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Does type of stimulus influence task-irrelevant evaluative categorization processes?

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DOES TYPE OF STIMULUS INFLUENCE TASK-IRRELEVANT EVALUATIVE CATEGORIZATION PROCESSES?

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Dedication

To Moses and Rebeca for being my inspiration.

DOES TYPE OF STIMULUS INFLUENCE TASK-IRRELEVANT EVALUATIVE CATEGORIZATION PROCESSES?

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Abstract

The effect of stimulus type on task-irrelevant evaluative categorization was examined in two separate studies by using the P3 component from event-related brain potentials. The first study presented idiosyncratic stimuli consisting of individuals that were rated by participants as either positive or negative within sequences of pictorial and verbal stimuli. The second study presented sequences of novel and familiar stimuli consisting of previously normed unattractive and neutral individuals. It was hypothesized that pictures would elicit task-irrelevant evaluative categorization processes and so would novel stimuli (relative to words and familiar stimuli, respectively). Task-irrelevance was examined by assessing P3 peak amplitude to stimuli that varied simultaneously along a task-relevant gender and a task-irrelevant evaluative dimension while participants explicitly categorized the stimuli only along the gender dimension. An odd-ball paradigm was used in which a rare stimulus (e.g., negative male) appeared in a sequence of frequent stimuli (e.g., positive males). The P3 results from study 1 showed task-irrelevant evaluative categorization processes that were similar during the presentation of both pictorial and verbal stimuli. The P3 results from study 2 also showed task-irrelevant evaluative categorization processes that were also similar during the presentation of both novel and familiar stimuli. The findings taken together suggest that pictures and novel stimuli are not more efficient than words and familiar stimuli in eliciting task-irrelevant evaluative categorical processing.

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Chapter 1: Introduction

According to Eagley and Chaiken (1993,1), an attitude is a "psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor." Research has shown that the evaluative classification of an entity as either positive or negative may occur within a fraction of a second after its presentation (see Cacioppo, Crites, Berntson, & Coles, 1993; Crites, Cacioppo, Gardner, & Berntson, 1995; Ito & Cacioppo, 2000). This quick appraisal of something as either positive or negative (good or bad) allows for approach or avoidance responses that are important for one's survival (e.g. upon encountering a snake, an individual will be quick to avoid contact). Evaluative appraisals are also important for long-term goals. For example, upon evaluating a person as positive, an individual may respond with approach behaviors and if the positive evaluation is reinforced, the individual may pursue a relationship with that specific person. Although the evaluation of an entity (e.g., any object or individual) is believed to be practical as well as functional in influencing behavior in individuals (Fazio, 2000; Katz, 1960; Pratkanis, Breckler, & Greenwald, 1989; Shavit, 1990; Smith, Bruner & White, 1956), not much is known about the degree to which certain factors (e.g. nature of a perceived stimulus) influence automatic, or unintentional, evaluations (objects, events, individuals, etc.). The current research, therefore, attempted to contribute to the understanding of unintentional evaluative categorizations by assessing how the brain processes stimuli based on factors such as mode of stimulus presentation.

Researchers have examined the influence various factors have on attitude activation using priming techniques (see Bargh, Chaiken, Govender, & Pratto, 1992; Bargh, Chaiken, Raymond, & Hymes, 1996; Fazio, 2000, 1993; Fazio & Dunton, 1997; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Glaser & Banaji, 1999). Some, for example, have found that the strength of the association between the attitude objects and their corresponding evaluations stored in memory influences attitude activation. In addition, those objects that have stronger associations are more likely to activate their corresponding attitudes (Fazio, 1993, 2000; Fazio, et al., 1986; Glasier & Banaji, 1999; see also Bargh, et al., 1992; Chaiken & Bargh, 1993). Other researchers who used similar paradigms, on the other hand, have found that associative strength is not always sufficient to elicit the attitude associated with a perceived object, especially when there is no need for an evaluation to occur (Sanbonmatsu, Posavac, Vanous, Ho, & Fazio, 2007).

