated \$0.30 for participation and informed consent was obtained from all participants.

For Experiment 2 a two-way ANOVA was conducted that examined the effect of font and attribution of font on ratings of intelligence of the author. There was a statistically main effect of font F(1, 529) = 7.004, p = .008. There was no main effect of attribution. However there was a significant interaction F(3,529), p = .016.

To conduct planned comparisons of the effect of font for each level of the attribution factor, the data were reorganized into eight conditions (groups). The groups were as follows: high fluency attributed to the author (N = 56), the experimenter (N = 65), unspecified (N = 66), and unspecified with font mentioned (N = 77), and low fluency attributed to the author (N = 75), the experimenter (N = 60), unspecified (N = 63), and unspecified but font mentioned (N = 67).

The new coded groups were submitted to a one-way analysis of variance, which included an LSD (least significant difference) paired comparisons procedure. The ANOVA indicated a statistically significant difference between groups F(7, 529) = 3.529, p = .016. The planned comparisons revealed that in the condition in which the font choice was attributed to the author, intelligence ratings were significantly lower in the low fluency condition (M = 3.06, SD = .92) than in the high fluency condition (M = 3.64, SD = .74), p < .001. No other attribution condition produced a significant effect of fluency (ps = .589, .328, .846, for attribution-unspecified-butfont-mentioned, the attribution-unspecified, and experimenter-attribution conditions, respectively).

As in Experiment 1 I additionally ran a 2 x 2 analysis of variance using only the explicit attribution conditions (N = 256) to establish that the effect of font is significantly greater in the author attribution condition (N = 131) than in the experimenter attribution condition (N = 125).

There was a main effect of fluency F(1, 256) = 8.98, p = .003. There was no main effect of attribution. However, there was an interaction between fluency and attribution. The effect of font on the mean intelligence rating was greater in the author attribution condition (a difference of .58) than in the experimenter attribution condition (a difference of .05) F(1, 256) = 6.40, p = .012.



Figure 3. Mean rating of intelligence as a function of attribution

and font, in Experiment 2.

Combined Analysis Experiments 1 and 2

I performed an additional analysis combining the comparable Experiment 1 and 2 group conditions: author, experimenter, and attribution-unspecified (font not mentioned). (N = 647).

A two-way analysis of variance was conducted. There was a statistically significant main effect of font F(1, 647) = 20.28, p < .001. There was no main effect of attribution. However, there was a statistically significant interaction between the effects of font and attribution on intelligence ratings, F(2, 647) = 6.85, p = .001.

The data were then reorganized into six conditions (groups) and submitted to a one-way analysis of variance, which included an LSD (least significant difference) paired comparisons procedure. There was a statistically significant difference between groups, F(5, 647) = 7.695, p < .001. As in the previous experiments only the author attribution condition produced a significant effect of fluency, with author intelligence ratings being higher in the high fluency condition (M = 3.65, SD = .82) than in the low fluency condition (M = 3.01, SD = .92), p < .001. The unspecified and unmentioned attribution and the experimenter attribution conditions produced non-significant effects of fluency (ps = .41 and .15 respectively).



Figure 4. Mean rating of intelligence as a function of attribution and font, in Experiments 1 and 2 combined.

Experiment 3

One hundred participants from Amazon Mechanical Turk online human resource marketplace participated in Experiment 3. The sample was 41% female ranging in age from 19-67 (M = 33.6, SD = 9.15). Participants were randomly exposed to one of two font conditions. Participants were compensated \$0.30 for participation and informed consent was obtained from all participants.

For Experiment 3 two independent-samples t-tests were used. One to compare intelligence ratings in high and low fluency conditions. And a second to compare perceived attribution ratings in high and low fluency conditions. When comparing intelligence ratings in the high and low fluency conditions there was a significant difference in scores for the high fluency (M = 3.59, SD = .78) and low fluency (M = 3.06, SD = .94); t(98) = 3.05, p = .003. These results suggest that fluency has a significant effect on ratings of an author's intelligence. Specifically the results suggest that when fluency is high, intelligence ratings increase. There was not a significant effect of fluency on perceived attribution p = .97

Additionally a multiple linear regression analysis was calculated to determine the interaction effects of fluency and attribution on ratings of intelligence. A significant regression equation was found ($R^2 = .09$, F(3, 96) = 3.30, p = .024). Fluency ($\beta = -.29$, p < .004) was the only significant predictor. Neither the attribution rating nor the interaction had a significant effect (β s = -.03 and .11, ps = .93 and .76 respectively)



Figure 5. Mean rating of intelligence as a function of attribution rating and font, in Experiment 3.

