The Effects of Perceptual Fluency, Schema Congruency, and Sexuality on Attribute Ratings

Rebekah Hovi

0296761

Supervisor: Dr. Joël Dickinson

Laurentian University

PSYC 4007EL-01

Dr. Emond and Dr. Urajnick

April 5th, 2016

Abstract

Previous literature on schema congruency has largely found that schema incongruence is associated with less positive attribute ratings. However, one recent study found the opposite effects where schema incongruence was associated with more positive ratings. A potential reason for their opposing results was that this study analyzed the schema incongruent stimuli of "a sensitive man" and "an assertive female" as one group and did not examine for differences according to gender; however previous literature has stated that schemas are entrenched different according to gender. The purpose of this study was to replicate this previous study that supported a positive affect for schema incongruence to determine whether this potential gender confound was responsible for the inconsistent results, while also looking to see if manipulating perceptual fluency (how easy something is to read) could mitigate this negative impact, particularly for sexuality schemas.

Despite previous robust effects, fluency did not impact attribute ratings. We suggest that this is potentially because the schemas for sexuality are too entrenched. Congruency did impact attribute ratings, and in almost all cases individuals who were schema congruent for sexuality were rated as more positive than those who were schema incongruent, suggesting that gender did play a role in previous findings.

Keywords:

Perceptual fluency, schema, sexuality, gender

The Effects of Perceptual Fluency, Schema Congruency, and

Sexuality on Attribute Ratings

Introduction

The purpose of this study was to determine whether manipulating perceptual fluency could mitigate the impacts of schema incongruence on attribute ratings, while replicating a previous study on sexuality schemas to try and reproduce its findings that were contrary to most current literature; this study will be discussed in depth at a later time (Rubin et al., 2013). What this means is that this study was looking to see if manipulating how easy a text was to process (perceptual fluency) (Oppenheimer, 2008), as well as manipulating how well an individual described in a text fit our preconceived mental representations (sexuality schema congruency) (Bransford & Johnson, 1972), would impact how they were rated for attributes such as likability. This was while focusing on the congruency of various individuals with associated descriptors, such as 'a creative gay man' and 'an assertive straight man', in particular it was examined to see how these factors impacted the various attribute ratings that were being measured (Appendix C) (Maass, Cadinu, Boni & Borini, 2005; Rubin, Hewstone, & Voci, 2001; Simon, Glassner-Bayerl, & Stratenwerth, 1991). This study was an attempt to determine if manipulations of perceptual fluency could mitigate the negative affect associated with schema incongruence, particularly for sexuality schemas, in an attempt to find a method to remove bias from written text; while clarifying some existing cognitive psychology theories.

It has been found that the ease in which a stimulus is processed can have a large impact on how it is evaluated; this is known as perceptual fluency (Westerman, Lanska, & Olds, 2014). Specifically it has been demonstrated that causing a stimulus to be presented as less fluent, or more difficult to process, can lead to the stimulus being interpreted as less familiar (Jacoby &

Dallas, 1981), less bright (Mandler, Nakamura, & Van Zandt, 1987), and shorter in duration (Masson & Caldwell, 1998). Manipulating perceptual fluency causes a stimulus to be easier, or more difficult to perceive depending on the manipulation (Oppenheimer & Frank, 2008).

Another variable this study examined was schemas; a schema is a mental representation of an individual, object, or event which allows for an individual to cognitively organize and interpret information (Bransford & Johnson 1972; Carreiras, Garnham, Oakhill & Cain, 1996). Information that matches an individual's preconceived mental representation is known as being schema congruent; whereas information that does not match the mental representation is known as being schema incongruent (Bransford & Johnson, 1972). Previous literature has noted that when a stimulus is presented schema incongruently there is a slowdown in processing compared to when it is presented schema congruently (Duffy & Keir, 2004; Dickinson, 2011). This slowdown in processing has been shown to be linked to more negative attribute ratings for things such as likeability (Forster, Leder, & Ansorge, 2012). Some recent literature has come to alternate conclusions which are opposite of the previous literature, and instead indicated that schema non-congruency was associated with more positive ratings for things such as likeability (Rubin, Paolini, & Crisp, 2013); its findings were not supported by most other current literature, and therefore the present study aimed to clarify this issue.

Since the present study focused on sexuality schemas in particular it was important to examine the literature surrounding sexuality; in previous studies it had been shown that implicit attitudes towards heterosexual individuals were more positive than the implicit attitudes towards homosexual individuals (Steffens, 2005). These effects were likely due to what is known as the 'heterosexual norm' which states that heterosexuality is assumed for individuals (Nielsen, Walden, & Kunkle, 2000; Dickinson, 2011). Accordingly, when an individual processes a

stimulus that is schema incongruent for homosexuality it would likely be viewed more

negatively than a stimulus that is schema incongruent for heterosexuality, as the stimulus would

have the negative affect associated with being schema incongruent, as well as a with violating

the heteronormativity assumption (Forster et al., 2012; Nielsen et al., 2000).

Perceptual Fluency

Perceptual fluency is described as the ease in which information is perceived and

processed (Laham, Alter, & Goodwin, 2009; Oppenheimer, 2008). When the concept of

perceptual fluency is applied to reading texts, the more difficult a text is to read because of visual

manipulations, the more challenging it is to process and it would then be considered disfluent

(Oppenheimer, 2008). When a text is presented visually so that it can be understood with ease,

then it would be considered a fluent text. Perceptual fluency can be manipulated in numerous

ways, but largely has to do with the contrast of the text to the background (Oppenheimer, 2008).

An example of a fluent condition would be black text presented on a white background, and an

example of a disfluent text would be a black text presented on a background with visual noise

(similar in appearance to the static that occurred on an old television) (Oppenheimer, 2008). The

visual noise would cause the disfluent text to be much more difficult to read than text presented

on the white background, because the contrast from the text to the background would be lessened

(see Appendix D for examples of fluent and disfluent text using visual noise).

Perceptual fluency's impact. In previous literature it has been found that manipulations

of perceptual fluency can impact things such as ratings of moral wrongness (Laham et al., 2009).

In a study where participants were asked to make moral judgements of the actions of individuals

described in various texts, it was found that when the actions described were presented

disfluently the actions were rated as more morally wrong then when they were presented

fluently; this study used the method of visual noise to impact perceptual fluency, by using a speckled grey background for their disfluent condition, and a white background for their fluent condition (Laham et al., 2009). For actions such as "a man defacing a memorial" or "a teacher burning an Australian flag" it was found that when they were presented fluently they received a mean rating of moral wrongness of M = 7.54. This was a mean rating of moral wrongness lower that when the same sentences were presented disfluently, which received a mean rating of moral wrongness of M = 8.70. This was when rating these actions on a scale from one to ten, one being morally acceptable and ten being morally wrong (Laham et al., 2009). This has potential implications for the current study in that fluency could be used as a potential mitigating factor for the negative affect associated with stimuli being presented schema incongruently (Rojahn & Willemsen, 1994). Fluency could provide a method to manipulate texts to remove bias in the future, by altering the fluency of particular aspects of text to allow for them to be processed seamlessly and easily, make them perceived more positively (Laham et al., 2009).

Perceptual fluency theories. There are a few theories as to why perceptual fluency manipulations lead to less positive interpretations of the disfluent stimuli. The first theory is the hedonic marking hypothesis (Winkielman, Schwarz, & Reber, 2004; Westerman et al., 2014). According to this theory it is believed that fluency is directly linked to affective preferences because of the positive emotional reaction that is triggered by easier processing (Westerman et al., 2014). Therefore positive feelings would be associated with the ability to process something easier, and negative feelings associated with more difficulty in processing.

Another theory that could potentially explain the findings surrounding perceptual fluency manipulations is the availability heuristic. The availability heuristic is a metacognitive memory theory that says individuals metacognitively monitor the processing of information by relying on

their subjective experience of ease or difficulty of memory recall (Winkielman, Schwarz, & Belli, 1998). It has been shown that this difficulty in recall causes information to be perceived less positively and this could explain the similar effects that difficulty processing regarding perceptual fluency has demonstrated (Winkielman et al., 1998). Perceptual fluency could mimic the memory theory in that when reading a passage that is difficult to process the information is also perceived less positively, leading to lower ratings as described in the study regarding ratings of moral wrongness (Laham et al., 2009). Although both theories could provide potential explanations for any findings in the current study, it appears through the literature analysis that the availability heuristic has been cited and supported more frequently, so it is the theory that will be mainly applied to the findings of this study (Winkielman et al., 1998; Tversky & Kahneman, 1973; Bem, 1981).

Schemas

A schema is a cognitive psychology concept which indicates that we have mental representations of various types of individuals, objects, or events that are designed to help us organize and interpret information quickly throughout our daily lives (Bransford & Johnson, 1972; Dickinson, 2011). It has been found that these mental pictures can be in the form of stereotypes towards particular groups of people and that these stereotypes often hinder comprehension rather than aid it; particularly in situations where someone breaks our idea of a specific stereotype (Carreiras et al., 1996; Duffy & Keir, 2004).