The use of priming paradigms, however, may not be the best option to assess how the brain categorizes attitude objects. That is, priming studies assessing the activation of evaluative associations do not necessarily guarantee that a perceived object is being automatically categorized according to its evaluation stored in memory. For example, in many studies using traditional priming techniques, participants are presented with an evaluative category label (e.g., good or bad) as a priming stimulus (often subliminally). Next, they are presented with a target stimulus, such as a personality trait (i.e., lazy, sincere, etc.). Faster responses to targets that are preceded by stereotypic-consistent (good/sincere) vs. inconsistent (bad/sincere) primes suggest that the two concepts are more closely linked in memory (see Anderson & Bower, 1972; Collins & Loftus, 1975; Neely, 1991). Faster responses to closely linked prime associates, however, may not necessarily indicate that unconditional automatic categorization of a target has occurred (see Macrae & Bodenhausen, 2000, 2001). When provided with a category label it stands to reason that associates of the category may be activated. However, much like in every day life, what if no category label is supplied, yet a target is perceived? We cannot assume that the target is always automatically classified along an evaluative dimension, especially given that most targets can also be classified along other categorical dimensions. For example, if a person sees a multiply categorizable target, such as an individual (e.g., a black, middle-aged female, such as Oprah Winfrey), is the attitude toward the individual stored in memory automatically elicited, or is other categorical information pertaining to the individual such as race, age or gender noted first?

In an attempt to side step the problem associated with the use of traditional priming techniques that use category labels as primes and to thereby get a better perspective on the complexities surrounding multiply categorizable targets such as individuals, researchers have turned to different strategies. One strategy has been to investigate whether evaluative or categorical processing occurs even when it is irrelevant to the task (see Bargh, 1997; Bargh, et al., 1996; Hermans, Van den Broeck, & Eelen, 1998; Macrae, Quinn, Mason, & Quadflieg, 2005; Quinn & Macrae, 2005). For instance, when people are presented with stimuli that can be categorized along two dimensions and are asked to categorize the stimuli along only one dimension, the task-irrelevant dimension may affect reaction times to the task-relevant response. Slower reaction times suggest that automatic categorical processing is occurring because a particular dimension is being activated without it being relevant to the task at hand, or without intent (see Macrae et al., 2005; Quinn & Macrae, 2005). This paradigm is promising; however, because many of the studies that have used this design have assessed reaction times to examine unintentional categorization effects, the results should be interpreted with caution. Reaction times may be susceptible to variations along other dimensions if the target can be categorized along more than two dimensions. That is, reaction times may not easily allow for an assessment of exactly which, or how many other irrelevant dimensions might be influencing responses to the relevant dimension.

Furthermore, because response times have limited sensitivity to cognitive processes, they may not be an appropriate measure to examine categorical processing in the brain. An explicit response can take up to several hundred milliseconds to execute after initial stimulus perception; multiple processes can occur during that time (see Cacioppo, Tassinary & Berntson, 2000). Although multiple processes may influence a response, response times are not readily able to provide information concerning all these processes. Thus, physiological measures of assessment in conjunction with behavioral measures may provide better understanding of how the perceiver processes and responds to any given stimulus.

1.1 ERPs as Measures of Assessment

Researchers investigating intentional (or task-relevant) and unintentional (or task-irrelevant) categorization processes have relied on both response times as well as physiological responses as measures of assessment. A notable method is the measurement of event-related brain potentials (ERPs; see Ito & Cacioppo, 2007). An ERP is the electrical brain activity associated with the temporal sequence of cognitive/neural processes working to identify and assess a stimulus (Fabiani, Gratton, & Fredermeier, 2007). This electrical brain activity can be measured by placing electrodes on the scalp. The ERP is comprised of a sequence of components that each reflect electrical activity associated with temporally discrete cognitive/neural processes (Cacioppo et al., 2000). The components' latencies and amplitude allow for inferences about the timing and degree of various psychological operations (Gehring, Gratton, Coles & Donchin, 1992). For example, components with onsets less than 50 ms have been found to reflect changes in the physical makeup of stimuli (Hansen & Hillyard, 1980, 1984; Mangun, Hillyard, & Luck, 1993); components with onsets between 100-200 ms reflect attentional changes (Hillyard & Munte, 1984; Ritter, Simson & Vaughan, 1983; Wijers, Mulder, Okita, & Mulder 1989); while later components with onsets after 300-400 ms are associated with more complex psychological processes such as categorical and semantic processing (Donchin, 1981; Donchin & Coles, 1988;

Duncan-Johnson, 1981; Kutas, McCarthey, & Donchin, 1977; McCarthey & Donchin, 1981; Niewenhuis, Aston-Jones, & Cohen, 2005).

