An Analysis of Perceptual Fluency and Sexuality Schemas: The Effect on Ratings of Relatedness and Processing Speed

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Abstract

This study looked at how response times and ratings of relatedness were impacted by congruency and fluency of stimuli. It was predicted that when information was presented in the fluent or congruent conditions, response times would be faster than for information that was presented in the incongruent or disfluent conditions. It was also hypothesized that the slowdown effect associated with incongruent category label pairings would be eliminated through the manipulation of fluency. The prediction was also made that ratings of relatedness would be lower for category labels that were presented disfluently or incongruently than labels presented fluently or congruently.

The congruency by fluency interaction displayed support for the first and second hypothesis. There was a significant difference in response times between the Congruent/Fluent and Incongruent/Disfluent conditions in Group 1. Another interesting finding was that the response times for the Congruent/Disfluent and Incongruent/Fluent conditions in Group 2 had no significant difference, indicating that the typical slowdown caused by the incongruent condition had been eliminated. The third hypothesis, related to attribute ratings, was supported by the main effect of congruency and the interaction between congruency and sexuality. These results demonstrated that when presented congruently paired labels were rated as more related than incongruently paired labels. Therefore, these results suggest that fluency can impact response times through the use of the sexuality IAT. Future studies should analyze whether sexuality schemas vary for different ages and whether the current results hold true for different age groups.

Keywords:

Perceptual fluency, schema, sexuality, Implicit Association Test

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1 Introduction

Schemas are mental representations or cognitive concepts that allow for an individual to organize and interpret information (Carreiras, Garnham, Oakhill, & Cain, 1996). A schema can include ideas of other people, objects, places, or stereotypes, such as those related to sexuality. Schemas can assist in categorizing information into already formed models (Carreiras, Garnham, Oakhill, & Cain, 1996; Dickinson, 2011). These pre-constructed concepts are continuously updated as new information becomes integrated into the model. Studies have found that individuals process schema incongruent information slower than schema congruent information (Bransford & Johnson, 1972; Duffy & Keir, 2004).

Perceptual fluency is considered the ease with which someone can perceive and in turn process information with which they are presented (Laham, Alter & Goodwin, 2009; Oppenheimer & Frank, 2008). It can be thought of as a metacognitive experience, in which one has a subjective feeling that a cognitive process is running smoothly (Oppenheimer, 2008). Information that is difficult to interpret is processed more slowly; this causes information to be more difficult to retrieve during recall and results in a more negative attribution of that information (Winkielman, Schwarz, & Belli, 1998). Fluency can be manipulated by changing the size or colour of font, adding visual noise, or changing the colour of the background (Oppenheimer & Frank, 2008).

How an individual perceives and processes stimuli can have an effect on ratings of many types of information as well as our feelings of negativity toward the stimuli (Oppenheimer &

Frank, 2008). Perceptual fluency and schema congruency can both have an impact processing of information (Laham, Alter, & Goodwin, 2009). The current study examined how perceptual fluency and violating sexuality schemas may impact cognitive processes and response time. Ratings of relatedness were also looked at to determine if perceptual fluency caused a difference in ratings of relatedness. The more difficult words are to read due to disfluency, the more difficult they are to cognitively process. The Implicit Association Test (IAT) is an implicit measurement tool, consisting of a sorting task (Greenwald, McGhee & Schwartz, 1998). This test measures participant's automatic associations of word labels based on response time. This test was used in the current study to determine if there are links between target and attribute categories and to develop a further understanding of sexuality schemas, as well as if manipulating fluency can impact the ratings of these associations. More specifically, the present study explored the interaction of schema violations and perceptual fluency to determine if they have an influence on ratings of relatedness and response time.

1.1 Sexuality Schemas

Schemas can serve to facilitate the understanding of text through categorization and organization of the information (Dickinson, 2011). Previous knowledge of our surroundings, events, or individuals allows us to interpret new information and categorize it into our existing schemas. The mental model consists of previous knowledge; however, it is continuously updated based on incoming information from the world around us (Garnham, 1981). When incongruent information is encountered, it takes longer to process because this information must be fit into the mental model.

In most cases, sexuality is usually assumed, and it is taken for granted that all individuals are heterosexual (Dickinson, 2011). Previous research has studied the "Heterosexual Norm", in

which heterosexuality of an individual was found to be automatically assumed when there was no other information suggesting that the character may be homosexual (Nielson, Walden, & Kunkel, 2000). These heteronormative expectations are embedded in sexuality schemas, which cause heterosexuality to be automatically assumed. Previous research performed by Dickinson (2011) also supported the statement that the activation of sexuality schemas is an automatic process, during which heterosexuality is assumed unconsciously. This study consisted of both a heterosexual and homosexual context prime. The heterosexual context was a video clip of a heterosexual family. The homosexual context consisted of a video clip featuring a young boy discussing issues that he encountered growing up with two lesbian mothers. This prime was implemented in an attempt to get rid of the assumption of sexuality. Participants were presented with sentences in which the expression and noun phrase are bound, so that the reader was presented with the information implying a homosexual relationship along with the expression. An example of this is, *"Last night, in the packed movie theatre Hannah screamed loudly until her wife held her close".* When reading this sentence, individuals automatically assume that Hannah is heterosexual, therefore a slowdown in reading speed is discovered when the reader reached the end of the sentence and encountered the terms "her wife" (Dickinson, 2011).

It has been found that while reading a passage with a homosexual main character, the participant's reading speed is slower compared to when the main character was heterosexual (Dickinson, 2011). The slowdown in processing is thought to occur when the participant encounters information that is incongruent with their schema, such as when they read the word "wife" in relation to a previously mentioned female character. In studies regarding eye movement and reading, it has been found that participants fixate on target words for longer periods of time when the character is male and homosexual compared to male and heterosexual

(Shilhan, 2011). In the homosexual prime group, a significant difference was found for response time (Dickinson, 2011). However, in the female homosexual prime, participant's reading speed actually decreased when the main character was homosexual. This suggests that the impact of priming of the homosexual context had an opposite impact when the character was female, which is likely due to the female homosexuality schema being less entrenched than males (Dickinson, 2011). This phenomenon was found to be an anomaly in the results and it has not been replicated in similar studies, so there was not expected to be a similar result in this particular study. These results contribute to the current study because they suggest that schemas surrounding sexuality do exist and that a slowdown in processing occurs when the sexuality schema is violated.

Throughout previous research, it has been found that heterosexuals are evaluated more positively than are gay men or lesbians (Steffens, 2005; Dickinson, 2011). In an experiment conducted by Steffens (2005), it was discovered that participant gender was a moderator of implicit attitudes toward homosexuals measured by the IAT task. Participants were presented with an IAT task with the target and attribute categories of heterosexual, straight, homosexual, gay, positive, and negative. Overall, compared to female participants, male participants held more negative implicit attitudes of homosexuals. In general, the spontaneous evaluation of gay men was more negative than that of lesbians. Female participants showed no difference in their views between homosexual and heterosexual female targets. That is, there was no difference in female participants' implicit attitudes between lesbian or heterosexual targets. This demonstrates that the spontaneous implicit attitude preference is heterosexual in the average male, while the average heterosexual female does not have this same automatic association because they associate female heterosexuals and homosexuals as equally positive. These results show that

gender of the participant can be a moderator in the sexuality IAT and attitudes toward homosexual individuals. In the current study, gender of the participant was not directly examined. However, the goal of the current study was to analyze data separately for males and females to determine if there was a difference in response times on the IAT, however the small male sample size would make any attempt to measure this difference inaccurate. This will be further discussed in the limitations section.

Heteronormative expectations intrude into everyday lived experience (Nielsen, Walden, & Kunkel, 2000). It has been found that the activation of sexuality schemas is an automatic process (Dickinson, 2011). This statement is supported by a study performed by Nielsen, Walden, & Kunkel (2000), in which they discovered that it is often assumed that a person's "default" sexuality is heterosexual when there is no information suggesting that they may be homosexual. In this study, participants were classroom students and asked to complete fieldwork assignments in natural settings. The students were asked to perform an action that was against the heterosexual norm (ex. Male students painted their nails) and then observe the reactions of other individuals in response to the violation of norms. Their written papers containing their observations were encoded and analyzed to find any correlations or themes among them. The data was transferred to coding sheets that categorized what actions the students performed, the observed reactions of others, the rationalizations the students made to explain their behaviour, and distinguishing features from each project. The results of the analysis found that heteronormative expectations become apparent when traditional normative gender boundaries are crossed. Neilson, Walden, & Kunkel (2000), determined that the most dominant theme in the analyzed papers was that of heterogender because it was found that when students performed actions that are considered untypical of their gender, automatic heteronormative assumptions

were made. When information that is presented to an individual does not follow the assumption of heterosexuality, processing occurs more slowly because the information took longer to process when it is not what was expected (Dickinson, 2011). The observed reactions of others were in terms of how the students assumed heterosexuality was questioned. In a study using eye movement measures to determine where processing difficulties arise during the violation of the heterosexual norm have found that when a participant encountered a homosexual male character in a text, their reading times were longer compared to text involving heterosexual male characters (Shilhan, 2011). These results demonstrated a delay or slowdown in processing for homosexual male characters. Heteronormative expectations and heterosexual assumptions relate to the current research project because it was assumed that the schemas would have an effect on the participant's response time of sorting stimuli during the IAT task. The research previously noted has shown that heterosexuality is favoured or responded to more positively by participants, which was expected to be replicated in the results of the current study (Dickinson, 2011; Steffens, 2005; Nielsen, Walden, & Kunkel, 2000).