Schema incongruence. When something is consistent with our mental representation it is known as schema congruent, whereas if it is inconsistent with our mental representation it is known as schema incongruent (Brod, Lindenberger, Werkle-Bergner, & Shing, 2015). An example of a schema congruent text would be "the *mechanic* picked up *his* wrench"; this

sentence supports our preconceived mental representation of a mechanic being male, and would

be processed normally (Duffy & Kier, 2004). On the other hand, the phrase "the *mechanic*

picked up *her* wrench" would be an example of a sentence which breaks our preconceived

mental representation of a mechanic, and would be known as schema incongruent (Duffy & Kier,

2004). It has been found that the second phrase, the schema incongruent phrase, displays what is

known as a 'slowdown' effect (Dickinson, 2011). This slowdown effect occurs around the

section of the sentence that says 'her' and it is thought to be the reader updating their mental

representation of what they are reading as they progress through the passage and gain more

information (Dickinson, 2011; Carreiras et al., 1996)

       Impact of schema incongruence. According to most current literature this slowdown

effect appears to be connected to negative ratings regarding the individuals who are described as

being schema incongruent (Rojahn & Willemsen, 1994). In a previous study regarding

congruency and ratings of effectiveness for leaders, they found that participants generally rated

the individuals who were incongruent to their schemas as less effective leaders than those who

were congruent to their schemas (Rojahn & Willemsen, 1994). Throughout this study

participants were asked to rate the degree in which a leader appeared effective based on one

sentence about that leader, to obtain an effectiveness rating out of 100. The study looked at

gender schemas and leadership and found that the schema congruent leaders ("he was an

assertive boss" and "she was a compassionate boss") had a mean rating of effectiveness in

leadership of M = 82.5. Whereas the rating of effectiveness was statistically different for the

individuals described schema incongruently ("she was an assertive boss" and "he was a

compassionate boss"), which had a mean rating of effectiveness of M = 76.3 (Rojahn &

Willemsen, 1994). This study found that when the leaders were presented schema incongruently

they were perceived as less effective and overall less positively than when they were presented schema congruently (Rojahn & Willemsen, 1994). This reinforces the notion that schema incongruent stimuli are interpreted more negatively than schema congruent stimuli; which is why this study examined for these effects.

Backlash effect. A potential theory as to why there is a negative affect associated with stimuli that are presented incongruently is what is known as the backlash effect (Moreno & Bodenhausen, 1999; Rudman & Fairchild, 2004). According to this theory individuals have a strong desire to maintain stable stereotype systems. Therefore, when they are presented with an example of a counterstereotypical, or schema incongruent stimulus, that disconfirms their mental representations they respond negatively. This is believed to be in order to try and maintain their stereotype system, which individuals are theorized to having a strong desire to maintain, in order to help their comprehension of others (Moreno & Bodenhausen, 1999; Rudman & Fairchild, 2004).

Opposing the backlash effect. Although most current literature supports the backlash effect, as well as a negative affect being associated with schema incongruent stimuli, there has been some literature which has found the contrary. In a recent study it was found that individuals who were presented with schema incongruent adjectives as descriptors were rated as more positive than individuals who were presented with schema congruent adjectives as descriptors (Rubin et al., 2013). Their study aimed to determine whether linguistic descriptions (i.e. the adjectives used) could act as moderators for the negative affect previously found, for individuals who were presented schema incongruently, or counterstereotypically, and they believed their findings supported their hypothesis (Rubin et al., 2013).

The researchers in the Rubin, Paolini, and Crisp (2013) study examined how individuals being described either congruently or incongruently with their schema would impact their ratings for various traits and attribute ratings, particularly for likeability (Rubin et al., 2013). What they found was that when an individual was described with schema incongruent adjectives as linguistic moderators (i.e. the adjective *sensitive* in the example of "a sensitive straight man") that they were given a mean rating of likability of $M = 4.51$, when ranked on a 7 point Likert scale. However, they also found that individuals who were described using schema congruent, or stereotypical, adjectives as linguistic moderators (i.e. the adjective *sensitive* in the example "a sensitive straight woman") only received a mean rating of likability of $M = 4.14$, when rated on a 7 point Likert scale. They believed these findings indicated that describing individuals with schema incongruent adjectives could potentially manipulate the negative affect generally associated with schema incongruence (Rubin et al., 2013).

The researchers believed that the reason the schema incongruent individuals in their study were rated as more likable was because they were described with adjectives, rather than behaviours; which is what they cited as having been primarily used in previous literature regarding schema congruency (Rubin et al., 2013). They cited that most previous literature had only examined behaviors when they received the results associated with a negative affect for schema incongruent individuals (Rubin et al., 2013). However, in the aforementioned study by Rojahn and Willemsen (1997) the participants were asked to rank a leader's effectiveness according to the descriptions provided which used adjectives ("compassionate", "assertive", etc.), not behaviors. In this study the individuals presented schema incongruently were still found to be rated as less effective leaders than the individuals who were presented schema congruently. Accordingly, this explanation as to why the negative affect did not occur in the Rubin et al.

(2013) study regarding likeability ratings is likely not accurate, and there is likely another potential reason for their findings.

Alternate explanation for Rubin et al. (2013) results. Upon closer examination of the study by Rubin et al. (2013), which looked at linguistic moderators' effects on likability, there were a few potential concerns with the methods which needed to be addressed. It was noted that the individuals being described according to sexuality contained both male and female stimuli, and that in the data analysis all the schema congruent stimuli were analyzed together, as well as all the schema incongruent stimuli, regardless of gender. This is a potential confound in their data analysis as it has been demonstrated that schemas are more entrenched for males than for females and they did not examine for group differences before including them as one group within their data analysis (Dickinson, 2011; Rubin et al., 2013).

If the Rubin et al. (2013) study's findings that linguistic moderators can act to mitigate negative affect are supported there could be potential implications for our current theory surrounding schema incongruent processing, as their findings appear to disconfirm the backlash effect theory (Rubin et al., 2013). The current study is designed to replicate the study by Rubin et al. (2013), in order to be certain the previous study's results were not incorrectly impacted by their method of data analysis. In the current study, the data analysis will be separated for gender as a preliminary analysis, before potentially including all the stimuli in one data analysis group, should this be possible. This would be done to ensure the removal of any potential confounds that could arise from groups with group differences being analyzed together. Along with these modifications, the current study will also have the added component of perceptual fluency to examine its impact as another potential mitigating factor for the negative affect associated with individuals being described schema incongruently.

Sexuality Schemas

Previously there has been some literature which has demonstrated that homosexual individuals are perceived less positively than heterosexual individuals (Steffens, 2005). In a study using an Implicit Association Test (IAT), which is a research tool used as a measure for implicit cognition (Nosek, Greenwald, & Banaji, 2004), the implicit attitudes of participants towards individuals of different sexualities was examined. It was discovered that individuals who were described as being homosexual received less positive implicit associations than individuals who were described as being heterosexual; this was for a population of university students in Germany, with the mean age of 22 years (SD=3) (Steffens, 2005). With the knowledge that heterosexual individuals are already processed more positively than homosexual individuals (Steffens, 2005), it is likely that when a heterosexual individual is presented schema incongruently they will still receive more positive attribute ratings than when an individual who is described as being homosexual is presented schema incongruently.

Sexuality schema theory. There are a few potential explanations for the less positive implicit association results for individuals described as being homosexual. The first possible explanation is in regards to the heteronormativity assumption. According to this premise individuals are assumed to be heterosexual as a norm (Nielsen et al., 2000). Therefore when they encounter a stimulus that discusses a homosexual individual this would violate their assumption of heterosexuality in a similar manner to schema incongruence (Nielsen et al., 2000). This could explain the negative affect, again with the backlash effect thought to be associated with breaking a stereotype system (Rudman & Fairchild, 2004). However, there is an additional theory that could explain these results; this is the theory of familiarity. The familiarity theory indicates that individuals rate things they are less familiar with less positively than things in

which they are more familiar with (Chen, Wang, Xie & Qin, 2015). This preference for familiarity likely comes from the evolutionary advantage of things that are more familiar being less of a perceived threat (Spencer-Rodgers & McGovern, 2002). It is possible that the previous literature's results for sexuality are due to a lack of familiarity many individuals may have with various types of sexualities.

The familiarity theory is another potential consideration that must be made when analyzing the data surrounding sexuality schemas in particular, as most of the studies that support the backlash effect examined gender schemas for male and female individuals, rather than for different sexualities (Rojahn & Willemsen, 1994). This is particularly important to keep in mind, because the current study will primarily be looking at sexuality schemas rather than gender schemas.

The purpose of examining sexuality schemas in this study is to try and determine whether there are any potential mitigating factors that can remove some of the negative affect currently associated with individuals who are schema incongruent for sexuality, as well as schema incongruent for linguistic descriptions, such as 'an insensitive gay man' (Rubin et al., 2013). This is also important because although current literature indicates homosexual stimuli are perceived less positively regarding implicit attitudes, it has yet to be established how this would impact attribute ratings (Steffens, 2005).