Although early ERP components do not provide a clear indication that a stimulus has been classified as either positive or negative upon being perceived, the P3, with a post-stimulus onset of around 300-400 ms, is associated with more complex processes such as categorization (Donchin & Coles, 1988; Duncan-Johnson, 1981; Fabian, Gratton, & Coles, 2000; Niewenshuis, et al. 2005). Past studies using the odd-ball paradigm, in which rare target stimuli are randomly interspersed among more frequent standard stimuli, have found that the P3's latency and amplitude are associated with categorical processes. The latency of the P3, for example, has been associated with time taken to evaluate or categorize a stimulus (Duncan-Johnson, 1981; Kutas, et al., 1977; McCarthy & Donchin, 1981) as well as with the difficulty of categorizing stimuli (McCarthey & Donchin, 1981; Ragot, 1984; see also Verleger, 1997). Furthermore, research has shown that although the P3's latency is affected by factors that tend to influence categorization processes, it is relatively unaffected by factors that are known to influence response selection processes (Niewenhuis et al., 2005; Verleger, 1997). The amplitude of the P3, meanwhile, is thought to reflect the amount of neural processing required in evaluating/categorizing a stimulus within a given context (Donchin, Kramer, & Wickens, 1986). Past studies have found that the P3's amplitude varies depending on the deviance, or significance, of a stimulus with respect to the context in which it appears. For example, P3 amplitude to a star that is preceded by squares (■■■★) will be larger than the P3 amplitude to a star that is preceded by stars (★★★★). In addition, P3 amplitude is relatively unaffected by the actual response that a person makes to a stimulus (Donchin, 1981; Goldstein, Spencer, & Donchin, 2002; Johnson, 1986; Nieuwenhuis, et al., 2005; Picton, 1992).

Different theoretical perspectives have been provided as to the utility of the P300 (e.g., *the context-updating hypothesis* – Donchin, 1981; Donchin & Coles, 1988; *stimulus-evaluation hypothesis* **–** Duncan-Johnson, 1981; Kutas et al., 1977; McCarthey & Donchin, 1981; *and the LC-P3 hypothesis* – Niewenhuis et al., 2005). The most common of the theories is the context-updating hypothesis. According to Donchin and colleagues (Donchin, 1981; Donchin & Coles, 1988), when stimuli provide information that is inconsistent with the context model in which it appears, the context model is updated to reflect this change. The P3 serves as a reflection of this process. According to the stimulus-evaluation hypothesis, the latency of the P3 serves as an index of the time taken to evaluate a stimulus (Duncan-Johnson, 1981; Kutas, McCarthey, & Donchin, 1977). The LC-P3 hypothesis incorporates ideas from research on both the context-updating hypothesis and the stimulus-evaluation hypothesis while also integrating neurological information regarding the P3. According to the LC-P3 hypothesis, the P3 reflects brain responses to the outcome of stimulus evaluation and decision making (Nieuwenhuis, Aston-Jones, & Cohen 2005). The different theories agree that the P3 is contingent upon stimulus-based decision process. For example, both the context-updating hypothesis and the LC-P3 hypothesis agree that stimulus evaluation precedes the P300 process, with the amplitude of the P3 allowing for inferences about memory encoding and/or context-updating (see Niewenhuis et al., 2005). In addition, according to both the stimulus evaluation hypothesis and the LC-P3 hypothesis, the P3 latency reflects the time taken to complete the stimulus-evaluation process; both hypotheses also contend that behavioral accuracy may decrease if taking place before completion of the evaluation process (see Niewenhuis et al., 2005). Thus theory as well as research on the P3, suggest the P3 may be a useful measure with which to assess categorical processing.

1.2 PAST RESEARCH EXAMINING EVALUATIVE CATEGORIZATIONS USING THE P3

Cacioppo and colleagues (Cacioppo & Bernston, 1994; Cacioppo et al., 1993; Cacioppo, Crites, Gardner, & Bernston, 1994; Crites et al., 1995) were among the first to use the P3 to examine the brain's processing of evaluative laden stimuli. Their studies have shown that the P3 increases in amplitude when the valence of the stimulus differs from the preceding stimuli; that is, a deviant (or oddball) negative item produces a larger P3 amplitude when preceded by positive items than when preceded by other negative items (Cacioppo, Crites, Bernston, & Coles, 1993; Cacioppo et al., 1994; Crites & Cacioppo, 1996; Ito & Cacioppo, 2000). However, as with prior research using response times as a measure of assessment (see Bargh, et al., 1992; Bargh & Fergusen, 2000; Fazio, 1990 Macrae, et al., 1997; Pendry & Macrae, 1996; Quinn & Macrae, 2005), research examining categorical processing using the P3 has produced mixed results. Some researchers have found that evaluative categorization happens only under task-relevant conditions (Crites & Cacioppo, 1996; Corral, Crites, Taylor, & Mojica, in preparation) while others have found that it happens under both task-relevant and irrelevant conditions (Ito & Cacioppo, 2000; Crites, de Heer, Mojica, White, Corral, & Taylor, in preparation).