CHAPTER IV. DISCUSSION

Experiment 1

Consistent with previous research, the results of Experiment 1 suggest there is a strong influence of fluency on judgments of an author's intelligence. However, there was no significant effect of fluency in the unspecified condition. The present study therefore did not confirm my first hypothesis and therefore did not replicate previous findings (Oppenheimer, 2006).

The significant interaction effect and the planned comparisons in the author attribution condition mostly confirmed my second hypothesis such that fluency effects should be most robust in the explicit author attribution condition. My second hypothesis was not fully confirmed however as the effect of fluency was reduced greatest in the unspecified condition and therefore prevented the explicit attribution condition from having the greatest reduction in fluency effect as predicted.

Finally, the lack of an effect in the unspecified condition, specifically that it elicited the smallest degree of difference implies, that participants in that condition were not automatically attributing the passage to the author or to the experimenter. The ratings in the unspecified condition were not between the explicit attribution conditions suggesting participants were not sometimes attributing to the author and sometimes attributing it to another source. Instead something different was occurring. Unfortunately, past research and the present data do not allow strong inferences to be made regarding potential reasons for the lack of an effect found in this study and not in Oppenheimer's 2006 study.

In summary, the results confirm that explicit attribution moderates fluency effects. But the results do not replicate the previous finding that fluency affects judgment when there is no explicit attribution for the disfluency.

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Experiment 2

Consistent with previous research, and with the results if Experiment 1, there was a strong influence of font on judgments of an author's intelligence. However, there was no significant effect of fluency in either of the attribution-unspecified conditions. Thus Experiment 2 failed to confirm my first hypothesis, thus constituting a second failure to replicate previous findings (Oppenheimer, 2006).

My second hypothesis was supported by Experiment 2. As in Experiment 1 the highest and lowest intelligence ratings were elicited by explicit attribution to the author in the high and low fluency conditions respectively. Using the attribution-unspecified condition, the greatest reduction occurred in the explicit experimenter attribution condition with a lesser degree of reduction in the attribution unspecified condition.

The repeated lack of an effect in the font and attribution unspecified condition further supports the claim that participants in that condition were not automatically attributing the passage to the author. Especially notable in Experiment 2 fluency appears to play little if any role when mentioned in judgments of the author's intelligence as the two fluency conditions are nearly identical. Perhaps fluency and attribution only affect judgments when they are explicitly mentioned. When they are not explicitly mentioned a third variable may be the driving force. Some speculative alternatives include other fluency cues such as complexity of the material or the degree of relevance of the material to the participant.

Experiments 1 and 2 Combined

The combined results for Experiments 1 and 2 further confirm the present findings that explicit attribution moderates the effects of fluency. But the results also re-confirm the replication failure in the attribution-unspecified (with font un-mentioned) condition (Oppenheimer, 2006)--even with 319 and 328 participants in the Times New Roman and Juice ITC conditions, respectively. Thus, the finding supports the idea, suggested by Experiment 1, that participants were not automatically attributing the fluency to the author and perhaps when no attribution information is mentioned participants do not use attribution information to make judgments of author intelligence.

My second hypothesis was mostly confirmed in the combined analysis. The effect of fluency was reduced in the unspecified and experimenter attribution conditions. The reduction was greatest in the unspecified condition and therefore again prevented the explicit attribution condition from having the greatest reduction in fluency effect as predicted. In the low fluency condition only responses in the unspecified condition did not appear to be a combination of automatic attributions to the author or the experimenter. This continues to support the idea that these attributions may only have an effect if explicitly mentioned. It is possible participants were attributing the fluency to another source, but more likely this type of information was not relevant or necessary in making their judgments.

Experiment 3

The present results confirmed my first hypothesis and demonstrated a replication of Oppenheimer's 2006 study using a more identical design to previous research. It further supports the claim found in Experiment 1, 2, and previous research that font fluency has a direct effect on judgments of an author's intelligence. The distinct difference between Experiment 3 and Experiments 1 and 2 was the font manipulations of the instructions and intelligence rating question. The lack of an interaction effect found in Experiment 3 is likely affected by font manipulations of the instructions and rating question. Future research in this area could address finding the specific mechanisms which led to the differing results.

CHAPTER V. GENERAL DISCUSSION AND IMPLICATIONS

Does the effect of the fluency manipulations depend on whether or not the participants attributed the fluency to the author's choice, and if so how would this interaction effect judgments of author intelligence? This question was largely answered by the present study. The interaction between fluency and explicit attribution suggests that the effect of fluency manipulations does indeed depend on attribution, especially attributions to the author. The degree of effect of fluency on judgments of author intelligence is largely moderated by how the participant attributes that fluency.

The most intriguing finding was neither predicted nor demonstrated in prior research. The data suggests that when attribution is unspecified participants do not automatically attribute information to an author. This leads to an interesting line of questioning. If attribution to the author is not automatic then to whom (or to what) are the participants attributing the information? How might participants make attributions when not explicitly told to do so in a specific manner?