Potential Implications

In this current study we are going to integrate the research on schema incongruent stimuli regarding sexuality schemas, with the manipulations of perceptual fluency. This was to be done by attempting to manipulate perceptual fluency for various texts, to see if manipulating something that would generally be considered more positive due to schema congruency could be

made to be considered equally as positive as something that was schema incongruent. By doing

so this study examined a potential way to remove bias from written sentences in the hopes of

discovering how the presentation of textual information can be done in a way that could remove

some of the associated negative affect (Rojahn & Willemsen, 1994). Another potential

implication of this study is that currently our preconceived notions and theories surrounding

schema congruency indicate that the backlash effect is likely the source of the negative affect

associated with schema incongruence (Rudman & Fairchild, 2004). However, some of the more

recent literature appears to be split in believing whether or not there are potential moderators that

could mitigate these effects by using adjectives as descriptors (Rojahn & Willemsen, 1994;

Rubin et al., 2013). By replicating this study and removing potential confounds from the data

analysis it could be possible for the current study's findings to either provide evidence for, or

against the alteration of some of the current theories surrounding schemas.

Current Study

In our study, we expected that the stimuli that were presented disfluently would receive

less positive attribute ratings than the stimuli that were presented fluently, as per the hedonic

marking hypothesis and the availability heuristic (Winkielman et al., 2004; Winkielman et al.,

1998). Both these theories supported the idea that when a text is more difficult to process it

should be interpreted as more negative relative to the interpretations of the easier to process text.

As for congruency it was expected that the incongruent stimuli's ratings would be reported less

positively than the congruent stimuli, because of the desire for participants to maintain stable

stereotype systems, as per the backlash effect theory that the majority of current literature

supports (Rudman & Fairchild, 2004). For sexuality it was expected that the homosexual stimuli

would receive less positive attribute ratings than the heterosexual stimuli, because individuals are

generally more familiar with heterosexual individuals than homosexual individuals; this is supported by the familiarity theory's principle that things individuals are less familiar with are rated less positively (Chen et al., 2015). These results were also expected due to the impacts of the 'heterosexual norm' which demonstrates that within society heterosexuality is taken for granted and assumed (Nielsen et al., 2000). When individuals read stimuli that involve an individual that is not heterosexual it is believed to cause a 'slowdown' similar to that displayed with stimuli that are presented incongruently, again likely resulting in lower attribute ratings (Nielsen et al., 2000; Dickinson, 2011). Overall this study attempts to manipulate the impact of schema incongruence for sexuality schemas by using perceptual fluency manipulations, in an attempt to merge all of the various literatures to come to conclusive findings.

Methods

Participants

Seventy undergraduate students from Laurentian University were recruited as participants for this study. The participants had a mean age of 19.65 and were composed of 10 males and 60 females. The participants were given the choice to receive one bonus mark towards course credit if the instructor of one of their courses allowed it; some individuals participated without incentive. The number of participants recruited was based on attempting to create even groups of participants for each of the four cells that were used in this study, while ensuring to have enough power according to Wilson VanVoorhis and Morgan's (2007) formula of predicting ideal sample size for a study with three independent variables ($N = 50 + 8*m$, where m = number of independent variables; $74 = 50 + 24$) (Wilson VanVoorhis & Morgan, 2007). The study had aimed to have 80 participants for these reasons, however only 70 participants were able to be recruited, largely due to the constraints of the eligibility criteria, which will be discussed in a

moment. The participants were all recruited under the guise of participating in a research project which determined how familiar university students were with various types of people. This was not the true purpose of the study; however it was presented this way in order to ensure the participants displayed no bias when answering questions, and in order to attempt to hide the true purpose of the study (Rubin et al., 2013). This deception was done because the nature of the questions being asked could demonstrate the effects of social desirability, and it was hoped that this guise could prevent, or decrease, these effects. Social desirability when an individual responds to questions differently than they truly feel because they know what is deemed more socially acceptable by society (Phillips & Clancy, 1972).

Eligibility requirements. There were only a few eligibility requirements the participants had to meet in order to have participated in this study. Firstly, all of the participants had either reported normal, or reported corrected to normal vision. This was to ensure the perceptual fluency manipulations were the only thing impacting the fluency, rather than the participant's lack of eyesight. Secondly, all participants were all from Canadian Anglophone culture. This was because it has been shown that schemas are developed according to the culture an individual participates in, and accordingly these schemas can vary across different cultures (Brochu, 2013). By keeping Canadian Anglophone culture constant, there was an assurance that cultural schema differences would be less likely to exist. These were the only restrictions used to determine eligibility for participation in this study.

Although the participant's sexuality was asked in the demographics questionnaire (Appendix A) it was not included as an exclusionary criterion for this study. This decision was based on prior research that indicated there are no differences in schemas across sexuality, because, as previously mentioned, they are developed by the culture individuals participate in,

not an individual's sexuality (Brochu, 2013; Shilhan, 2012). However, the participant's sexuality was collected in the demographics form once again to confirm that this was true, and that sexuality did not impact schema creation (Shilhan, 2012) This was done as an additional and preliminary data analysis in order to control for any potential confounds this could have resulted in.

Materials

REDCap Program. The current study used a web based research program entitled REDCap. Specifically this study used REDCap at Laurentian University, which had been purchased by the research institute conducting this study. Purchasing the program allowed for all the information to be hosted and stored onsite at the university, and ensured the safety and security of all the information collected. This allowed confidentiality to be assured, and decreased the risk associated with using a web based tool for research. The REDCap program acts as a platform to create a unique and specific program as needed for a research project, and allows for any necessary manipulations to question type, images, and fonts that a survey based research project may require. This allowed the entire program from the informed consent documents, demographics forms, the stimuli, and the questions, to be created on the program and remotely accessed by internet connection. REDCap has mechanisms in place to ensure anonymity of participants, and mechanisms to ensure that an individual cannot fill out the survey twice. This program was chosen for these reasons and because of the extra security surrounding hosting on site, and also because it functioned in a similar way to the programs used in previous literature that conducted similar studies (Rubin et al., 2013).

Stimuli. The stimuli used in the study (Appendix B) were manipulated using REDCap's program which allowed for customization of font type and color using either the preselected color options, or by using the html coding for hexadecimal color choices (Weinman & Heavin, 1997). By using the hexadecimal color coding it is possible to choose the exact amount of each primary color of red, green, and blue that is desired to be in your font choice and will make up the color you desire, this allows for an exact color to be chosen (Weinman & Heavin, 1997). For the fluent stimuli group all of the sentences were written in the preselected font color of black Arial font, in the font size 20. The disfluent stimuli group's sentences were written in Arial font as well, however using the hexadecimal color coding for a shade of light grey (shade D5D5D5). This shade of grey was selected according to previous literature which indicated any contrast beyond 50% from text to background was sufficient to manipulate fluency (Oppenheimer & Frank, 2008).

The stimuli set was created for the purpose of this study, and used prior knowledge from previous literature concerned with fluency to determine what font color to use; and research on congruency to determine which terms are congruent to various schemas (Oppenheimer & Frank, 2008; Maass et al., 2005; Rubin et al., 2001; Simon et al., 1991). Both the fluent and the disfluent conditions were presented in the aforementioned size 20 Arial font, as the only fluency manipulation used in this study was through font color. This was selected as previous literature found both to be sufficient to manipulate the fluency on their own, and it provided easier information for the REDCap program to process (Oppenheimer & Frank, 2008).

Independent variables. The first independent variable included in this study was perceptual fluency. Perceptual fluency was incorporated using a between subjects design with two levels: fluent and disfluent. The fluent conditions received their stimuli as black text on a

white background whereas the disfluent conditions received their stimuli as light grey (D5D5D5) text on a white background. The second independent variable was also incorporated using a between subjects design and also had two levels: schema congruent and schema incongruent. The schema congruent condition would only receive stimuli described with schema congruent descriptors (i.e. a sensitive woman), whereas the schema incongruent condition would only receive stimuli described with schema incongruent descriptors (i.e. an aggressive woman). These terms were determined to be schema congruent or schema incongruent according the findings of previous literature on schema congruency (Maass et al., 2005; Rubin et al., 2001; Simon et al., 1991). Finally the last independent variable was sexuality, this was incorporated using a within subjects design with two levels: heterosexual or homosexual. This was done by manipulating the sexuality of the individuals described within the sentences of the stimuli (i.e. a sensitive straight man, or a sensitive gay man).

The within subjects design for sexuality was based of the methodologies used throughout previous literature that examined sexuality schemas (Rubin et al., 2013), and the between subjects design for schema congruency and fluency was also based off previous literature; where the design was intended to remove the likelihood of the participants noting the true purpose of the study during their participation (Rubin et al., 2013; Oppenheimer & Frank, 2008). With this design the four cells used for analysis resulted in a group that was schema congruent and fluent; a second group of schema congruent and disfluent; the third group having all schema incongruent and fluent stimuli; and the last group receiving all schema incongruent and disfluent stimuli. Each group also had sexuality being examined within-subjects, which resulted in every participant receiving equal amounts of heterosexual stimuli sentences, as well as homosexual stimuli sentences. Specifically in all four of these conditions there were 8 stimuli based on

heterosexuality, and 8 stimuli based on homosexuality ("a straight man" and "a gay man"), for a total of 16 stimuli.