1.2 Perceptual Fluency

How fluently or easily one can perceive information they are presented with can have numerous effects on their interpretation of that stimuli (Laham, Alter, & Goodwin, 2009). Through manipulation, fluency can be altered so that a stimulus is much more difficult to read or see, which causes processing to slow down (Oppenheimer & Frank, 2008). By changing the size or colour of the font, background colour, or adding visual noise, fluency can be manipulated to hinder or improve information processing (Oppenheimer & Frank, 2008). When stimuli is presented disfluently, it is more difficult to interpret, which can also affect our judgments because the information is interpreted as more negative when one cognitively monitors that

processing is slower (Winkielman, Schwarz, & Belli, 1998). Processing new information, retrieving information from memory, and forming thoughts can be either a simple or difficult task (Schwarz, 2010a). The level of difficulty and our ability to process information is metacognitively monitored. The fluency with which new information can be processed is also metacognitively monitored and has been found to have an impact on an individual's interpretations or "feelings" about that stimuli (Schwarz, 2010a). In the current study, metacognitive monitoring may have an impact in the disfluent condition during which the stimuli is harder to perceive as well as cognitively process and in turn result in a more negative rating of relatedness.

Studies have shown that fluency can effect: judgments of familiarity, confidence, feature typicality, and categorization (Laham, Alter, & Goodwin, 2009). This is supported by the Familiarity-Attribution Model, which has been proposed by Winkielman & Cacioppo (2001). This model states that processing manipulations elicit a vague feeling of familiarity. When processing of information occurs quickly and fluently, stimuli are rated as more familiar compared to information that is more difficult to process. This theory also suggests that the feeling of familiarity is positively marked because familiarity may inform the individual that a situation is known and harmless (Winkielman, Cacioppo, 2001). If the stimuli are presented disfluently, an individual's attribute rating toward that stimuli may decrease as a result of the information being harder to interpret and process.

During a study performed by Oppenheimer & Frank (2008), participants were shown statements and presented with a category. For example, for the category of FISH, participants would be shown statements such as: has fins, is less than 1 foot long, is considered edible, and is colourful. These statements were shown to participants in either 12pt black Arial font or Italic

Blackadder font that was 60% greyed. Results found that the greyed and difficult to read statements in the disfluent condition were more difficult for the participant to process, which caused them to be judged as less typical of that category compared to statements written in the 12pt Arial font. The results of this experiment displayed that statements in the lowered fluency condition were judged to be less likely for any given category (mean for fluent condition = 6.70, mean for disfluent condition = 6.54). Oppenheimer and Frank believed that it is the difficulty of reading and processing the stimulus materials that causes participants to give lower attribute ratings. This means that the slowdown of information processing in the disfluent condition causes individuals to think of stimuli as less typical of a category simply because the stimuli was more difficult to interpret. The results of this experiment relate to the current study because it analyzed the impact of fluency on the attribute rating of relatedness in relation to sexuality schemas.

Previous data has demonstrated that the facilitation of stimulus processing leads to physiological responses indicative of positive affect as well as self-reports of higher liking (Winkielman & Cacioppo, 2001). In their article, Winkielman & Cacioppo (2001) state that the ease of processing is associated with positive affect toward stimuli. For example, when an individual is presented with the same information repeatedly they become familiarized with this information and in turn process it much faster. This is the mere-exposure effect, which claims that people prefer stimuli that they are repeatedly exposed to (Bornstein, 1989). In their study, Winkielman & Cacioppo predicted that an ease in processing facilitation should be accompanied by an increase in positive evaluations but should not be accompanied by an increase in negative evaluations, even if the rating context is negative. In the first study, fluency was manipulated by the addition of visual noise in the form of multiple dots to line images of various neutral objects.

After each trial, participants were asked to rate the stimulus from one to four on their degree of positive or negative response. The results indicate that when rating target images, significantly higher ratings were given to fluent stimuli (M=2.46) when compared to disfluent stimuli (M=2.19). This data supports the hedonic fluency model because there was a recorded increase in positive reactions but not negative reactions. Furthermore, this means that ease of processing did not influence self-reports of negative affect, even when the participants were focused on and only reporting their negative reactions. These results support a connection between high fluency and positive affective reactions, which is related to the current study that looked at ratings of relatedness in relation to how fluently a stimulus is presented. The results presented in the study by Winkielman & Cacioppo support the hypotheses of the current study in predicting that when information is presented disfluently to participant's, their attribute ratings will be affected due to the difficulty in processing.

How easily a stimulus is processed has a wide-ranging effect on how it may be evaluated by the viewer. For example, information that is processed effectively or fluently may seem more familiar (Westerman, Lanska, & Olds, 2014). Processing fluency can have an effect on ratings of both liking and familiarity. A study completed by Westerman, Lanska, & Olds (2014) compared the effect that fluency has on judgments of familiarity and liking. Throughout the multiple experiments conducted in this study, participants were asked to record their feelings of familiarity or liking, or both in order to determine if fluency had an effect on these ratings. Overall, they found that fluency did have an impact on increasing the ratings of both familiarity and liking; however, when these judgements were made on separate tests, familiarity was given higher ratings and was the dominant interpretation of processing fluency. The manipulation of fluency was found to influence familiarity judgements (d= .31) more than liking judgements (d=

.01). This was an interesting finding because previously given evidence has stated that fluency is associated with an automatic positive response, which was the basis of the prediction that liking judgements might be more strongly influenced by fluency manipulations than familiarity judgements. This result challenges the hedonic marking hypothesis, which states that fluency is directly linked to affective preferences via a positive emotional reaction (Winkielman, Schwarz, Fazendeiro, & Reber, 2003). According to this theory, the ratings of liking should have been higher than familiarity; however, participants were found to attribute the ease of processing with familiarity rather than liking. These results are important to the current study because it has also manipulated fluency to determine the impact on ratings of relatedness. This attribute is very different from either familiarity or liking, which is why it was beneficial to determine if it is impacted by perceptual fluency in the same way.

Studies researching metacognitive monitoring processes and the effect on attribute ratings have found that disfluent information requires more effort to process and encode into memory. In turn, information that is presented disfluently is harder to process, which also causes that information to be more difficult to recall (Winkielman, Schwarz, & Belli, 1998). Schwarz (2004), claims that our thought processes are paired with metacognitive experiences, such as the fluency with which new information is processed. If our thought processes are efficient and fluent, metacognitive experiences are more positive. This supports the claim that the higher level of difficulty an individual has in processing, encoding, and recalling information, the more negative the rating associated with that information (Winkielman, Schwarz, & Belli, 1998). We develop feelings or attitudes toward information that is harder to interpret because we have metacognitively monitored the difficulty of interpreting that information. If the information is

difficult to cognitively perceive, then the metacognitive feelings that arise from this monitoring will be more negative compared to neutral stimuli (Schwarz, 2010a).

In a study performed by Reber and Schwarz (1999), participants were shown statements considered either highly visible (dark blue and red font) or moderately visible (green and yellow font). After the presentation of the statement, participants were asked to determine whether the statement was true or not. The researchers concluded that the perceptual fluency of the statements affected the participant's judgements of truth. It was found that statements shown in the highly visible condition were rated as true significantly more often than false, and that statements shown in the moderately visible condition were rated as false significantly more often than true. These findings suggest that any variable that increases the ease of processing is also likely to increase judgements of truth. This research is important to the current study because it displays that humans metacognitively monitor how easily stimuli is processed, which has an effect on attribute ratings such as judgements of truth. The current study manipulated perceptual fluency in order to determine if there was an impact on ratings of relatedness due to the occurrence of metacognitive monitoring.