Crites and Cacioppo (1996) presented participants with idiosyncratic (i.e. stimuli that were unique to each individual based upon his/her attitudes), multidimensional verbal stimuli. The stimuli varied along both an evaluative (positive/negative) and non-evaluative (foods that were either vegetables or non-vegetable) dimension. Half of the participants explicitly categorized the stimuli along the evaluative dimension while the other half did so along the non-evaluative dimension. Results showed a P3 effect when participants were explicitly categorizing along the evaluative dimension (i.e., larger amplitude to evaluatively oddball stimuli) but found no evidence of task-irrelevant evaluative categorization. Similarly, when participants were explicitly categorizing along the nonevaluative dimension, there was a P3 effect for the task-relevant oddball stimuli, but found no evidence of task-irrelevant nonevaluative categorization.

Later, however, Ito and Cacioppo (2000) found that the P3 was sensitive to both task-relevant and task-irrelevant categorization processing. They used pictorial stimuli that were also multidimensional and varied along evaluative (positive/negative) and non-evaluative (people/no-people) dimensions; participants explicitly categorized along one but not the other dimension. The results of Ito and Cacioppo (2000) replicated the task-relevant findings of Crites and Cacioppo (1996). Changes along the evaluative dimension evoked larger P3s when participants evaluatively categorized the stimuli and changes along the non-evaluative dimension evoked large P3s when participants categorized the stimuli along the non-evaluative dimension. However, Ito & Cacioppo's (2000) findings also revealed evidence of task-irrelevant categorization. When participants were explicitly categorizing along the evaluative dimension, the P3 was also sensitive to task-irrelevant (people/no people) stimulus change. In addition, when participants were explicitly categorizing along the non-evaluative dimension, the P3 was sensitive to variations along the evaluative dimension. Thus, Ito and Cacioppo (2000) found evidence for automatic task-irrelevant categorization as indexed by increases in P3 amplitude to categorical shifts along task-irrelevant dimensions whereas Crites & Cacioppo (1996) found no evidence for this phenomenon.

More recently, my colleagues and I conducted two studies in an attempt to replicate findings by Ito and Cacioppo (2000) of task-irrelevant evaluative categorization processes. The first study (Corral, Crites, Taylor, & Mojica, in preparation) used a similar design to that of Crites & Cacioppo (1996) using idiosyncratic multidimensional verbal stimuli that also varied along an evaluative and non-evaluative dimension. In this case, however, the stimuli consisted of names of well-known individuals (i.e. entertainers, politicians, athletes, etc.) instead of names of foods depicting vegetables or non-vegetables. Participants were asked to engage in a gender categorization task and an attitude categorization task. Findings supported past research showing task-relevant categorizations as indexed by the P3 along both the evaluative and non-evaluative dimensions. However, task-irrelevant categorical processes were only seen for the gender dimension. That is, when participants were engaged in the attitude task the P3 was also sensitive to task-irrelevant variations of gender but when participants were engaged in the gender task there was no effect of task-irrelevant evaluative categorization.

We used a slightly different paradigm in the second study (Crites et al., in preparation). Participants were again presented with multidimensional stimuli, but instead of names, we employed pictorial stimuli as in the study conducted by Ito & Cacioppo (2000). Half of the pictures depicted males and the other half depicted females. The individuals depicted in the pictures also varied on attractiveness, with most of the pictures depicting individuals who were average in attractiveness and only a small percentage of the pictures depicting individuals who were either relatively more or less attractive (attractiveness was based on normative ratings by a separate group of participants). As in the previous studies, the stimuli varied along both an evaluative (attractiveness) and non-evaluative (gender) dimension. Participants were given the task to categorize the gender of the individuals in each picture. The P3 was sensitive to task-relevant (gender) variations; in this case, however, the P3 was also sensitive to variations along the task-irrelevant evaluative dimension of attractiveness. That is, pictures of both attractive and less attractive individuals evoked larger P3 amplitudes than pictures of neutral or average looking individuals. Thus, the results replicated findings from Ito and Cacioppo (2000) of task-irrelevant, or unintentional, evaluative categorizations.