CHAPTER VI. LIMITATIONS AND FUTURE DIRECTIONS

Future research in this area should aim to answer the above questions and there a systematic ways to find solutions to each question. One solution to the problem of understanding participants' automatic attributions would simply be to ask participants following an unspecified condition: "To whom did you attribute the previous information?" To which participants could respond openly as opposed to the choice between degrees of confidence of attribution to the author or experimenter offered in Experiment 3. However, this would only solve the problem if participants were consciously aware of how they make attributions. Research regarding heuristics and snap judgments have suggested that people often make decisions and judgments without cognitive awareness regarding why they make them (McLaren et al., 2014). Future research in this area would need to determine if attribution is something participants can be aware of and if not how can it be measured in other ways?

The problem of the second question regarding how participants make attributions when not being explicitly told to do so may be more methodological in nature. One methodological limitation in my research and in most controlled experiment is the *Hawthorne* or *observer effect* in which participants may alter their natural behavioral judgments due to the fact that they are aware they are being studied or observed (Jung & Lee, 2015; Landsberger, 1958). Knowing that they are in an experiment may inhibit participant's attributions. The knowledge of being in an experiment might impair any attribution such that they know, even when being told explicitly otherwise, that any manipulation at all is being done by an experimenter.

One potential solution to this observer effect problem is to embed attribution information in another task such that participants will think they are completing one task that simultaneously reveals attribution judgments. For example, imagine participants need to make a decision

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regarding choosing a partner for a quiz game show. Participants would benefit from choosing a more intelligent partner. Now suppose information was provided regarding each potential partner and that information was manipulated by fluency. When the participant chooses a partner we can infer that the fluency information was attributed to the partner chosen, and that this partner was chosen as the most intelligent or valuable. We can do this without explicitly stating attribution information. Hopefully this could reduce the observer effect and create a more natural setting for making attributions and judgments.

The fact that attribution by itself did not have a significant effect on judgments presents an alternative theory to describe these results. Perhaps it might be that attribution has little to no effect on judgments when unspecified and a more salient cue like fluency may be the only cue used to make judgments. While this theory may have some bearing it is unlikely that participants would rely only on a single cue as there is some evidence that judgments require an integration of many cues (Juslin, Karlsson, & Olsson, 2008). Instead perhaps the most salient cue is used most heavily in making judgments with decreasing dependability occurring with decreased salience. This hypothesis could be tested by integrating cues such as utilizing multiple heuristics and systematically ordering their salience to see how salience effects affect judgments (Hütter & Sweldens, 2013).

CHAPTER VII. CONCLUSION

Despite the questions being raised the present study contributes to the knowledge base regarding judgments of author intelligence manipulated by font previously contributed to by Oppenheimer (2006). It added the additional component of explicit attribution which had previously been uncombined in research analyses.

The data supports attribution theory in which people have a need to explain behaviors and events and those explanations have some effect on how that behavior is judged. When attribution is explicit to the target being judged, whatever manipulation is also used, in this case fluency, tends to have a greater effect on judgments than when the attribution is explicitly not to the target of the judgment or when attribution is unspecified. The data also supports fluency theory in which high fluency leads to more positive judgments than low fluency. When the source of fluency is known and perceived as relevant (i.e., attributed to the target of judgments) this tends to increase judgments especially when fluency is high and decrease judgments especially when fluency is low.

Overall, the designs of present studies were appropriate for testing my hypotheses. Two experiments demonstrated significant effects of font and significant interactions of attribution in novel ways that had not been previously investigated, while a third experiment provided the replication basis.

While fluency appears to clearly influence judgments, there may be other factors to consider. The content of the passage read was taken from an application to a graduate school. The increased level of intelligence likely found at that level of education may have influenced judgments of intelligence beyond what effects fluency and attribution had. Future directions of research may include varying the base line intelligence of the content to be read.

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Low fluency appears strongly associated with lowered judgments of author intelligence. An obvious implication of this finding is that authors should avoid using triggers to low fluency including, but not limited to, low fluency font or over complexity of word choice (Oppenheimer, 2006). This finding could be more broadly applied beyond authors to anyone presenting information in a written format. However, caution should be exercised as there is evidence that disfluency increases judgments in specific domains such as agent-exerted effort and competence (Thompson & Ince, 2013).

Another factor to consider is the fluency manipulation used. Juice ITC font is a particularly juvenile looking font. Future research might implement more or different types of fonts, particularly fonts that may have low fluency but might appear more sophisticated than the fonts presently used.

In conclusion, it appears that fluency plays a substantial role in judgments of an author's intelligence and that attribution of the fluency moderates that effect. The present study also suggests a surprising new finding that attribution to an author is not automatic. Future research is necessary to solidify this claim.

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