1.3 Overview of Current Study

The purpose of this study was to evaluate the cognitive impact of manipulating fluency on sexuality schema violations using the IAT (See Appendix C for example of fluency conditions). This may be used to further understand how disfluent information can impact sexuality schemas as well as cognitive processes. Another purpose of this study was to evaluate the impact of disfluency on ratings of relatedness to determine whether these ratings would be lowered if a stimulus was harder to interpret or presented disfluently. If presenting information disfluently results in a lower attribute rating, we can attempt to understand and neutralize the

negative slowdown effect caused by the sexuality schema violation. More specifically, if fluency manipulations can cause congruently presented information to be processed slower, and incongruently presented to be information processed faster, the typical slowdown in processing may be eliminated. This may also impact attitudes toward sexuality stereotypes and aid in neutralizing or changing the negative stigma associated with sexuality.

1.4 Theory

According to the availability heuristic, when an individual judges their memory they may rely on the subjective experience of ease or difficulty of recall (Winkielman, Schwarz, & Belli, 1998). As was mentioned earlier, encoding of information is much more difficult when it is presented disfluently. When information is not encoded effectively, it is not as easily retrieved. This results in participants giving higher attribute ratings to information that experienced as easy to recall compared to when recall is experienced as difficult (Winkielman, Schwarz, & Belli, 1998). When retrieval of information is more difficult, a slowdown in processing occurs. We metacognitively monitor this slowdown and in turn interpret the stimuli as more negative because it was more difficult to process (Winkielman, Schwarz, & Belli, 1998). Using the availability heuristic in relation to the current study, it was predicted that the disfluent condition would result in lower ratings of relatedness because the information presented disfluently would be more difficult to encode and in turn retrieve from memory.

A theory that is supportive of ease of processing and perceptual fluency is the mere exposure effect. This occurs when a stimulus is accessible to the individual. It is suggested that simple, unreinforced exposure of information leads to the increased liking of a stimulus, or in other terms, familiarity of a stimulus can lead to liking (Bornstein, 1989; Zajonc, 1968). Research on this theory in relation to cognitive psychology has found that repeated exposure to

information can facilitate easier stimulus processing. This is demonstrated through faster recognition, higher judgements of clarity, and a decrease in relevant brain areas as a result of repetition (Bornstein, 1989; Winkielman, Cacioppo, 2001). These occurrences result in the ability to more fluently process and interpret information effectively, which results in a higher attribute rating.

Finally, the feelings-as-information model was developed to provide a framework for looking at the role of moods, emotion, and metacognitive feelings in human judgement (Schwarz, 2010b; Reber, Fazendeiro, & Winkielman, 2002). This theory states that high fluency leads to a positive subjective experience that participants interpret as their reaction to the stimulus. In turn, a more positive subjective experience leads to more positive evaluations of stimuli (Reber, Fazendeiro, & Winkielman, 2002). Schwarz (2010b) observed that individuals use their feelings like any other source of information, which led to more positive judgements while individuals were in happy rather than sad moods (Schwarz, 2010b). This theory relates to the current study because it predicts that an individual can be influenced by emotions or metacognitive experiences, such as ease of processing. Participants using their feelings as a source of information may impact ratings of relatedness based on their perception of the task.

1.5 Hypotheses

The first hypothesis was that response time would be impacted by congruency and fluency. More specifically, stimuli would be responded to significantly faster when presented during a congruent condition, and when the stimuli is presented fluently. In comparison, it was hypothesized that stimuli presented in the incongruent condition or disfluently would result in slower response times. This hypothesis is supported by the availability heuristic, which states that automatic associations allow for individuals to process information effectively. If

information is more easily accessible, such as in a fluent or congruent condition, the judgement and response to that information should be faster as well as more positive because the information was more easily accessible and easier to process (Winkielman, Schwarz, & Belli, 1998).

Second, it was hypothesized that the manipulation of fluency would counteract the response time slowdown caused by the incongruent condition, which occurs when processing of presented information is more difficult to do. This slowdown occurs in the incongruent condition because the category labels of straight/bad and gay/good are inconsistent with our mental schemas of sexuality. In relation to hypothesis 2, it was predicted that presenting the congruent condition fluently and the incongruent condition disfluently, the response time differences caused by the congruent and incongruent labels would be eliminated.

Thirdly, it was hypothesized that ratings of relatedness would be lower for incongruent or disfluently presented label pairings than congruent or fluently presented label pairings. More specifically, when participants were presented with congruent labels, and asked to rate the relatedness of straight/good and gay/bad, those ratings were predicted to be significantly higher than when they were asked to rate the relatedness of straight/bad and gay/good. It was also hypothesized that fluency would have an impact on these ratings, with the fluent condition producing a higher rating of relatedness than the disfluent condition. Due to the results of previous studies (Oppenheimer & Frank, 2008; Laham, Alter, & Goodwin, 2009), it was hypothesized that attribute ratings would be influenced negatively through the manipulation of fluency (introduction of a 60% black background). This means that when the images and words were presented disfluently or were harder to read and perceive, they were rated more negatively. This hypothesis also relates to the feelings-as-information model, which assumes that people

attend to their feelings as a source of information, with different feelings proving different types of reactions (Reber, Fazendeiro, & Winkielman, 2002; Schwarz, 2010a).

1.6 Implicit Association Test (IAT)

The Implicit Association Test is an implicit measurement tool that will be used in this study. It consists of a sorting task that asks participants to organize stimuli into presented target and attribute categories (Greenwald, McGhee, & Schwartz, 1998). This test is interpreted as measuring the differences in a participants attitudes toward categories or labels and is used in schema violation studies. For the sexuality IAT being used in this study, the target categories Gay and Straight were paired with the attribute categories of Good or Bad. Reaction time is an indicator of the strength of association between the pairs of categories (Nosek, Greenwald, & Banaji, 2007; Greenwald, McGhee, & Schwartz, 1998). If the pairing of Gay and Bad resulted in slower reaction times compared to the pairing of Straight and Good, there would be a negative association for homosexuals compared to heterosexuals (or a strong positive association for heterosexuals compared to homosexuals) (Schubert, 2013).

If target categories are strongly associated with attributes, participants will find either the congruent or incongruent task easier than the other (Schubert, 2013). Over time, attitudes towards lesbians and gay men, as assessed by questionnaires have become more positive (Steffens, 2005). A concern about this data is whether the trend is reflecting true changes in attitudes or if the change is due to an increased reluctance to admit or share negative attitudes towards others (Steffens, 2005). Implicit attitudes are thought to either be outside of our conscious awareness, or are within our conscious awareness but are not socially acceptable to express (Coates, 2011). Implicit attitudes are never appropriate to express if they are negative so they are difficult to accurately measure. The IAT allows for us to test the associations between

category labels (Greenwald et al., 1998). By measuring participant's attitudes implicitly, social desirability bias can be eliminated. Explicit measures such as questionnaires or surveys can often not be used with sensitive topics such as sexuality because a participant's answers or opinions may be altered due to social desirability or masking effects; therefore, false or biased results may be collected using these methods (Greenwald et al., 1998).

Response times in the IAT task are measured by how quickly the participant sorts stimuli to the correct category. The participant used a response box which had keys that they were able to press in order to sort the stimuli to the category on the left or right. The implicit association task consists of five "blocks" or stages that allow for the participant to be introduced and become familiar with the stimuli, categories, and attributes, and then their results are measured in the experimental trial (See Appendix B for demonstration of individual trials).

2 Method

2.1 Participants

There was a total of 29 individuals who participated in the study. The average age was 20.97 years with a range of 18-38 years. In Group 1 there was a total of 14 participants, consisting of 3 males and 11 females. Group 2 had a total of 15 participants, with 7 males and 8 females. All of the participants were undergraduate students from Laurentian University. All participants included in the study were Anglophone and born and raised in Canada because it has been found that different schemas can be effected by culture (Brochu, 2013). If needed, corrective lenses were worn throughout the experiment to ensure that the participants could easily see the computer screen that stimuli were presented on.

2.2 Variables

Perceptual fluency was an independent variable in this study. It had two levels: fluent and disfluent. The fluent condition consisted of images or words presented in a Times New Roman black font on a white background. The disfluent condition consisted of images or words presented in Times New Roman black font on a 60% greyscale background, which made the images or words more difficult to see. The second independent variable was congruency. This also had two levels: congruent and incongruent. The congruent condition consisted of the labels "Straight/Good, Gay/Bad". The incongruent condition consisted of the labels "Straight/Bad, Gay/Good". The labels were paired in this way because previous research based on response time and reading speed has shown that Straight/Good and Gay/Bad have been considered congruent with existing schemas while Straight/Bad and Gay/Good have been considered incongruent with existing schemas (Schubert, 2013; Dickinson, 2011; Duffy & Keir, 2004).