The different results in the studies that found task-irrelevant categorization of evaluative laden stimuli (Ito and Cacioppo, 2000; Crites et al., in preparation) compared to those that only found task-relevant evaluative categorizations (Crites & Cacioppo, 1996; Corral et al., in preparation) are interesting given the overall similarities of the studies. The mixed findings suggest that unintentional evaluative categorization may be conditioned by the nature of the stimulus. That is, both studies finding task-irrelevant evaluative categorization used pictorial stimuli that were novel to the participants (Ito and Cacioppo, 2000; Crites et al., in preparation) while the two studies that did not, employed verbal stimuli that were familiar to the participant (Crites & Cacioppo, 1996; Corral et al., in preparation). Although the difference in stimuli type may account for the opposing results of the aforementioned studies, it is not clear whether unintentional attitude activation may have been due to either: 1) using pictorial stimuli instead of verbal stimuli or 2) using stimuli that were novel to the participant as opposed to using stimuli participants were already familiar with.

1.3 PICTORIAL VERSUS VERBAL STIMULI

The pictorial/verbal distinction has been the basis of extensive research geared towards clarifying both how words and pictures are encoded in memory and whether one has an advantage over the other in accessing relevant information. Two types of memory models, the common and dual coding models have been used to examine these questions and both assume that pictures are encoded more quickly in memory than words. One type of model assumes that there is a unitary, or common, code in memory for both words and pictures while the other model holds that a memory code exists for each, words and pictures. Although the common and dual coding models differ in the number of memory codes presumed to exist, they both assume that pictures are more efficient in activating attitudes compared to other modes of stimuli presentation.

According to common coding theorists, pictures may allow for faster semantic interpretation (Banks & Flora, 1977; Friedman & Bourne, 1976; Intraub, 1979). Pictures are thought to be quicker at accessing abstract semantic information than words (Potter & Faulconer, 1975; Seymour, 1973; Snodgrass, 1984) because pictures are more distinctive (and/or easily identifiable). That is, the physical features of objects that are represented by pictures allow for quicker semantic processing and may allow for more efficient classification of objects. Thus, the distinctness of pictures may also allow for evaluative information to be elicited more efficiently and, therefore, evaluative categorization may occur faster. On the other hand, because words are less distinctive, they may take longer in accessing and activating their corresponding attitudes.

Like the common coding theory, the dual coding theory also assumes that pictures are better able to aid in attitude activation. According to dual-coding theory, there is verbal and nonverbal information stored in memory that corresponds to objects and activities that are perceptually identifiable (Paivio, 1986). Instead of one common system storing the representations, as proposed by common-coding theory, dual coding theory argues that there are two memory storage systems. The first is the verbal system that is specialized in dealing with linguistic or verbal information (such as words) and the second is the nonverbal or image processing system that specializes in dealing with perceptual information (such as pictures). The two systems are thought to be partially interconnected; therefore, the picture of an object can activate its name and a name can also give rise to its referential image (or picture) (Paivio, 1986). However, images are thought to be more efficient in evoking their associated names than names are in evoking their referential images (Paivio, 1986).

In addition, according to dual coding theory, prior activation of verbal or nonverbal mental representations mediate learned responses that are motivational and/or emotional in nature (Paivio, 1986), such as attitudes. For example, Paivio (1986) argues that objects and events that arouse emotions are stored in memory as visual images with highly probable connections to affective systems but that this may not be the case for verbal representations. As predicted by both common coding and dual-coding theories, the unintentional evaluative categorization effect found in the studies using pictorial stimuli (Crites et al., in preparation; Ito and Cacioppo, 2000) may be due to a picture superiority effect in accessing evaluative information in memory. However, even if pictures are more efficient in eliciting task-irrelevant evaluations than words, novelty/familiarity of stimuli may nonetheless play a role in the unintentional evaluation effect found in previous research (Ito & Cacioppo, 2000; Crites et al., in preparation).

1.4 NOVEL VERSUS FAMILIAR STIMULI

Research suggests that when individuals encounter a novel object they automatically evaluate it (Duckworth, Bargh, Garcia & Chaiken, 2002). However, when an attitude object is repeatedly encountered in a context where there is no need to evaluate it, automatic activation of the attitude is less likely to occur (Sanbonmatsu, Posavac, Vanous, Ho & Fazio, 2007). Because participants had no present need to evaluate the stimuli, given the different tasks assigned, this might have hampered attitude activation in the two studies that did not find unintentional categorization of attitude (i.e., Crites & Cacioppo, 1996; Corral et al., in preparation). That is, participants were already familiar with the stimuli and had likely evaluated it on previous occasions. Since there was no imminent need to reevaluate the stimuli, the corresponding existing attitudes might not have achieved the threshold required to activate (see Sanbonmatsu, et al., 2007).