Counterbalancing stimuli. Since the stimuli being presented to each group included sentences both regarding heterosexual and homosexual individuals, it was important that the stimuli were not arranged in any particular order according to stimuli as it could cause a priming effect. Priming effects occur when the order of the presentation of stimuli causes a different response in the proceeding stimuli than it would have without the prime (Dickinson, 2011). In this case to have an organization of stimuli in which all of the heterosexual stimuli were presented first, followed by all of the homosexual stimuli, or even alternating between the two could result in priming effects. It was necessary to randomize the order of the stimulus presentation to prevent this from occurring. In order to have a random presentation of stimuli to remove any of these potential priming effects a randomization program on Microsoft Excel was used to generate a random order for the stimuli. To do so the stimuli sentences were placed into Microsoft Excel and using the random number generator function (Excel code "=rand") random numbers were generated beside each sentence. These numbers were then randomized a few times, then using the data sorting tool they were "special pasted to value" in the next column; the order this generated was what was used as the presentation order of the sentences for all groups. However, in order to ensure there was still not any form of order effects each group was counterbalanced for half the participants. To accomplish this all four stimuli groups were counterbalanced by creating alternate orders for the stimuli which involved taking the random order of the original group and flipping the order of the stimuli, so placing stimuli in the random order of 1-16 in the first half of the group, and then organizing those 16-1 for the second half of

the group. This counterbalanced version of the stimuli sets were given to half the participants in each cell to control for order effects of the presentation of any of the stimuli.

        Measurement tool. The participants responded to six questions after the presentation of each of the 16 stimuli to which their responses were recorded on 7 point Likert scales. This was used as a self-report measure of data collection, which was selected due to its use in previous studies of a similar nature; specifically the study this current study was trying to replicate (Rubin et al., 2013). Five of the questions that were asked of the participants (Appendix C) were the questions directly from this previous study regarding sexuality schemas (Rubin et al., 2013). These five questions covered the five dependent variables included from the previous study: familiarity (which was also used as the fake purpose of the study), conventionality, stereotypicality, ease of imagination, and likability. The study by Rubin, Paolini and Crisp (2013) primarily emphasized the dependent variable likability, as it was chosen as an indicator of how positive the individuals were being perceived, and could give an indication of whether the individuals were associated with a negative or a positive affect. They also included the variable of familiarity due to previous research finding significant effects where schema congruent stimuli were reported as more familiar than schema incongruent stimuli; which was also their reason for including conventionality, stereotypicality and ease of imagination into their study (Rubin et al., 2013). For this current study an additional question of "how easy was this to read?" was added to the question list to try and determine whether the participants were aware of the perceptual fluency manipulations, and whether they found the texts hard to read or easy to read. This was an additional measurement that was added to the current study, because the original study did not examine for the effects of perceptual fluency.

Procedure

When an individual indicated they were interested in participating in the study, they were contacted by the administrators by email and provided with the link to the appropriate portion of the study. The portion of the study the participant received was determined by whichever group the participant was randomly assigned to, varying from group 1 to group 4. The first group received only stimuli sentences which were schema congruent, and fluently presented; such as sentences like "an assertive straight man" presented in the fluent condition's black colored text. The second group received only stimuli sentences which were schema congruent and disfluently presented; so again a sentence such as "an assertive straight man" however presented in the disfluent condition's light grey colored text. The third group received only the stimuli sentences which were schema incongruent and fluently presented; so a sentence such as "a creative straight man" presented in the fluent condition's black colored text. Finally, the last group received sentences which were schema incongruent and disfluently presented; such as the sentence "a creative straight man" but presented in the disfluent condition's light grey colored text.

The participants were able to use any computer with internet access to participate in this study, as the program was designed to function equally on all computers and web browsers; however they were not permitted to use any other type of electronic device, such as a tablet or cell phone. It has been found that completing research on different devices yields different results and as of yet computers are considered best practice (Been-Lim Duh, Tan, & Hsueh-hua Chen, 2006). In order to ensure this did not occur a mechanism was put in place which did not allow the participants to use any other type of electronic device. During recruitment the participants were instructed to only use a computer for completing the study; however an additional precautionary measure was put in place in order to ensure this was maintained. There

are certain question types on the REDCap program which cannot be completed on any type of electronic device other than a computer, one of these question types was a slider scale similar to a Likert scale. By adding a question with this type of response to the demographics form, and making it a mandatory field, any individual who attempted to progress through the study on a different device could not progress past the second screen. This ensured that no data collected and analyzed would have been collected on the wrong type of electronic device. This was a solution to the issue that using different devices, with this program especially, would have led to a potential confound in our data analysis, and therefore by adding this mechanism this issue was prevented.

Once the participant accessed the link they had been sent by the administrators they were brought to the screen where they provided informed consent if they desired. The participants then progressed to the demographics form (Appendix A) which was used to ensure that all the exclusionary criteria were maintained. Any participant that indicated anything that was against the exclusionary criteria led to their data being eliminated from the data analysis. They then received a screen with brief instructions explaining to expect 16 trials, where each trial was composed of a stimulus followed by a series of six questions, which were answered in regards to the previously read stimulus.

After reading these instructions participants then proceeded to their first stimulus, which was presented according to the condition they had been randomly assigned to, then they proceeded to the first question, to the second, and so on and so forth for the total of the six questions for that stimulus. These six questions were responded to using the self-report method of Likert scales, For example, the stimulus could be "a creative man" and the individual would then progress to the first question, which could be "how likeable was this individual?" They

would then respond to this question on a 7 point Likert scale which ranged from "very likeable" to "neither likeable nor dislikable" to "very dislikable".

The participant continued in this pattern of stimulus, then series of six questions for the remainder of the study. This pattern proceeded for the 16 trials the individual completed. Following the completion of the 16 trials the participant then came across the debriefing form, where they were able to provide their email address for further information about the study, and where they received their bonus mark if desired. The debriefing form informed them of the true purpose of the study and provided the participants with all the necessary contacts should they have had any questions of concerns.

Results

Due to multiple dependent variables an overall MANOVA was carried out in order to decrease the chance of a type 1 error. The multivariate test did not support the hypothesis surrounding perceptual fluency; however it did appear to support the hypotheses surrounding congruency and sexuality. There was found to be a three-way interaction between congruency, character sexuality, and character gender; where character sexuality and character gender represent the sexuality and gender of the individuals described in the stimulus, not of the participants. There was also found to be a main effect of sexuality, which demonstrates the support of the hypothesis for sexuality. In regards to the interaction between schema congruency, character sexuality and character gender; character gender was originally examined as a precaution to ensure there were no effects before we could include both genders into one group for further analyses, however during this time we did notice significant differences according to gender, and thus included it as an additional within-subjects independent variable within the analysis.

Fluency

As aforementioned, the multivariate test did not support the hypothesis surrounding perceptual fluency. There were no interaction effects between the independent variables and no main effects across

dependent variables, $F = (6, 61) = 1.68$, $p > .05$ (Figure 1), with the exception of ease of reading. Ease of

reading was a dependent variable that was included to ensure the fluency manipulations were effective,

meaning that the disfluent stimuli were harder to read than the fluent stimuli. The results did demonstrate

the disfluent stimuli were more difficult for the participants to read than the fluent stimuli, $F = (1, 61) =$

4.78, $p < .05$, $\eta_\rho^2 = 0.067$ (Figure 2). However, this impact of disfluency did not appear to have any

implications across our dependent variables, as none of the other five measures demonstrated
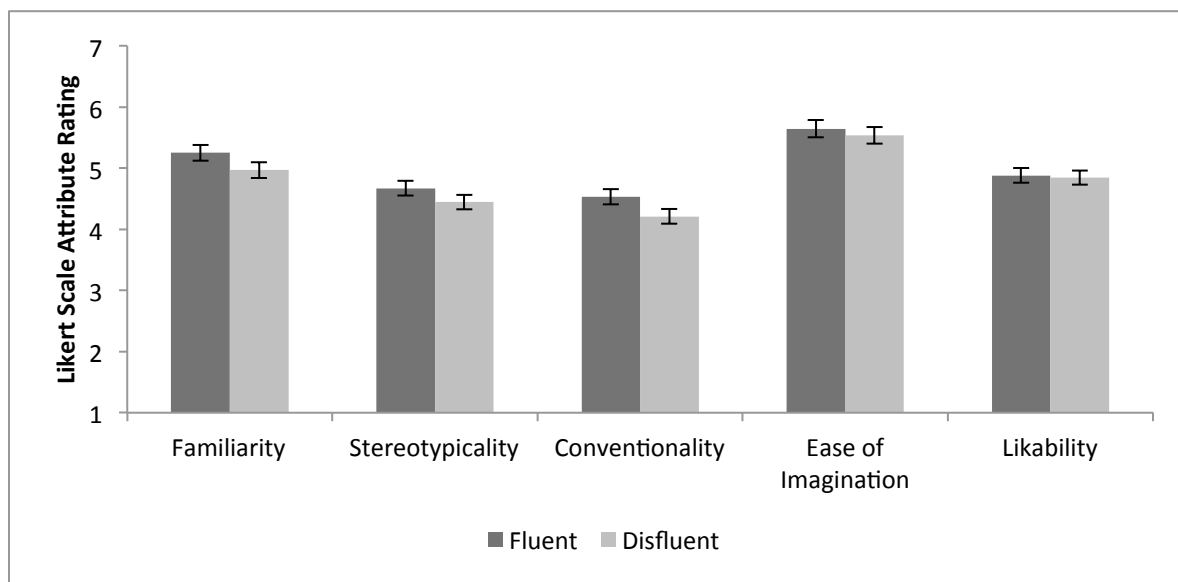
significance.