The congruent and incongruent categories were based on studies that determined these associations as congruent and incongruent based on response times. As was found in previous literature, response times are used to determine congruency of the associations used in this study (Greenwald et al., 1998). Although there may be other ways to define the congruence of these terms. For the purpose of this study, and based on the literature reviewed, the same categories based on response time were used. However, congruency can also be looked at as the ease of processing, or how easily the association is made between the presented labels, so faster response times are indicative of congruent associations, while slower response times are indicative of incongruent associations. For this study, the operational definition based on response times for determining congruency was used, although it is acknowledged that other factors could impact how congruency is determined. In all studies using the Sexuality IAT, the same congruent and

incongruent labels were used. The studies all found that when straight was associated with good and gay with bad, response times of sorting stimuli was significantly faster. The faster processing indicates that that association is congruent with our schema of sexuality (Greenwald et al., 1998; Dickinson, 2011; Shilhan, 2011; Schubert; 2013). However, these word pairings eliciting a faster response time do not imply that they are the participant's attitudes toward gay or straight individuals. Rather, it is the automatic association caused by our mental schema of sexuality that has been formed from the world around us, such as through media.

In this study, the dependent variables were response time and an attribute rating of relatedness. Response time is how quickly the participant responds to the stimuli and sorts it into the proper category. This time was measured in milliseconds and recorded to observe if there was a difference in times between the congruent and incongruent trials as well as the fluent and disfluent trials. Ratings of relatedness were reported by the participant on a Likert scale ranging from 1-5 at the end of the experiment, 1 represented "Not related" and 5 represented "Very related" (see Appendix D for an example of this scale). Participants were asked to rate how related the labels used throughout the experiment are to each other (Straight, Gay, Good, Bad). The pairings of labels was randomized, however the program was designed so that the participant would not have to rate how related two opposing labels are, such as Good and Bad. These results were used as an average and ratings from the fluent and disfluent conditions were compared in order to determine if manipulating fluency has a negative effect on attribute ratings.

2.3 Materials

The current study used the Implicit Association Test following the five step task described previously. The stimuli were presented using E-Prime software v. 2.0 (Schneider, Eschman, & Zuccolotto, 2002). Stimuli for the sexuality IAT consisted of words and images.

Images to be sorted into the Gay category were represented by pictures or symbols of two female or two male figures together, whereas images to be sorted into the Straight category were represented by pictures or symbols of a male and female together. Stimuli for the good and bad categories consisted of positive and negative adjectives developed by Greenwald et al. (1998) specifically for the sexuality IAT. (See Appendix D for a complete list of all stimuli used in this study).

2.4 Procedure

Participants were recruited from undergraduate classrooms at Laurentian University and given study information via email. Individuals who agreed to participate in the study arrived at the Cognitive Health Research Lab and were given an Informed Consent Form (Appendix H) that they were asked to thoroughly read and sign if they agreed to proceed with participation. They were also required to fill out the Handedness Questionnaire (Appendix F) and the Demographics Questionnaire (Appendix G) before beginning the task.

Before the experiment began, participants were randomly assigned to either Group 1 or Group 2. These groups determined the conditions of congruency and fluency that the participants received. In Group 1, participants were presented with the congruent/fluent condition followed by the incongruent/disfluent condition, or the opposite order. In Group 2, participants were presented with the congruent/disfluent condition followed by the incongruent/fluent condition or the opposite order. This ensured that congruency and fluency were counterbalanced throughout the experiment. Participants were placed in a sound attenuating booth in front of a computer monitor and response box. The response box had keys on it that the participant used to sort the presented stimuli into the category on either the left or right of the screen. The entire procedure and experiment took approximately 1 hour to complete. Throughout the length of the

experiment, the participant was given breaks to reduce eye strain. Participants were asked to sort the words and images that appeared on the screen into the correct categories. Labels for each category appeared in the left and right upper corners of the monitor for the first 3 blocks of the experiment so that the participant could familiarize themselves with the labels and stimuli that would be used throughout the experimental trial. All stimuli was presented randomly throughout the experiment. If the participant sorted the stimuli incorrectly at any time throughout the experiment, a red X would appeared on the screen, however, the participant was not required to fix their mistakes.

During the first block of the experiment the labels of Straight and Gay appeared in the top left and right corners of the computer monitor. This block consisted of 10 trials, during which the participant was asked to sort associated words and images into these categories. During the second block of the experiment, the participant was presented with the labels of Good and Bad in the top left and right corners of the monitor. This block consisted of 14 trials and participants sorted all of the related stimuli into the correct categories. For the third block of the experiment, the target and attribute labels were shown together in the top left and right corners of the monitor. These pairings were either be congruent (Straight/Good, Gay/Bad) or incongruent (Straight/Bad, Gay/Good) depending on the trial. This block consisted of 24 trials, so that the participant saw each target and attribute word or image once. The fourth block of the experiment was the same as the third as well as with the same amount of trials; however, the labels in the top left and right corners of the monitor were removed in order to reduce the participant's eye movement. This ensures that they were no longer shifting their eyes toward the labels and that they were not distracted by them. The fifth and final block was the experimental trial, during which the participant's response times were measured and recorded. Response time was

measured in milliseconds from the time that the stimulus appeared on the screen until the participant pressed a key on the response box to sort the stimuli to either of the labels on the left or right. The labels were also missing during this block in order to keep eye movement and distractions minimal, and it consisted of a total of 192 trials for the participant to complete. (See Appendix B for a breakdown of trails with example labels and stimuli).

During each trial, the stimuli were shown for an unlimited amount of time. Therefore, the length of the study ultimately depended on the speed of the participant. If the participant answered incorrectly, a red "X" appeared in the middle of the screen for 500 milliseconds and then disappeared, as participants were not be required to correct any of their mistakes. The amount of time between trials was 400 milliseconds for all trials.

When the experiment was completed, the participants were asked to rate how related they thought the target and attribute category labels were using a Likert scale from 1-5. They were presented with the question, "How related are the terms _____ and _____?", using randomized pairings of the target and attribute category labels of straight, gay, good, and bad. Ratings of relatedness were averaged and compared across conditions in order to determine which manipulations resulted in the lowest ratings. (Refer to Appendix D for design of Likert scale). When participants were completed the relatedness rating, they were given a Debriefing Form (Appendix I), the nature of the study was explained to them, and any questions were answered.

3 Results

3.1 Response Time

The results show that there was a main effect of Couple Type. A 3 (couple type) x 2 (congruency) repeated measures ANOVA was performed to analyze the response time data. The response times for only the images was extracted and analyzed because they are the stimuli

sorted to the labels of Straight or Gay, which is the most important association of the sexuality IAT. The images were sorted into 3 types of couple; straight, gay, and lesbian. The straight category consisted of the male and female characters or symbols together, the gay category consisted of two male characters or symbols together, and the lesbian category consisted of two female characters or symbols together. Figure 1 demonstrates the main effect of couple type. These results show that participants responded fastest when sorting gay stimuli (M= 777.13ms, SE= 26.76ms). This response time was significantly faster than when participants sorted straight (M= 875.07ms, SE= 28.79ms) or lesbian (M= 841.2ms, SE= 27.16ms) stimuli. This particular result was not expected to occur during this study; however, it is an interesting finding that will be further explained in the discussion.