The idea that one's attitude is no longer automatically activated after there has been repeated exposure to the attitude object was originally based on past research examining 'semantic satiation' (see Sanbonmatsu et al, 2007; see also Pynte, 1991; Smith, 1984, Smith & Klein, 1990). For example, Smith (1984) found that when participants were asked to repeatedly state the name of a category (e.g. fruit) 30 times (versus 3 times) and then asked to decide whether a target exemplar (e.g. orange) was a member of the category, decision times were greater when the category word had been repeated 30 times. Other research that assessed semantic satiation also found similar results, suggesting that repeated semantic processing of a category may cause neural fatigue decreasing the accessibility of its semantic meaning and ability to activate associative cognitive networks (Pynte, 1991; Smith & Klein, 1990).

Sanbonmatsu et al. (2007) were among the first to examine semantic satiation effects on attitude objects. During the first phase of their experiment, the researchers repeatedly presented words involving strong evaluative associations to participants. Half of the participants were asked to evaluate the words while the other half were asked to indicate recognition of the words. During the second phase of the experiment, all participants were given an attitudinal priming task. Primes consisted of words repeatedly presented to participants during the first phase, as well as words that had not been previously presented (control words), letter string non-words (used to establish baseline), and filler words. Results showed that repeated exposure of prime words during the first phase weakened attitude activation during the priming task in the group of participants who had repeatedly encountered the words in a setting where there was no need to evaluate them (those involved in the recognition task). Attitude activation was observed during the priming task only in the group of participants who had the need to evaluate the words in the first phase (those involved in the evaluation task).

According to Sanbonmatsu et al. (2007), results from their study suggest the repeated non-utilization of evaluative information in a given task attenuates the likelihood of automatic attitude activation because perceivers learn to encode the stimuli in a non-evaluative manner. For example, in a gender task the need to evaluate the stimuli as either positive or negative is not present and therefore participants learn to process the repeatedly presented stimuli in a different manner (i.e. attending to gender related features) that helps them accomplish the task. The results from Sanbonmatsu et al.'s (2007) study need to be taken with caution given that the researchers employed priming techniques and used only verbal stimuli in their experiments; this gives rise to questions of whether activation of associative links signifies the occurrence of independent evaluative classification (as mentioned earlier) and whether using pictorial stimuli versus verbal stimuli would have produced different results. The main purpose of the present studies, therefore, was to assess the effect of stimulus presentation mode on task-irrelevant evaluative categorization processes. While the first study examines the effect of pictorial versus verbal stimuli, the second examines the effect of novel versus familiar stimuli.

Chapter 2: Study 1

2.1 INTRODUCTION

According to both the common coding and dual-coding theories, pictorial stimuli may allow for quicker access to evaluative information stored in memory than verbal stimuli. Previous research using pictures as stimuli found that the P3 was sensitive to unintentional evaluative categorical processes (Crites et al., in preparation; Ito and Cacioppo, 2000). On the other hand, research employing words as stimuli did not produce the same results (Crites & Cacioppo, 1996; Corral et al.,in preparation). The purpose of study 1, therefore, was to expand upon previous research examining the automaticity by which evaluations are processed by assessing whether unintentional evaluative categorization is affected by mode of stimuli presentation (pictures vs. words). This study mirrored the study by Corral et al. (in preparation) that examined gender/evaluative categorizations toward well-known people who participants personally liked or disliked except that, instead of engaging in both evaluative and gender categorization tasks, participants were only asked to explicitly categorize by gender.

2.2 OVERVIEW AND HYPOTHESES

Participants first came to a pre-session where they indicated their attitudes toward 568 well-known individuals (entertainers, politicians, sports stars, etc.). For each participant, the experimenter selected a subset of stimuli that included both positive and negative males and females for use in the ERP session. Each set of stimuli consisted of names and pictures of individuals that varied along the gender and evaluative dimensions (e.g., positive males, negative males, positive females, and negative females). Participants came back days later to an ERP session where they completed a gender categorization task. During the ERP session, brain activity was recorded while participants engaged in the gender task as they viewed sequences consisting of pictures and sequences consisting names. We employed a version of the oddball paradigm in which target stimuli were randomly interspersed among more frequent standard stimuli. We expected that target stimuli, varying from the context (or the more frequently presented stimuli) along the task-relevant gender dimension would produce larger P3 peak amplitude than the frequently presented stimuli that did not vary on either dimension. The oddball paradigm also allowed us to explore whether unintentional, automatic processing of the task-irrelevant evaluative (positive/negative) dimension had occurred during the presentation of both verbal and pictorial stimuli. We hypothesized that: 1) categorizations of gender would be revealed during the presentation of both verbal and pictorial stimuli; and 2) task-irrelevant evaluative categorizations would be revealed only during the presentation of pictorial stimuli.