Figure 1. The effects of perceptual fluency across various attribute ratings. F = (6, 61) = 1.68, ρ > .05. This shows that there were no significant effects of fluency across the dependent variables of familiarity, stereotypicality, conventionality, ease of imagination, or likability. The error bars represent the standard error of the mean for each dependent variable.
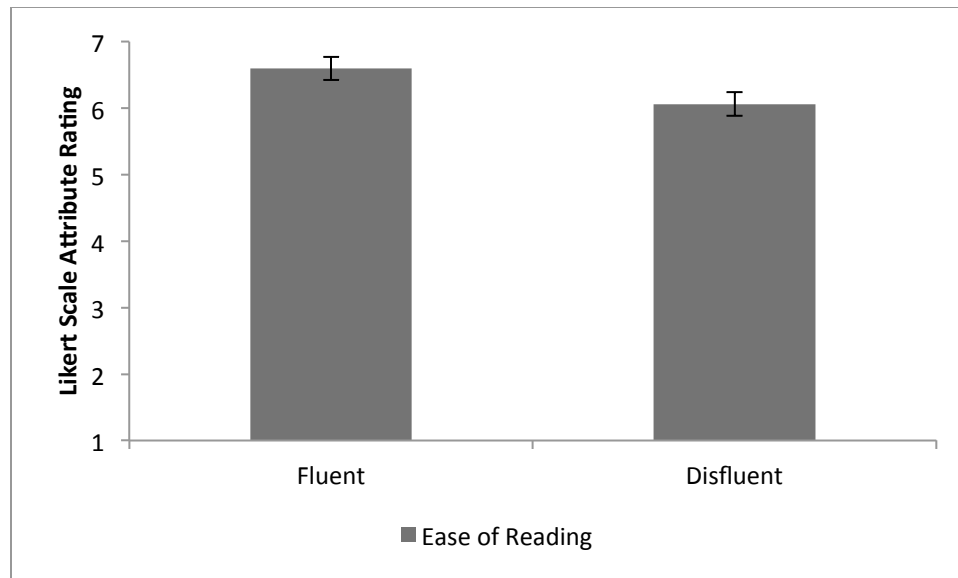
Figure 2. The effects of perceptual fluency across the attribute rating of ease of reading. F = (1, 61) = 4.78, ρ < .05, η_ρ^2 = 0.067. This shows that there was a significant effect of the fluency manipulation, and that the disfluent condition was significantly harder to read than the fluent condition. The error bars represent the standard error of the mean for each condition.

Three-Way Interaction

However, the multivariate test did reveal a three way interaction between congruency, character sexuality, and character gender; which supported the hypotheses surrounding congruency and sexuality, F = (6, 61) = 8.34, p < .05, η_ρ^2 = 0.45. Once examining the pairwise comparison it was determined that the interaction demonstrated effects across the dependent variables of conventionality, likability, familiarity, stereotypicality, and ease of imagination. However, ease of reading, as previously indicated, did not show any significance.

For the dependent variables of conventionality, familiarity, stereotypicality, and ease of imagination the results indicated that there was significant differences in which the schema congruent stimuli were reported as more positive across all attribute ratings than the schema incongruent stimuli (Figure 3). This supports the theory surrounding schema congruency, and indicates that generally schema congruent stimuli are reported more positively than schema incongruent stimuli. As for the dependent

variable of likability the findings were not consistent with the hypothesis and the other dependent

variable's findings (Figure 4). It was found that for gay male and gay female the schema congruent

attribute ratings were reported significantly more positively then the schema incongruent attribute ratings.

However, for the straight male category the schema congruent category was reported significantly less

positively than the schema incongruent category, a potential explanation for these findings will be
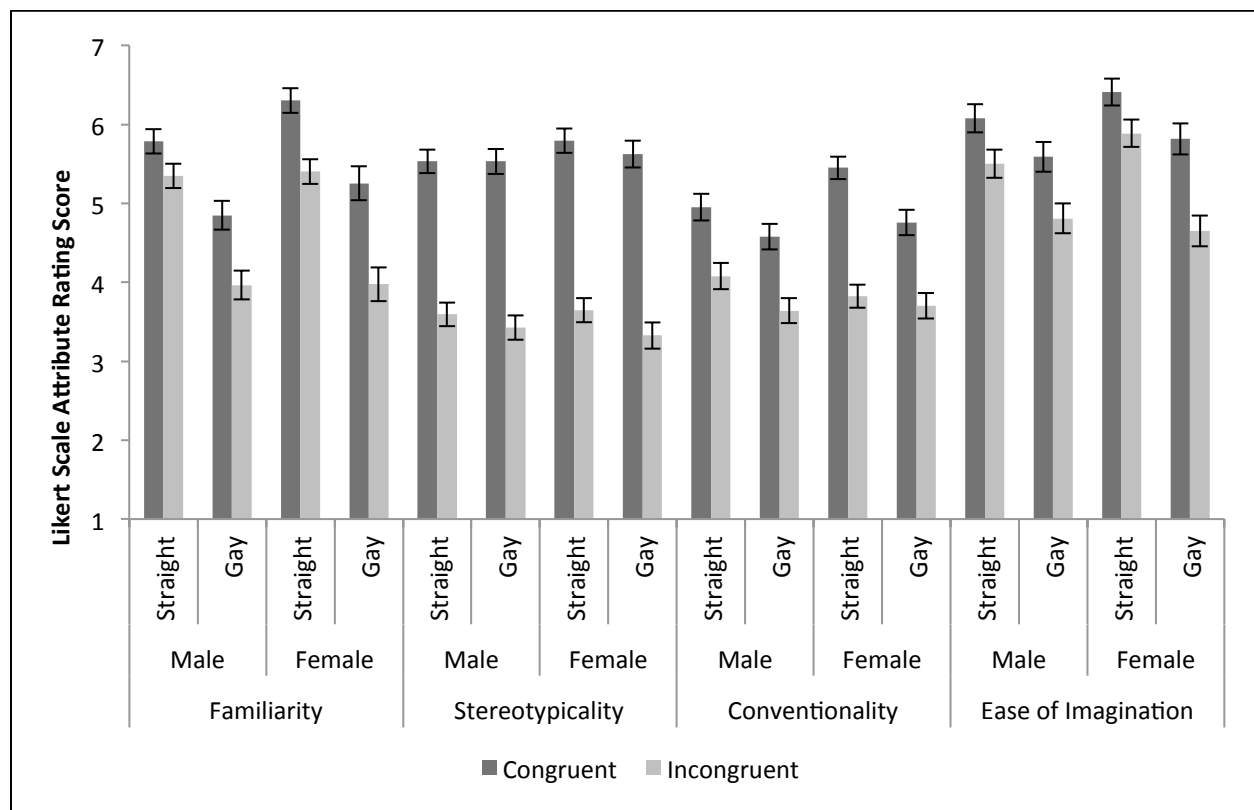
discussed further later on.

Figure 3. The effects of the three-way interaction between schema congruency, character gender, and character sexuality. $F = (6, 61) = 8.34$, $p < .05$, $\eta_p^2 = 0.45$. This shows that there were significant effects demonstrating that schema congruent stimuli were reported more positively than schema incongruent stimuli. The error bars represent the standard error of the mean for each dependent variable.

Sexuality

In order to clarify the results surrounding sexuality they were included separately from the three-

way interaction as an additional graph to demonstrate the main effects (Figure 5). These findings support

the hypothesis surrounding sexuality and it was found that there was a statistically significant difference

between the heterosexual individual's attribute ratings and the homosexual individual's attribute ratings.

In particular it was demonstrated that for the dependent variables of familiarity, conventionality, and ease

of imagination the heterosexual individuals were reported more positively than the homosexual

individuals; for the other dependent variables there were no other statistically significant differences, F =
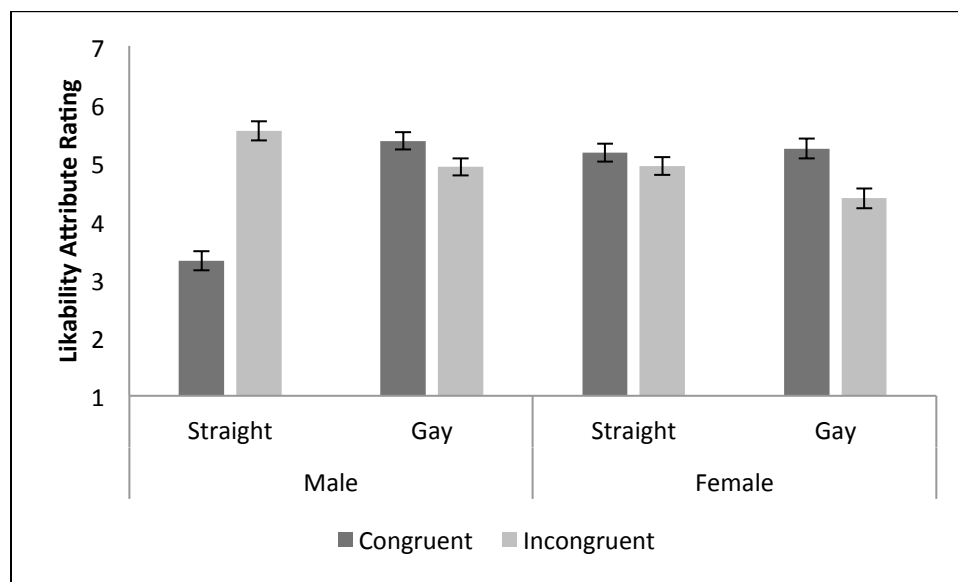
$(6,61) = 23.30$, p < .05, $\eta_\rho^2 = 0.70$.