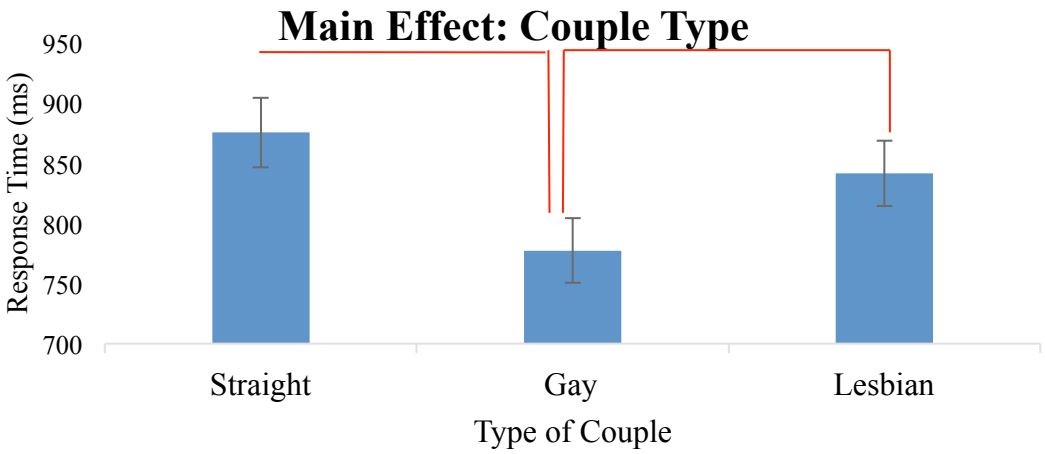
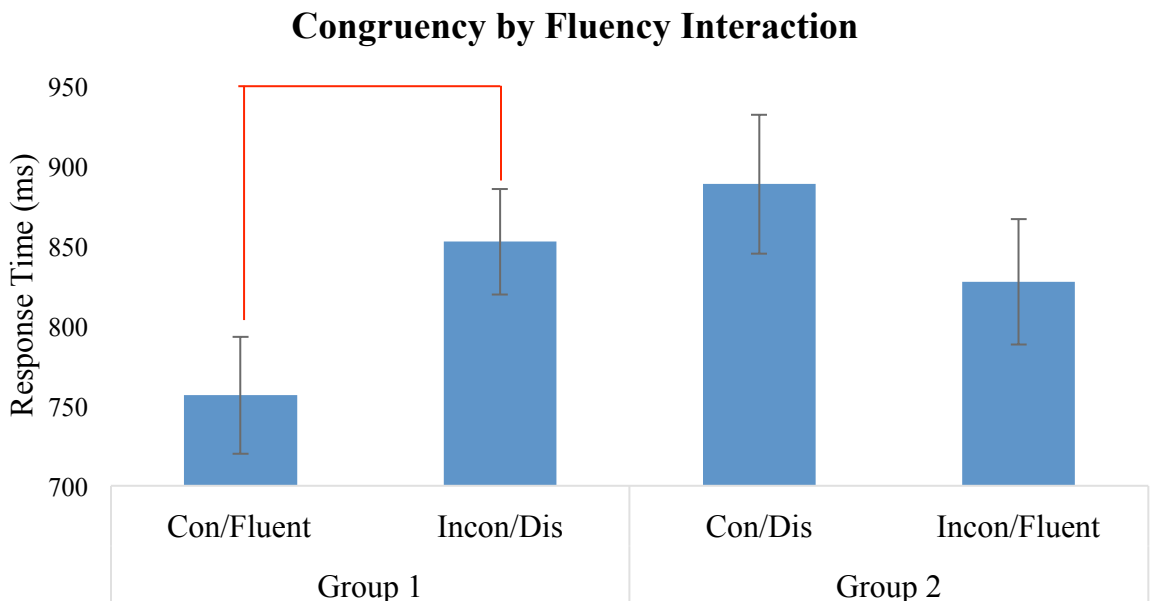


Figure 1: This graph demonstrates the significant main effect of couple type. $F(2,54) = 11.53$, $p<.05$, $n^2 = .29$. Response times were analyzed from sorted images only. The error bars represent the standard error of the mean.

Next, the results showed that there was a significant congruency by fluency interaction (Figure 2). A 2 (congruency) x 2 (fluency) repeated measures ANOVA was performed to analyze response time data for each combination of conditions participants were presented with.

The significant interaction in Figure 2 was driven by the difference in response times between the Congruent/Fluent and Incongruent/Disfluent conditions in Group 1. Response times in the



Congruent/Fluent condition in Group 1 were the fastest (M= 756.53, SE= 36.55). These results support hypothesis 1 as well as previous research.

Figure 2: This graph demonstrates the significant interaction of fluency and congruency in terms of participant response time. $F(2,54) = 13.45$, $p<.05$, $n^2 = .33$. The error bars represent the standard error of the mean.

3.2 Ratings of Relatedness

In examining ratings of relatedness, it was found that there was a significant main effect of congruency. Figure 3 demonstrates that there was a significant difference in relatedness ratings between the congruent and incongruent conditions. More specifically, this means that participants rated congruent label pairings of Straight/Good and Gay/Bad as more related than incongruent word pairings of Straight/Bad and Gay/Good. The mean rating given for congruent label pairings was 3.03 and the mean rating given for incongruent word pairings was 2.27.

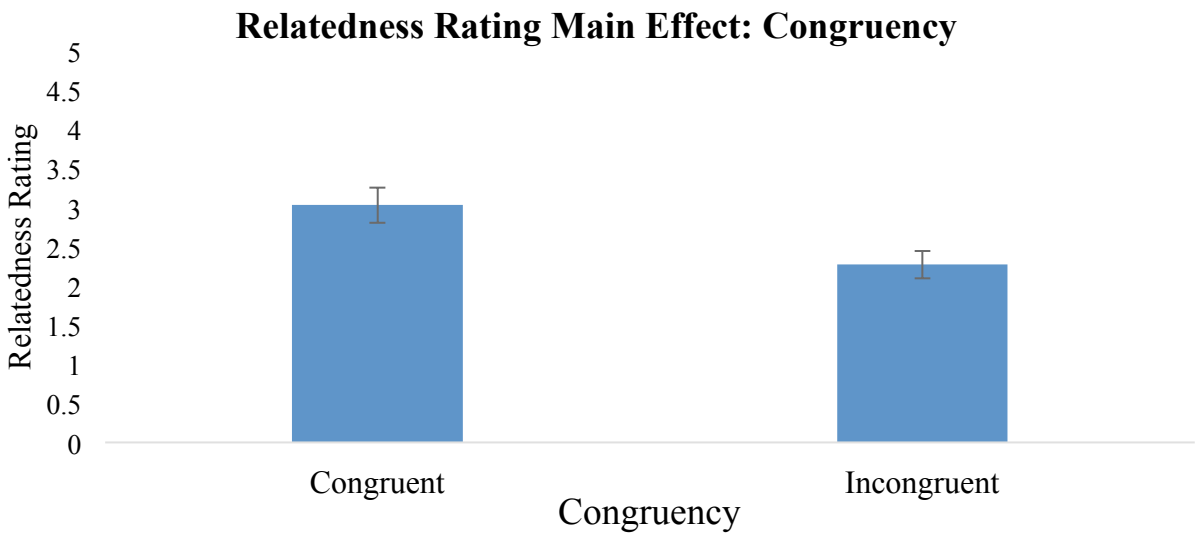


Figure 3: This graph represents the significant difference in ratings of relatedness for congruent and incongruent label associations. $F(1,27) = 7.97$, $p<.05$, $n^2 =.23$. Associations that were rated as more related included straight and good, and gay and bad.

There was also a congruency by sexuality interaction for ratings of relatedness found in the results (Figure 4). A 2 (congruency) x 2 (sexuality) repeated measures ANOVA was performed to analyze this data. Figure 4 represents the relatedness ratings of the congruent and incongruent word pairings that participants were asked to rate. Straight/Good and Gay/Bad are congruent word label pairings, and Straight/Bad and Gay/Good are incongruent word label pairings. Driving this significant interaction was the difference in ratings of relatedness for the label pairings of Straight/Good and Straight/Bad, which what expected and predicted in hypothesis 2.

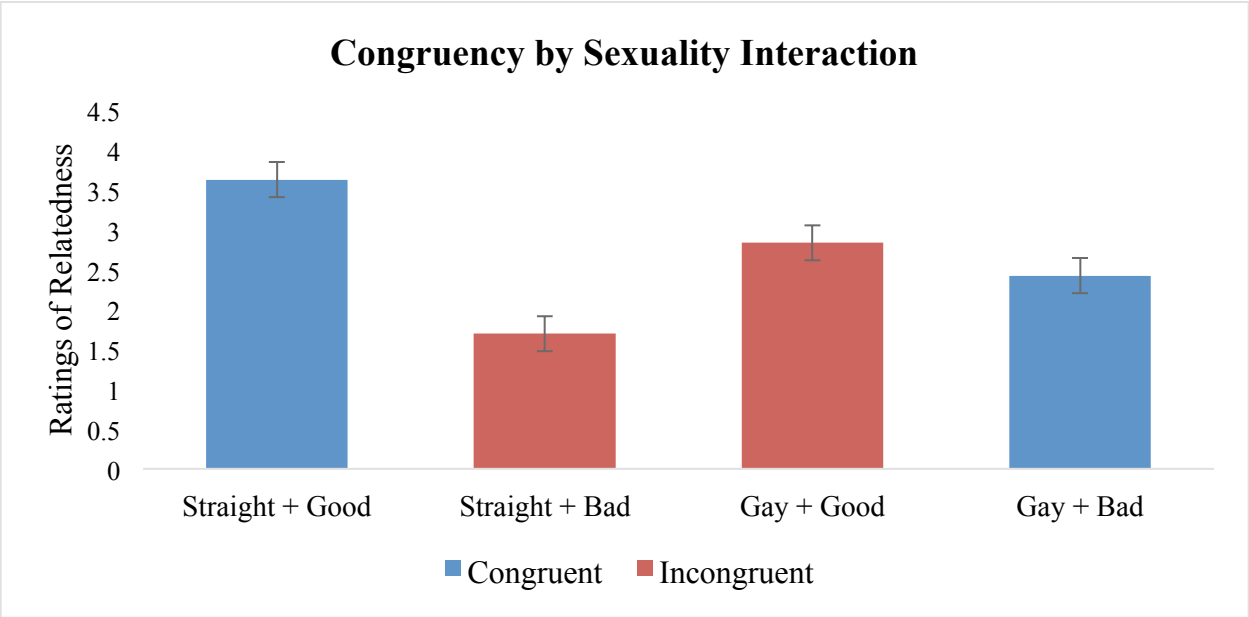


Figure 4: This graph represents the congruency by sexuality interaction for ratings of relatedness. The significance is driven by the difference in ratings for the labels Straight + Good, and Straight + Bad. $F(1,27) = 23.03$, $p<.05$, $n^2 =.46$. The error bars represent the standard error of the mean.