2.3 METHODS

2.3.1 Participants

The final sample included 27 participants (15 male) after data from four participants were excluded. Data were excluded either due to a less than 75% accuracy rate on the gender categorization task, technical problems with the program, or excessive electrical artifacts. Participants included in the sample achieved accuracy scores above 80% during the gender categorization task. The age of participants ranged from 18 to 42 with an average age of 22. Twenty-four (or 89%) of participants were Hispanic. Participants were recruited from undergraduate psychology courses at the University of Texas at El Paso via Experimetrix. All participants received partial course credit for their participation.

2.3.2 Pre-Session Stimulus Set

The set of stimuli used during the pre-session consisted of 568 pictures and names of relatively well-known individuals (actors, politicians, athletes, musicians, religious figures, etc- see Appendix A for complete list of names). The stimuli were obtained from public internet sites (e.g. Google.com images, Yahoo.com images, etc.). The pictures were first screened to ensure that they were: (a) all in color, (b) that they did not have any distracting features (e.g., unusual hair styles, distracting backgrounds, unusual coloring, etc.), (c) that only the individual's face or face and shoulders were depicted, and (d) that the individuals' facial expressions did not vary drastically (e.g. laughing, angry, sad, etc.). The pictures were generally equivalent in quality and size; they were cropped or resized when necessary and screened by multiple people to ensure quality equivalence (370 x 500 pixels).

2.3.3 Procedure

Pre-session. Participants were required to first attend a pre-session. Upon arrival, the experimenter explained the risks and benefits of the experiment, thoroughly described the procedure, asked participants to read and sign an informed consent form, and scheduled an ERP session for a later date. The experimenter then took participants to an isolated room where they were asked to indicate their evaluations toward the set of stimuli presented one by one on a computer screen. Participants reported their attitudes on a computer keypad by pressing one of seven labeled keys (-3, -2, -1, 0, +1, +2, +3) when the picture and name of a stimulus person appeared on the computer screen. Participants were asked to press a separate key if they did not know a stimulus person. The presentation order of the 568 names and pictures was randomly determined for each participant. The participants were then asked to complete a demographic questionnaire and were given an appointment card with a scheduled date and time for the ERP session and were allowed to leave. Appointments for the ERP session were scheduled on average 7 days after the pre-session. Although carry-over effects of evaluative categorization processes have not been found to interfere with new categorization tasks, as indexed by the P3 (Corral et al., in preparation), it was nonetheless important to take precaution and allow ample time to pass before having participants return to engage in a new task.

Each participant's pre-session attitude ratings of the 568 stimuli were reviewed in order to select a set of attitudinal stimuli for the ERP session. The ERP stimulus set contained two gender categories (male/female) and two evaluative categories as depicted by the 7-point bipolar scale: positive (+3 and/or +2) and negative (-3 and/or -2). Female and negative stimuli were presented less frequently than positive male stimuli in the ERP session in order to evoke larger P3's'. Therefore, the stimulus set consisted of a greater number of positive males serving as the context (35), five positive females, five negative males, and five negative females. The context of sequences presented to participants was held constant (positive males) because female participants were less likely to report very positive attitudes (+2 and +3) towards female stimuli than to male stimuli. This did not allow for the needed number of positive female stimuli to make up the context in various cases in order to make appropriate comparisons. If more stimuli than required fell within a given evaluative category, the stimuli with the fastest reaction times were chosen to be used in the ERP session (e.g., Fazio, 1995; Fazio, 2000).

ERP Session. During the ERP session, the experimenter prepared the participant for electroencephalographic (EEG) recording by placing an elastic cap containing EEG electrodes on the participant. Once preparation was complete, the participant was taken to an isolated room and seated in a comfortable recliner placed approximately 0.5 m in front of a monitor on which the experimental stimuli were displayed. The participants were informed that the experiment consisted of a gender categorization task and that the stimuli would appear in 12 sequences of 50 with rest periods in between each sequence. At this point the experimenter introduced the experimental manipulation given that half of the sequences were presented in names of the well-known individuals (verbal stimuli) while the other half were presented in pictures of the individuals (pictorial stimuli). The order of sequence presentation was randomized across participants. The stimuli presented within each sequence were also randomly presented to participants. Before the participants started the task, the experimenter made sure they clearly understood the instructions and turned on a white noise machine to help drown out any external noise from outside the chamber. Participants then initiated the task by pressing a button on the keypad.