Figure 4. The effects of the three way interaction between schema congruency, character gender, and character sexuality on the attribute rating of likability. $F = (6, 61) = 8.34$, $\rho < .05$, $\eta_\rho^2 = 0.45$. This demonstrates that for the groups of gay male and gay female the congruent stimuli were reported as significantly more positive than the incongruent stimuli. It also demonstrates that for the straight male category the congruent stimuli were reported significantly less positive than the incongruent stimuli. However there were no significant effects for the straight female category. The error bars represent the standard error of the mean for each dependent variable.
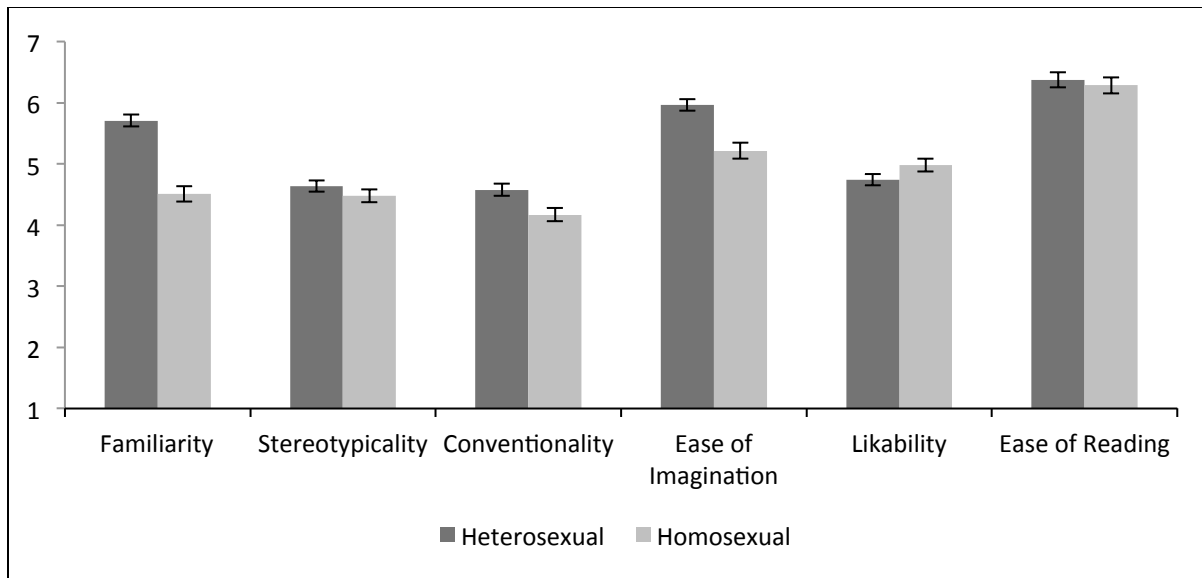
Figure 5. Main effects of sexuality across attribute ratings. F = (6, 61) = 23.3, ρ < .05, η_ρ^2 = 0.70. This shows that there were significant effects for the dependent variables of familiarity, conventionality, and ease of imagination, which all demonstrated that heterosexual individuals were rated more positively than homosexual individuals. For the variables stereotypicality, conventionality, likability, and ease of reading there were no significant effects. The error bars represent the standard error of the mean for each dependent variable.

Discussion

Summary

The purpose of this study was to replicate the previous study by Rubin, Paolini and Crisp (2013), which found a positive affect for individuals described schema incongruently, and aimed to determine whether their results were due to gender confounds in their analyses; this study also served to determine if perceptual fluency could mitigate the negative affect generally demonstrated to be associated with schema incongruence, particularly while looking for differences across sexuality schemas (Oppenheimer, 2008; Laham et al., 2013). It was demonstrated that although the current study's attempt to manipulate perceptual fluency was effective, this did not appear to have an impact across any of the dependent variables being measured; indicating perceptual fluency could not mitigate the negative affect of schema non-

congruency for sexuality schemas. A three way interaction between schema congruency, character sexuality, and character gender was discovered which demonstrated that for most of the dependent variables (familiarity, stereotypicality, conventionality, and ease of imagination) the schema congruent stimuli were reported more positively than the schema incongruent stimuli. However, for the dependent variable of likability it was found that heterosexual males were rated more negatively when they were reported schema congruently rather than schema incongruently; which was contrary to the other results in the present study. Findings also demonstrated a main effect of sexuality across the dependent variables of familiarity, conventionality, and ease of imagination, all which demonstrated that heterosexual individuals were rated more positively than homosexual individuals. The results obtained in this study did not support the hypothesis for perceptual fluency; however they did appear to support the hypotheses for sexuality and schema congruency.

Perceptual Fluency

Previous literature has found that when texts are presented as more difficult to read they are interpreted less positively than when they are presented as easy to read (Jacoby & Dallas, 1981; Mandler, Nakamura, & Van Zandt, 1987; Oppenheimer & Frank, 2008). A potential theory to explain this effect was the availability heuristics theory which is a metacognitive memory theory that indicates that people rely on their subjective ease or difficulty of memory recall, and that things that are harder to process are perceived as more negative (Winkielman et al., 1998). According to the findings of previous literature, as well as the availability heuristic's theory, it was hypothesized that manipulating how easy a text was to process, and causing it to be more difficult to read, would lead to the text being perceived less positively. Specifically it was anticipated that the text presented as the fluent condition would be reported more positively

across attribute ratings than the text that was presented as the disfluent condition. Although previous literature has found that fluency manipulations had robust effects on things such as ratings of moral wrongness (Laham et al., 2009), familiarity (Jacoby & Dallas, 1981), and even aesthetic pleasure (Winkielman et al., 2004), the findings of the present study could not confirm these effects for sexuality schemas, as demonstrated by Figure 1.

As discussed, the only significance found surrounding perceptual fluency was in regards to the dependent variable ease of reading. This dependent variable was not a variable included in the Rubin, Paolini, and Crisp (2013) study; the ease of reading variable was included into this study as a measure to ensure the perceptual fluency manipulations were effective in order to ensure that the groups that were presented with the disfluent condition stimuli did indeed have a harder time reading, and therefore processing, the texts than the groups presented with the fluent stimuli. These findings, demonstrated in Figure 2, did indicate that the disfluent text was significantly more difficult to read than the fluent text, and this demonstrated that the manipulations conducted were effective, and perceptual fluency was being impacted by the alterations to the colour of the texts. Since fluency studies have previously found robust effects, where only slight manipulations of perceptual fluency had an impact on various types of ratings, the effectiveness of the current study's fluency manipulations should have led to fluency having an impact on the various other dependent variables being measured, however this was not seen to be the case (Oppenheimer, 2008; Oppenheimer & Frank, 2008).

No further main effects or interaction effects existed regarding the independent variable of perceptual fluency across any of the other dependent variables. This is contrary to the availability heuristic's theory, and does not support the findings that fluency has robust effects; however a potential explanation does exist. None of the previous literature on perceptual fluency

has examined the impacts of fluency on sexuality schemas; it is possible that these schemas are too entrenched to be manipulated by fluency (Oppenheimer 2008; Laham et al., 2009). It is also possible that there is a threshold of fluency manipulation that must be reached in order to mitigate the impacts of something with a strong entrenchment, and although the results demonstrated that the fluency manipulations were effective it is possible that the effects were not extreme enough to manipulate something so entrenched. A potential future study surrounding the topic of a threshold for perceptual fluency manipulations is further discussed under the limitations and future directions heading. These results also indicated that the availability heuristics theory does not appear to apply to perceptual fluency, particularly regarding manipulations on sexuality schemas; meaning that further research and theorizing must be done in order to establish a theory that would encompass all aspects of how perceptual fluency works. Developing an encapsulating theory on perceptual fluency will require further research, and this study suggests fluency's effects are not as robust as previously anticipated.

Congruency

When an individual breaks a stereotype they can be described as being incongruent with their schema, in most cases individuals who are described schema incongruently are perceived as less positive than their schema congruent counterparts (Rojahn & Willemsen, 1994; Bransford & Johnson 1972; Carreiras, Garnham, Oakhill & Cain, 1996). When reading a text where a schema incongruent individual is being described, it has been found that a slowdown effect occurs; this is when there is a slowdown in processing at the point in the sentence where an individual comes across the incongruent schema (Dickinson, 2011). This slowdown effect is thought to be associated with a negative affect for the individuals who are described schema incongruently; a potential explanation for this is the backlash effect's theory that individuals want to maintain a

stable stereotype system, and that schema incongruent examples interfere with this desire (Moreno & Bodenhausen, 1999; Rudman & Fairchild, 2004; Duffy & Keir, 2004). Due to most of the previous literature surrounding schema congruency supporting this negative affect, with the exception of the Rubin, Paolini, and Crisp (2013) study, it was anticipated that individuals who were described schema incongruently for their sexuality schema would be perceived less positively than individuals who were described schema congruently (Rojahn & Willemsen, 1994). It was also anticipated that should the results for the dependent variable of likeability support the Rubin, Paolini, and Crisp (2013) study that these differences would largely be due to the potential gender confound previously described; and that once the confound was removed there would likely be no differences from the previous literature, and the results would actually demonstrate schema congruent as more likable than schema incongruent.