Furthermore, there was a lack of support for hypothesis 3 as there was no effect of perceptual fluency on the ratings of relatedness. Mean ratings for the fluent condition were 2.43, and mean ratings for the disfluent condition were 2.87, which were not significantly different. Figure 5 depicts the relatedness ratings for the fluent and disfluent conditions.

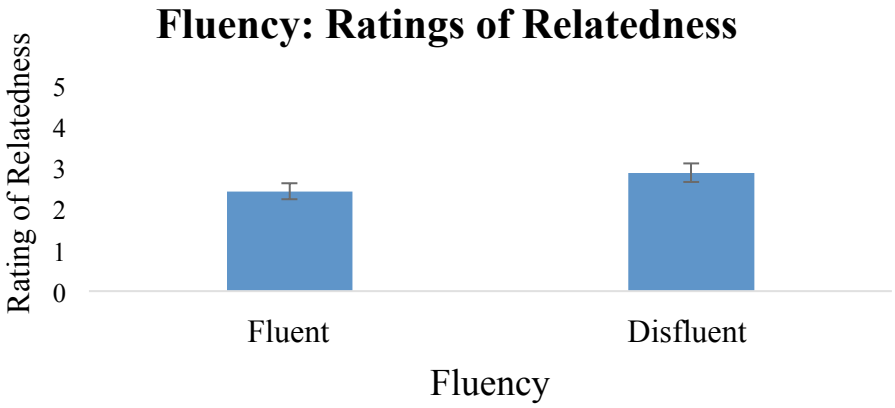


Figure 5: This graph demonstrates that perceptual fluency had no effect on ratings of relatedness. $F(1,27) = 2.23$, $p>.05$. The error bars represent the standard error of the mean.

4 Discussion

The purpose of this study was to determine if the manipulation of perceptual fluency had an effect on response times for sorting stimuli using the sexuality IAT. Ratings of relatedness were also examined to determine if perceptual fluency manipulations had an impact; however, the results showed that there were no significant results. It was discovered that through the introduction of perceptual fluency manipulations, participant response times were altered and there was a significant difference between congruent and incongruent label pairings for the ratings of relatedness.

Figure 1 illustrates the main effect of couple type for response time data. What was found was that the gay stimuli (images of two males), was responded to significantly faster than the straight or lesbian stimuli. A possible explanation of this decrease in response time for the gay male couple type could be that the stimuli was processed faster by participants because the images contained two males. In previous studies, it has been shown that male character stimuli are processed faster than female character stimuli, which is supported by the effect shown in this graph (Dickinson, 2011; Banaji & Hardin, 1996). This result was not predicted and was therefore unexpected for this study, so this phenomenon may require further investigation in future research.

Support for hypothesis 1 was demonstrated in Figure 2, which is the congruency by fluency interaction. These results support previous research because they reveal that stimuli can be processed more quickly and easily if presented congruently and fluently. This result also provides support for the availability heuristic because it shows that effective processing of

information allows for that information to be more accessible. This would result in easy retrieval, and more positive judgements of that information. These results also correspond with previous perceptual fluency studies performed by Oppenhiemer & Frank (2008) as well as Laham, Alter, & Goodwin (2009). Their research found that when information was presented fluently, it was processed more quickly, which is supported by the results of this study. More interestingly, the results shown in Figure 2 also provide support for hypothesis 2, which stated that the typical response time difference seen when using the IAT would be eliminated through the manipulation of fluency. In Group 2, participants were shown the Congruent/Disfluent and Incongruent/Fluent conditions in random order. The current study found that there were no significant differences between these conditions, which was what was predicted in hypothesis 2. More specifically, when the congruent condition was made disfluent, response times increased and when the incongruent condition was made fluent, response times decreased. This resulted in no significant difference between the conditions. Therefore, it can be claimed that the slowdown effect typically caused by the incongruent condition was eliminated.

The congruency by fluency interaction found in the results of the current study also resembles previous research on sexuality schemas. Previously conducted research has found that information that is incongruent with our schemas is much more difficult to process and a slowdown effect occurs. These results also support previous findings that heteronormative expectations embedded in schemas and that the activation of heterosexual sexuality schemas is automatic and more easily processed (Dickinson, 2011; Duffy & Keir, 2004). It has been shown that heterosexual information is responded to more efficiently and positively, which was replicated in the results of the current study (Nielsen, Walden, & Kunkel, 2000).

There was a main effect of congruency on ratings of relatedness because there was a significant difference between the ratings of congruent and incongruent word pairings. This means that when participants were presented with word pairs that were considered congruent (straight/good, gay/bad) they rated these pairings as much more related than incongruent pairs (straight/bad, gay/good). Research presented previously found that heterosexual information was evaluated more positively than gay or lesbian information (Steffens, 2005). The main effect of congruency for ratings of relatedness supports this previous finding because it also demonstrates that information that is congruent with our mental sexuality schemas (straight) is rated more positively than information that is incongruent with our mental sexuality schemas (gay). This finding partially supports the third hypothesis in that congruent pairings were given a higher rating of relatedness. The feelings-as-information model is also supported by this data, because it supports the theory that the participant's subjective metacognitive experience and how easily they can process stimuli influences their ratings of congruent and incongruent label pairings.

An interaction was also found for the ratings of relatedness. Participants rated the congruent word pairing of straight/good the highest, or most related, while the incongruent pairing of straight/bad was rated the lowest, or least related. More interestingly, there was no significant difference between ratings for gay/good and gay/bad. A plausible explanation for this phenomenon may be that relatedness ratings are a very subjective measure and participants may not want to seem biased in their answers. In this case, social desirability may be a factor because participants may not want to rate the word gay as more related to good or bad so that it is not interpreted as an attitude or stereotype that they have. In this case participants may have chosen a neutral answer on the scale (approximately a 3, which was indicated as somewhat related) rather than a more extreme answer of very related or not at all. Another explanation of this result could

be that, with a population that is mostly heterosexual, participants may not have an opinion or attitude toward the term gay and whether it is related to good or bad. However, the sexual orientation of the participants was not asked, so this claim can only be an assumption.

Finally, Figure 5 displays the lack of an impact that fluency had on ratings of relatedness. These results did not support hypothesis 3 because there was no significant effect of fluency on the ratings or relatedness. Some explanations of this result could be that relatedness is too subjective of a measure, that fluency was not manipulated within the rating portion of the experiment, and that sexuality schema associations are too strong. A relatedness rating is an extremely subjective measure and involves participants thinking about the word pairings they are presented with and then providing a rating for how related they believe the terms are. Although fluency has been shown to impact judgements of morality, typicality, and categorization; relatedness may not be an attribute that fluency is able to impact (Oppenheimer & Frank, 2008; Laham, Alter, & Goodwin, 2009). The sexuality schema and congruent versus incongruent word pairings may be too strong and entrenched within our society and culture, which could be a reason that perceptual fluency could not impact the ratings of relatedness on its own. Another explanation is that there was no perceptual fluency manipulation on the screen during the time participants were presented with the rating scales. This is also a possible limitation to the study, which will be discussed in more detail in the following sections of limitations and future directions.

Furthermore, previous studies that examined the impact fluency could have on judgements of feature typicality, familiarity, and categorization found that there was a significant difference in these attribute ratings based on how fluently they were presented (Oppenheimer, 2008; Laham, Alter, & Goodwin, 2009; Westerman, Lanska, & Olds, 2014). In comparison to

the current study, the studies previously mentioned may have discovered an effect of perceptual fluency on attribute ratings because they continued their manipulation through the entire experiment. Participants in their studies were subject to perceptual fluency manipulations throughout the experiment as well as when the participants were asked to provide attribute ratings. This is different from the current study, which does not include a fluency manipulation during the time participants are asked to provide a relatedness rating. This difference could possibly explain the lack of effect of fluency produced in the current study.

4.1 Limitations

As mentioned previously, there was no manipulation of fluency present during the portion of the experiment in which the participants were asked to rate the relatedness of word label pairings. This can be considered a limitation of this study because it could be part of the reason that fluency did not have an effect on the outcome of these ratings. There is a possibility that manipulating perceptual fluency within the rating scales may have resulted in a significant impact. Previous studies have manipulated perceptual fluency throughout the duration of the experiment (Oppenheimer & Frank, 2008; Westerman, Lanska, & Olds, 2014). In the current study, perceptual fluency was manipulated throughout the duration of the IAT; however, when participants were presented with the relatedness rating scale, a manipulation of perceptual fluency was not incorporated. An explanation for perceptual fluency failing to have an impact on ratings could be that the perceptual fluency manipulation presented throughout the task must be carried through to the rating task because perceptual fluency may not have long lasting effects, and the participant's interpretation of fluency might not be carried over into the rating scale portion of the experiment.

Participant gender was not controlled for when recruiting students to participate in this study. There was an unequal amount of males and females within Group 1, so an accurate measure could not be taken and an analysis could not be performed to determine if perceptual fluency had an impact based on the gender of participant. The small amount of male students can be considered a limitation because it does not allow for an accurate analysis to be performed. The original goal of this study was to analyze the data for males and females separately; however, due to a lack of male participants and an unequal distribution, the sample would not be representative. Future research could look into gender in regards to the impact that perceptual fluency manipulation could have on males and females separately.

Another limitation of this particular study was that participants were only given two out of the four possible conditions of congruency and fluency. Referring back to the previous explanation of Group 1 and Group 2 used in this study, participants were only given 2 of the possible combinations of congruency and fluency. For example, in Group 1, participants saw the congruent/fluent condition and the incongruent/disfluent condition. This method of counterbalancing did not allow the participant to accurately compare the fluent and disfluent perceptual fluency manipulations in relation to congruency. If they were first presented with the congruent/fluent condition, they would find this task fairly simple and their processing would not be impaired, however that condition would be followed by the incongruent/disfluent. This did not allow the participant to compare the conditions of fluent and disfluent with only congruent label pairings, or incongruent label pairings. A solution to this limitation would be to introduce a full repeated-measures design, which will be described in further detail in the future research section. Although this procedure would allow for a complete design, it was not considered for

this particular study due to time constraints and the amount of time the participant would need to complete the entire experiment.

4.2 Implications

Potential implications of this study include the development of a further understanding of the effect violating a schema has on cognitive impact in relation to how fluently a stimulus is presented. As individuals in society we reflect social norms and societal beliefs in the form of schemas that we have formed from the world around us. Fluency of stimuli can slow down cognitive processing if it is manipulated so that the stimuli are harder to interpret (Oppenheimer, 2008). This study is attempting to determine whether the fluency of stimuli can alter the cognitive impact that has been shown to occur when a sexuality schema is violated.

Another implication of this particular study is to understand the impact of the slow down effect that occurs when fluency is manipulated. When the stimuli presented are harder to process, a slow down effect occurs (Dickinson, 2011). The goal is to further comprehend this phenomenon and determine why it occurs. This study is manipulating the background of the stimuli to make it more difficult to interpret and process; however, future research may explore what other types of fluency manipulations can be performed and if they will have the same effect on cognitive processes and the slow down effect.

If ratings of information can be impacted through the manipulation of perceptual fluency, the effect of incongruent sexuality stereotypes on cognitive processes can be reduced. In this study, ratings of relatedness were recorded in order to determine if how fluently stimuli was presented effected this attribute rating. An effect was not found for the impact of fluency on ratings of relatedness. This is an area that future research should focus on and look into further.

4.3 Future Research

As was mentioned previously, future research could look into using a full repeated-measures design, which would have all participants presented with all conditions of congruency and fluency. This design would work best if participants were presented with both fluent and disfluent conditions with congruency counterbalanced. This design would provide a more accurate measure of the impact that fluency has on cognitive processing as well as ratings of relatedness because participants would be able to compare both fluent and disfluent conditions while subjected to both congruent and incongruent conditions.

Future research can also look at different age groups to determine if fluency has the same effect on cognitive processing as it did on the university population in this study. The younger population used in this study has been shown to be the age group that is most accepting of sexuality in that being gay is no longer as strongly associated with stigma (Decoo, 2014). This study has shown that sexuality schemas are still very strong in this population, as there is still a difference in response times for congruent and incongruent word label pairings. It is assumed that if an older generation was presented with the IAT task, the differences between congruent and incongruent conditions would be exaggerated due to their more traditional views. However, it would be interesting to see if manipulating fluency in the same way would eliminate the slowdown as was shown in results from this study.

4.4 Conclusion

There has been extensive research in the area of perceptual fluency manipulations and how they can influence attribute ratings. However, the current study examines perceptual fluency manipulation in relation to the sexuality IAT in order to determine the effect these manipulations

may have on response time and ratings of relatedness. The integration of the IAT with perceptual fluency has not been previously performed, which makes this study a first in this field.

The results of this study revealed that there was a congruency by fluency interaction for the response times of sorting images. These results showed that participants sorted stimuli presented fluently in the congruent condition significantly faster than when stimuli were presented disfluently in the incongruent condition. This difference in response times was expected and supports the typical IAT effect and slowdown that is caused when information is presented disfluently. These results also showed that the slowdown in processing that is usually found when participants are sorting stimuli into incongruent word label pairs has been eliminated. More specifically, the congruent condition presented disfluently resulted in similar response times to the incongruent condition presented fluently. This means that through the use of perceptual fluency manipulation, the typical IAT effect (congruent conditions producing faster response times than incongruent condition) has been eliminated.

For ratings of relatedness, there was a main effect of congruency as well as a congruency by sexuality interaction. These results show that congruent label pairs were rated as significantly more related than incongruent label pairs. Post hoc testing was performed, which found that the significance was being driven by the difference in ratings between the word pairings of straight + good and straight + bad. It was also found that there was no significant effect of fluency on ratings of relatedness. As was discussed previously, this result should be the focus of future studies because this study did not allow for an accurate measure of how fluency may impact ratings of relatedness.

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Appendix A

IMPLICIT ASSOCIATION TEST TRIALS

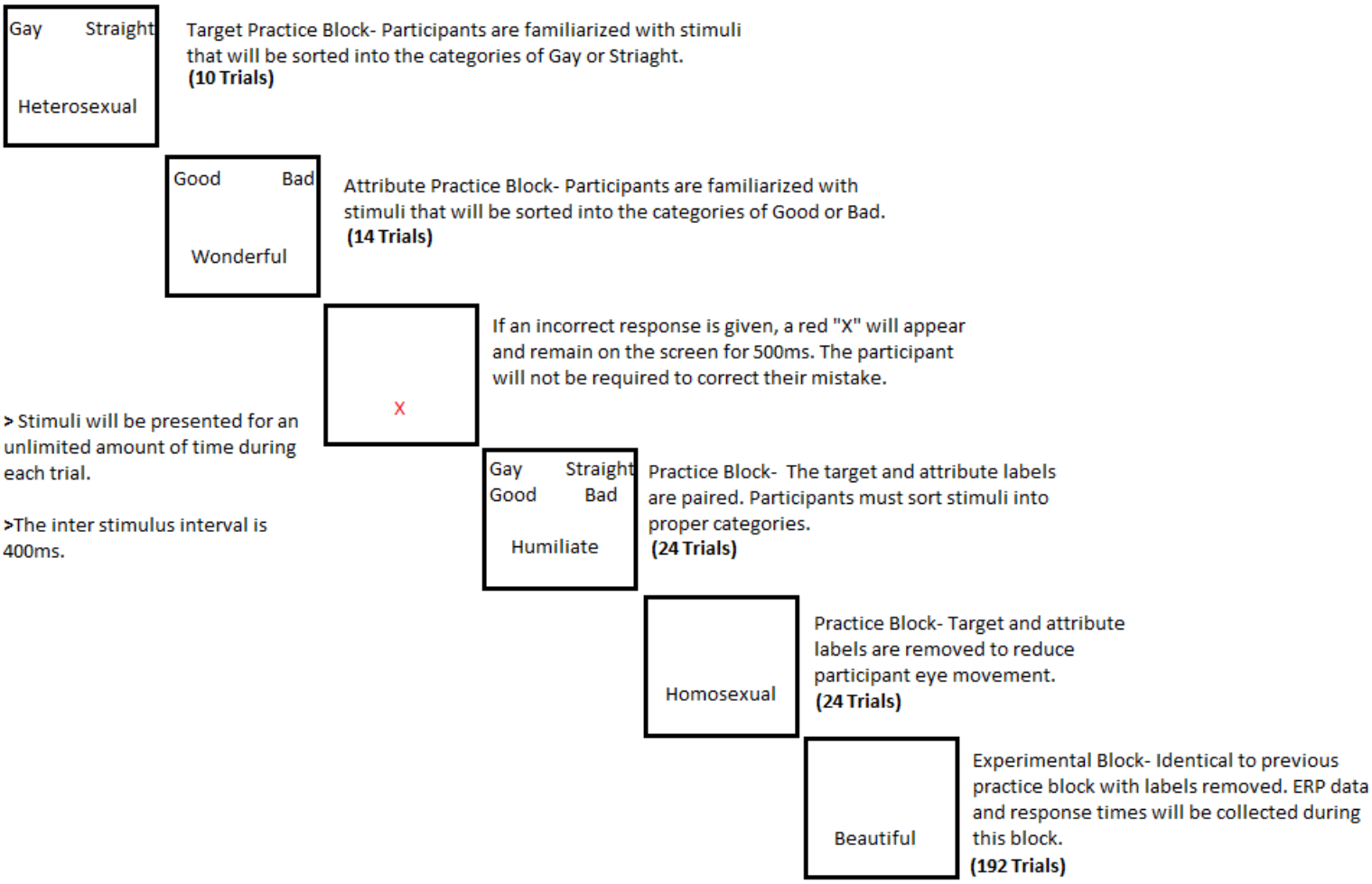
Number of Trials for the IATs Used

	Sexuality IAT
Block	Number of Trials
Target Discrimination	10
Attribute Discrimination	14
Paired Practice Block	24
Paired Practice Block*	24
Experimental Block*	192