The three-way interaction found between schema congruency, character gender, and character sexuality largely supported the previous literature's findings that schema incongruent individuals are perceived less positively than schema congruent individuals, and these results are displayed in Figure 3. This interaction demonstrated a similar pattern of results that for the dependent variables of familiarity, stereotypicality, conventionality and ease of imagination; where all of the schema congruent stimuli was rated as more positive than the schema incongruent stimuli. This pattern was not demonstrated for the dependent variable ease of reading, which displayed no significant effects, nor was the pattern found for the dependent variable likability; however this will be discussed further at a later time. These results appear to have supported the backlash effect's theory that individuals have a strong desire to maintain a stable sense of stereotypes and this accordingly caused them to report things that are schema incongruent as less positive (Moreno & Bodenhausen, 1999; Rudman & Fairchild, 2004). These

findings support the previous research that has consistently demonstrated that schema

incongruence is associate with a negative affect (Rojahn & Willemsen, 1994; Dickinson, 2011),

however the results for the dependent variable of likability demonstrates a different effect.

For the dependent variable likability some unique findings were made within the three

way interaction, which is demonstrated in Figure 4; it was found that for the categories of

homosexual male and homosexual female that the results were consistent with the other results in

the study, showing that schema congruent was rated as significantly more positive than schema

incongruent. However, for the category of heterosexual male it was found that the schema

congruent individuals were reported significantly less positively than the schema incongruent

individuals, which is contrary to most previous literature, but did support the findings in the

Rubin, Paolini and Crisp (2013) study. What this suggested was that in the Rubin, Paolini and

Crisp (2013) study their differences found in likability were also in this group, heterosexual

males, however since they did not separate for gender in their analysis they were not able to note

these differences. Since these differences only pertained to the heterosexual male category

potential reasons for these results was examined. Upon further speculation surrounding the

stimuli it was noted that the schemas previously researched surrounding heterosexual men

appeared to be more negative in nature when they were schema congruent, as opposed to schema

incongruent. It was also noted that this did not appear to be true for the categories of homosexual

men, homosexual women, or heterosexual women. This indicated that the results surrounding

likability for heterosexual men were skewed by the fact that generally the traits that were found

by literature to be schema congruent for that group were more negative in nature, and therefore

perceived as less likeable (Maass, Cadinu, Boni & Borini, 2005; Rubin, Hewstone, & Voci,

2001; Simon, Glassner-Bayerl, & Stratenwerth, 1991). This was a potential limitation to the

Rubin, Paolini and Crisp (2013) study, as well as the present study, and a potential solution is discussed further under the limitations and future directions heading.

Sexuality

According to the familiarity theory individuals rate things they are more familiar with as more positive (Chen, Wang, Xie & Qin, 2015); likely due to evolutionary adaptations where things that are more familiar are considered less of a perceived threat (Spencer-Rodgers & McGovern, 2002). According to this theory it was anticipated that homosexual individuals would be perceived less positively than heterosexual individuals, simply because generally people are more familiar with heterosexuals than homosexuals. The results found in this study supported the familiarity theory in multiple ways, and also supported the hypothesis that heterosexual individuals would be reported as more positive than homosexual individuals.

It was found that not only was sexuality involved in the three-way interaction with congruency and character gender, Figure 3, but that also a main effect for sexuality did exist, Figure 5. It was found that sexuality of the individual being described, not of the participant, impacted the attribute ratings for familiarity, ease of imagination, and conventionality. Across all three variables the heterosexual individuals were reported more positively than the homosexual individuals; the other dependent measures showed no significant results. Discovering that heterosexual individuals were indeed rated as more positive than homosexual individuals helped provide support for the familiarity theory as well as the hypothesis for sexuality. Particularly because the dependent variable familiarity did demonstrate that generally people were significantly more familiar with heterosexual individuals rather than homosexual individuals. Also, since the other dependent variables with significant effects were also demonstrated to be reported as more positive for the heterosexual group than the homosexual group the results

provided further support for the theory as well as the hypothesis. Overall it appears as though the differences found for sexuality are due to individuals being more familiar with heterosexuals than homosexuals and as a result rating them more positively.

Another thing surrounding sexuality to discuss is surrounding the sexuality of the participant, rather than the sexuality of the character being described. Although this study collected data surrounding the sexuality and gender of the participants there was not enough variance to analyze for differences. A total of sixteen participants identified as a sexual orientation that was not heterosexual (2 pansexual, 8 bisexual, 6 homosexual), meaning that 54 of the participants identified as heterosexual. As explained previously however this should not have impacted the results since previous studies have looked into sexuality as potentially effect results surrounding sexuality schemas and found that no differences for sexualities existed, despite the appearance that participant sexuality could have an impact (Shilhan, 2012).

Limitations and Future Directions

The current study's results have implications largely towards cognitive psychology theories and the direction of future research. The results supported the familiarity theory as well as the backlash effect, however provided evidence against the robust effects of perceptual fluency, and against the availability heuristic's theory. This knowledge, along with evidence that sexuality schemas are firmly entrenched, can help guide further research effectively.

As aforementioned, there has not been sufficient research into schemas regarding sexualities of various individuals. The current stimuli used throughout literature tend to report the negative schemas for straight men in higher abundance than the negative schemas for other groups (Rubin et al., 2013). This lack of research does not allow for the stimuli to be equally balanced between the amount of positive and negative stimuli per group, and is likely the cause

of the differences found regarding schema congruency and the attribute rating of likability. This

is anticipated because more negative attributes, such as aggressive and inattentive have been

found to be schema congruent for straight men, which do not generally appear to be likeable

qualities, potentially causing a skew in the interpretation of schema incongruent versus schema

congruent attribute ratings for this variable. In the future further research should look into

determining various terms that can be considered schema congruent and schema incongruent for

all groups: straight men, gay men, straight women, and lesbian women. Once it has been

determined what terms are considered schema congruent and schema incongruent for each group

it would be important to also determine which of these terms are considered to be positive

attributes, and which are considered to be negative. After this is completed a similar study to the

present study could be conducted, however this time with balanced groups of positive and

negative stimuli in order to ensure this effect of negativity of the stimuli would not occur again.

This would give a clearer picture on where the differences truly lie regarding likability and

schema congruency, or whether they exist at all.

Another potential limitation to the current study was the specific program that was used;

REDCap at Laurentian. Within this program counterbalancing was not possible within subjects,

and therefore this current study was unable to counterbalance for effects surrounding fluency,

nor congruency, and simply counterbalanced between subjects for order effects surrounding

sexuality, and between subjects for Likert scale side preference. It would be beneficial that in the

future a study were to use an alternate program which allowed for within subjects

counterbalancing and that counterbalancing would be conducted regarding perceptual fluency,

schema congruency, and sexuality, where all conditions were counterbalanced and a control

group existed in order to ensure a within subjects design for fluency and congruency did not

allow the participants to note the purpose of the study and provide alternate answers for reasons of social desirability.

Previous research surrounding perceptual fluency has indicated that even slight fluency manipulations appeared to have robust effects across various measures (Oppenheimer, 2008), however the current study did not have findings to support this, as mentioned this is potentially due to the strong schema entrenchment surrounding sexuality and gender schemas. Future research could examine whether there are various thresholds of fluency manipulations that must be reached in order to impact different types of variables. In other words explore different levels of entrenchment, from little preconceived thoughts, to strong preconceived ideas of a topic, and then examine if there is a fluency manipulation level that must be obtained in order to mitigate the impact of the various levels of entrenchment. If a topic is strongly entrenched it perhaps needs a higher level of disfluency to manipulate the results, and future research could aim to determine this.

Conclusion

Although the current study's results did not demonstrate that perceptual fluency could mitigate the impact of schema non-congruency for sexuality schemas, this study did help clarify some issues surrounding schema congruency. It was found that there was a potential explanation for the findings in the Rubin, Paolini, and Crisp (2013) study, and partially gender differences, but mostly an imbalance in the number of positive and negative schemas for various individuals may likely have been the true cause of the results found in their study. Further research into what is schema congruent and what is schema incongruent is required before conducting further studies with the variable of likability in regards to schema congruency, and in general it did appear that schema incongruent individuals were perceived less positively than schema

congruent, which supported the backlash effect's theory. It also appeared that sexuality schemas are largely entrenched in current Canadian Anglophone culture, which supports the familiarity theory; however as time and acceptance progresses it would be interesting to explore whether these views will shift with society's development, or whether they will remain stagnant.

References

Been-Lim Duh, H., Tan, G., & Hsueh-hua Chen, V. (2006). Usability evaluation for mobile device: a comparison of laboratory and field tests. *Mobilehci*, *06*, 181-186.