Note. *Target and Attribute labels were removed during these blocks

Appendix B

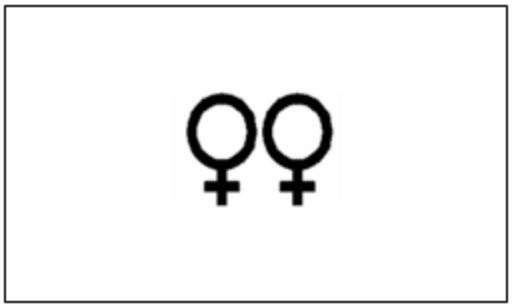
TEST TRIAL EXAMPLE



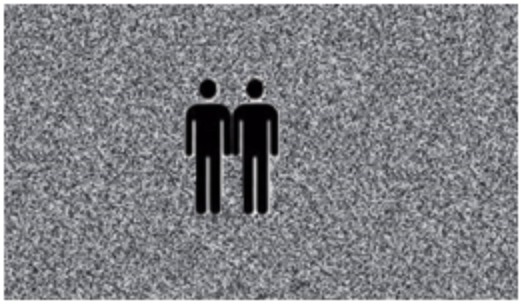
Appendix C

FLUENCY CONDITIONS

Fluent



Disfluent



Appendix D

STIMULI & RATING SCALE

Gay-Straight IAT

Category	Stimuli Used
Good:	Joyful, Beautiful, Marvelous, Wonderful, Pleasure, Glorious, Lovely, Superb
Bad:	Agony, Terrible, Horrible, Humiliate, Nasty, Painful, Awful, Tragic
Gay:	Gay, Homosexual

Straight:	Straight, Heterosexual

Ratings of Relatedness Scale

1	2	3	4	5
Not Related		Somewhat Related		Very Related

Appendix E

POSSIBLE FUTURE STUDY

* Represents the counterbalancing of conditions

Current Study

Group 1	**Group 2**
*Congruent/Fluent	*Congruent/Disfluent
*Incongruent/Disfluent	*Incongruent/Fluent
Relatedness Rating	Relatedness Rating

Future Study

*Congruent/Fluent
*Congruent/Disfluent
Relatedness Rating

*Incongruent/Fluent
*Incongruent/Disfluent
Relatedness Rating

Appendix F

HANDEDNESS QUESTIONAIRE

Have you ever had an injury or other problem that caused you to change your hand preference? YES NO

If so, please give the date of the change and the reason for it:

Which hand do you use for each of these things?
If your preference is not strong, put +
If you would never use the other hand unless forced to, put ++
If you might use either hand, put + in both columns

1. Writing	_____	_____
2. Drawing	_____	_____
3. Throwing	_____	_____
4. Scissors	_____	_____
5. Toothbrush	_____	_____
6. Knife (without a fork)	_____	_____
7. Spoon	_____	_____
8. Broom	_____	_____
9. Striking a match (match)	_____	_____
10. Opening box (lid)	_____	_____
11. Which foot do you prefer to kick with	_____	_____
12. Which eye do you use when using only one? Eg. for a telescope	_____	_____

Is anyone in your family left-handed, including parents, siblings, and grandparents? _____

If yes, give relationship (s): _____

_____

_____

_____

Appendix G

DEMOGRAPHICS QUESTIONAIRE

Age: _____ Years

Year in University: 1 2 3 4 5 More

(Please circle)

Gender: Male Female

Handedness: Right Left Ambidextrous

Do you speak English as your first language? Yes No (Please circle)

Were you born and raised in Canada? Yes No (Please circle)

Appendix H

INFORMED CONSENT

Paige Smith
Laurentian University
psmith@laurentian.ca

I, _____, am interested in participating in this study on participants' response to words and images presented on a computer screen following various instructions. This study is being conducted by Paige Smith, a fourth year student supervised by Dr. Dickinson.

My participation will consist of attending one 1.5 hour session during which I will be asked to respond to presented words and images according to the task instruction by pressing two keys as they are presented. I will also be asked to complete an attribute rating scale at the end of the session. I give my consent for the use of my results obtained from the computer task. These results will be kept confidential, and only the researcher and her supervisor will have access to them. Digital data will be kept indefinitely (with no ID or reference numbers connecting participants to their data) and may be used for publications in the future.

My participation is strictly voluntary and I am free to withdraw from the study at any moment or refuse to participate without any penalty. Although it would be preferable that I answer all questions, if I am uncomfortable with any particular question, I am able to refuse to answer. I have also received assurance from the researcher that the information I will share will remain strictly confidential.

I understand that this research experiment includes observing a computer monitor for some time. If for any reason I do feel any discomfort, I may stop at any time without penalty. I have received assurance from the researchers that discomfort is rare and will most likely not occur.

If I have any questions or concerns, I may contact the thesis researcher Paige Smith at psmith@laurentian.ca, or her thesis supervisor, Dr. Dickinson, at jdickinson@laurentian.ca. If you have any ethical concerns about this study, you may contact: Dr. Luc Rousseau (Chair of ethics committee) with the Laurentian University Psychology Department Ethics committee. You may contact Dr. Rousseau at lrousseau@laurentian.ca or (705) 675-1151 ext. 4253

Participant's Signature: _____ Date: _____

Researcher's Signature: _____ Date: _____

I wish to receive a summary of the results of this study, which will be available in May, at the following email address: _____

Appendix I

DEBRIEFING FORM

Thank you for participating in this research study conducted by Paige Smith under the supervision of Dr. Joël Dickinson.

Our research is designed to examine whether cognitive processes are slowed when our schemas are violated and if the greying of stimuli affects this occurrence. Schemas are mental shortcuts that we use to assist us in making quick judgments in our everyday life. Concepts that are non-congruent, or that don't match up with the knowledge we have previously stored, have been shown to typically increase a person's reaction time when completing an implicit association test. Since we are using pre-existing experiences and mental constructs, this can slow down our cognitive processes as we struggle to make sense of the incongruent information we are receiving and fit it into our schema. Perceptual fluency is the cognitive ease with which individuals process information. When words or images are greyed on the monitor, they take longer to process. In this study we are attempting to determine if this slowdown in processing can in turn cause individuals to interpret schema congruent stimuli as more negative and schema incongruent information as less negative based on a scale of relatedness.

Upon interpreting the collected data, we expect to find that sexuality concepts, when presented with an incongruent attribution category (e.g. GOOD or BAD), will interrupt your cognitive processes causing a slowdown effect indicating that our socially ingrained schemas impact the way in which we perceive these concepts. In turn, we also expect to find that when stimuli are greyed, they are interpreted as more negative because they are processed slower. This way, we are able to make schema congruent information more difficult to perceive and therefore processed more slowly.

Any personal information is kept separate from all experiment data. All information provided will remain both anonymous and confidential. We would ask you to please refrain from discussing any of the information surrounding this research study with other students. These individuals could potentially participate in this study and any information that they have prior to performing may affect the results that we collect from them.

If you would like to discuss certain aspects of this research study or have any concerns, you may contact the student researcher, Paige Smith, at psmith@laurentian.ca or her supervisor, Dr. Joel Dickinson at jdickinson@laurentian.ca. If you have questions regarding the rights you have as a research participant, you can contact the Psychology Department ethics chair.

Additionally, if you are interested in reading about the background of this experiment, you may consult the following sources:

Dickinson, J (2011). The Impact of "Violating the Heterosexual Norm" on Reading Speed and Accuracy. *Psychology. 2 (5), 456-9*

Schubert, C. (2013). Are all stereotypes created equal? Examining gender as a moderator of event-related potentials evoked during schema violation. (Master's Thesis). Laurentian University, Sudbury, ON.