Bem, S. (1981). Gender schema theory: A cognitive account of sex typing. *Psychological Review*, *88*(4), 354-364. http://dx.doi.org/10.1037/0033-295x.88.4.354

Bransford, J., & Johnson, M. (1972). Contextual prerequisites for understanding: some investigations of comprehension and recall. *Journal of Verbal Learning and Verbal Behavior*, *11*(6), 717-726. http://dx.doi.org/10.1016/s0022-5371(72)80006-9

Brochu, P. (2013). Est-ce que la culture agit comme modérateur ou médiateur de la violation des schémas sur les processus cognitifs? (Master's Thesis). Laurentian University, Sudbury, ON.

Brod, G., Lindenberger, U., Werkle-Bergner, M., & Shing, Y. (2015). Differences in the neural signature of remembering schema-congruent and schema-incongruent events. *Neuroimage*, *117*, 358-366. http://dx.doi.org/10.1016/j.neuroimage.2015.05.086

Carreiras, M., Garnham, A., Oakhill, J., & Cain, K. (1996). The use of stereotypical gender information in constructing a mental model: evidence from english and spanish. *The Quarterly Journal of Experimental Psychology A*, *49*(3), 639-663. http://dx.doi.org/10.1080/027249896392531

Chen, L., Wang, P., Xie, Y., & Qin, Z. (2015). The effect of familiarity and compatibility on mental representation of the stereotype in compound social categories. *Acta Psychologica Sinica*, *47*(3), 375-388. Retrieved from http://search.proquest.com/docview/1689322196?accountid=12005

Dickinson, J. (2011). The impact of 'violating the heterosexual norm' on reading speed and accuracy. *Psychology*, *02*(05), 456-459. http://dx.doi.org/10.4236/psych.2011.25071

Duffy, S., & Keir, J. (2004). Violating stereotypes: eye movements and comprehension processes when

    text conflicts with world knowledge. *Memory & Cognition*, *32*(4), 551-559.

    http://dx.doi.org/10.3758/bf03195846

Forster, M., Leder, H., & Ansorge, U. (2012). It felt fluent, and I liked it: subjective feeling of fluency

    rather than objective fluency determines liking. *Emotion*, *13*(2), 280-289.

    http://dx.doi.org/10.1037/a0030115

Laham, S., Alter, A., & Goodwin, G. (2009). Easy on the mind, easy on the wrongdoer: discrepantly

    fluent violations are deemed less morally wrong. *Cognition*, *112*(3), 462-466.

    http://dx.doi.org/10.1016/j.cognition.2009.06.001

Maass, A., Cadinu, M., Boni, M., & Borini, C. (2005). Converting verbs into adjectives: asymmetrical

    memory distortions for stereotypic and counterstereotypic information. *Group Processes &*

    Intergroup Relations,*8*(3), 271-290. http://dx.doi.org/10.1177/1368430205053943

Moreno, K., & Bodenhausen, G. (1999). Resisting stereotype change: the role of motivation and

    attentional capacity in defending social beliefs. *Group Processes & Intergroup Relations*, *2*(1), 5-16.

    http://dx.doi.org/10.1177/1368430299021001

Nielsen, J., Walden, G., & Kunkel, C. (2005). Gendered heteronormativity: empirical illustrations in

    everyday life. *The Sociology Quarterly*, *41*(2), 283-296. http://dx.doi.org/10.1111/j.1533-

    8525.2000.tb00096.x

Nosek, B., Greenwald, A., & Banaji, M. (2004). Understanding and using the implicit association test: II.

    method variables and construct validity. *Personality And Social Psychology Bulletin*,*31*(2), 166-180.

    http://dx.doi.org/10.1177/0146167204271418

Oppenheimer, D. (2008). The secret life of fluency. *Trends In Cognitive Sciences*,*12*(6), 237-241.

    http://dx.doi.org/10.1016/j.tics.2008.02.014

Oppenheimer, D., & Frank, M. (2008). A rose in any other font would not smell as sweet: effects of

perceptual fluency on categorization. *Cognition*, *106*(3), 1178-1194.

http://dx.doi.org/10.1016/j.cognition.2007.05.010

Phillips, D., & Clancy, K. (1972). Some effects of "social desirability" in survey studies. *American*

Journal of Sociology, 77(5), 921-940. http://dx.doi.org/10.1086/225231.

Reber, R., Schwarz, N., & Winkielman, P. (2004). Processing fluency and aesthetic pleasure: is beauty in

the perceiver's processing experience?. *Personality And Social Psychology Review*, *8*(4), 364-382.

http://dx.doi.org/10.1207/s15327957pspr0804_3

Rojahn, K., & Willemsen, T. (1994). The evaluation of effectiveness and likability of gender-role

congruent and gender-role incongruent leaders. *Sex Roles*, *30*(1-2), 109-119.

http://dx.doi.org/10.1007/bf01420743

Rubin, M., Hewstone, M., & Voci, A. (2001). Stretching the boundaries: strategic perceptions of

intragroup variability. *European Journal Of Social Psychology*, *31*(4), 413-429.

http://dx.doi.org/10.1002/ejsp.51

Rubin, M., Paolini, S., & Crisp, R. (2013). Linguistic description moderates the evaluations of

counterstereotypical People. *Social Psychology*, *44*(4), 289-298. http://dx.doi.org/10.1027/1864-

9335/a000114

Rudman, L., & Fairchild, K. (2004). Reactions to counterstereotypic behavior: the role of backlash in

cultural stereotype maintenance. *Journal Of Personality And Social Psychology*, *87*(2), 157-176.

http://dx.doi.org/10.1037/0022-3514.87.2.157

Shilhan, J. (2012). Heteronormativity and the mismatch effect: the role of context in the processing of

schema incongruent information. (Master's Thesis). Laurentian University, Sudbury, ON

Simon, B., Glassner-Bayerl, B., & Stratenwerth, I. (1991). Stereotyping and self-stereotyping in a natural

    intergroup context: the case of heterosexual and homosexual men. *Social Psychology*

    Quarterly, *54*(3), 252. http://dx.doi.org/10.2307/2786654.

Spencer-Rodgers, J., & McGovern, T. (2002). Attitudes toward culturally different: the role of

    intercultural communication barriers, affective responses, consensual stereotypes, and perceived

    threat. *International Journal of Intercultural Relations,* 26(6), 609-631.

    http://dx.doi.org/10.1016/s0147-1767(02)00038-x.

Steffens, M. (2005). Implicit and explicit attitudes towards lesbians and gay men. *Journal Of*

    Homosexuality, *49*(2), 39-66. http://dx.doi.org/10.1300/j082v49n02_03

Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and

    probability. *Cognitive Psychology*, *5*(2), 207-232. http://dx.doi.org/10.1016/0010-0285(73)90033-9.

Weinman, L., & Heavin, B. (1997). Coloring web graphics. 2. Indianapolis, IN: New Riders Pub.

Wilson VanVoorhis, C., & Morgan, B. (2007). Understanding power and rules of thumb for determining

    sample sizes. *Tutorials In Quantitative Methods For Psychology*, *3*(2), 43-50.

Winkielman, P., Schwarz, N., & Belli, R. (1998). The Role of Ease of Retrieval and Attribution in

    Memory Judgments: Judging Your Memory as Worse Despite Recalling More

    Events. *Psychological Science*, *9*(2), 124-126. http://dx.doi.org/10.1111/1467-9280.00022

Appendix A

Stimuli

Schema Congruent Stimuli	Schema Incongruent Stimuli
A promiscuous gay man	A handy gay man
A sensitive gay man	An insensitive gay man
A creative gay man	An inattentive gay man
A fashionable gay man	A conservative gay man
An assertive straight man	A passive straight man
An aggressive straight man	A creative straight man
An insensitive straight man	A sensitive straight man
An inattentive straight man	An attentive straight man
A feminine straight woman	An aggressive straight woman
A sensitive straight woman	An assertive straight woman
A fashionable straight woman	A muscular straight woman
A vulnerable straight woman	A handy straight woman
An athletic lesbian woman	A feminine lesbian woman
A masculine lesbian woman	A fashionable lesbian woman
A handy lesbian woman	A vain lesbian woman
A tough lesbian woman	A delicate lesbian woman

Appendix B

Demographics Questionnaire

Age: _____ Years

Year in University: 1   2   3   4   5   More

Gender Identity: _____

Sexuality: _____

Do you have 20/20 vision?   Yes   No

      If no, do you wear contact lenses or glasses? State what you are using today. _____

      If contact lenses, do you wear: Hard   Soft

Do you speak English as your first language?

☐ Yes
☐ No

Were you raised in predominantly English/Anglophone Canadian culture? (I.e. friends spoke English, went to English language movies etc.)

☐ Yes
☐ No

What device are you currently using to participate in this study?

☐ Computer
☐ Tablet
☐ Cell phone
☐ Other

Appendix C

Stimuli Questions and Dependent Variables

Familiarity

- How familiar was this individual to you?

Stereotypicality

- How stereotypical was this individual?

Conventionality

- How conventional was this individual?

Ease of imagination

- How easy was it to imagine this individual?

Likability

- How likable was the individual described?

Ease of reading

- How easy was the text to read?

Appendix D

Fluency Manipulation Examples

Disfluent Stimuli (using visual noise technique):

A sensitive man.

Fluent Stimuli:

A sensitive man.