The task consisted of 12, 50-stimulus sequences. Six of the sequences consisted of names and the other six of pictures. The ordering of the 12 the sequences was random across participants. The stimuli within each sequence were also randomly presented to participants. Participants were able to initiate the sequences by pressing a key on a key pad. The first of 50 stimuli appeared 500 ms after participants initiated each sequence. Each stimulus appeared for 700 ms and there was a 1300 ms interval between each stimulus. As previously mentioned, the stimuli set used for the ERP session consisted of 50 individuals selected from the 568 individuals used in the pre-session. The 50 individuals varied on two social dimensions: evaluative and gender. The experimenter selected a set of 50 stimuli, 35 positive male, 5 negative male, 5 positive female and 5 negative female, all from the list of pictures the participant had previously assessed. The combination of stimuli used allowed for both negative and female categorized stimuli to be presented less frequently than positive male categorized stimuli (i.e., negative and female categories were made inconsistent to evoke larger peak amplitudes of the P3) and the stimuli were randomly presented within each sequence.

2.3.4 Data Acquisition and Reduction

Bioelectrical activity was recorded using Ag/AgCl electrodes. EEG activity was recorded from 62 scalp locations and referenced to the right mastoid. Electrical activity was also recorded from the left mastoid so a digital linked reference could be computed following data collection. A ground electrode was located between FPz and Fz electrode location. Vertical electrooculographic (VEOG) and horizontal electooculographic (HEOG) activity was recorded so artifacts from these channels could be digitally removed from the scalp locations. The electrodes were filled with a high conductivity gel, and electrical impedance at each recording location was reduced to less than 15 Kohms. Neuroscan amplifiers were used to amplify, filter (bandpass of 0.05-30 Hz), and digitize (500 Hz) the bioelectrical signals that were recorded continuously during the experiment.

A number of steps were taken to reduce and quantify the bioelectrical data: 1) EEG data was re-referenced to a digital, linked-mastoids reference; 2) a digital, zero-phase shift, band pass filter (0.15 and 5 Hz 48 dB/octave) was applied to the continuous data; 3) epochs associated with each target stimulus (0.3 s prestimulus, 1.0 s stimulus, & 0.3 s poststimulus periods) were extracted from the continuous data, and each epoch and electrode site was baseline corrected to the mean of its pre-stimulus period; 4) epochs containing extreme activity at VEOG were excluded from further analyses; 5) a regression procedure for removing VEOG artifacts from the EEG recordings was applied (Semlitsch, Anderer, Schuster, & Presslich, 1986); 6) the sweeps associated with each stimulus were re-epoched (0.2 s prestimulus, 1.0 s stimulus, & 0.2 s poststimulus periods) and baseline corrected to the mean of the 0.2 s pre-stimulus period; 7) data was manually reviewed, and electrodes were deleted from further analyses if there was a problem (e.g., if an electrode came loose); 8) epochs containing extreme activity at any scalp site were excluded from further analyses; 9) the EEG recordings over each recording site for each participant were averaged separately within each of the experimental conditions; and 10) the peak amplitude, peak latency, and mean amplitude of the P3 component were recorded from each ERP waveform using a latency window of 300 to 850 ms from target onset.

2.4 RESULTS

2.4.1 Behavioral Data

We first analyzed the effect of mode of stimuli presentation (pictorial/verbal) on target gender and evaluative categorizations by examining behavioral data. Error rates were compared between contextually inconsistent and context-consistent stimuli during sequences consisting of pictures and those consisting of names. Response accuracy rates were positively skewed, therefore, a log linear transformation was first conducted to correct for this (see Bargh & Chartrand, 2000). However, for ease of interpretation, mean error scores are presented in percentages.

Hypothesis 1 – Task-relevant categorizations. Error rates were first compared between contextually inconsistent positive female and context-consistent positive male stimuli during sequences consisting of pictures and those consisting of names using a 2 (stimulus type: pictures vs. names) X 2 (task-relevant target gender: positive male/positive female) ANOVA. Results revealed a target gender effect, F (1, 26) = 8.48, $p < .01$, $\eta^2 = .25$. Participants had greater error rates to inconsistent positive females (M = 5.37%, SE = 1.10) than to context-consistent positive males making up the context (M = 3.21%, SE =1.11). However, the analysis also revealed a significant interaction between stimulus type and target gender, F (1, 26) = 9.63, $p < .01$, η^2 = .27. Error rates produced by positive male and positive female names were similar (M = 4.07%, SE = 1.65, and M = 4.07%, SE = 1.34, respectively) while greater error rates were produced by positive female pictures (M = 6.67%, SE =.69) than positive male pictures (M = 2.35%, SE =1.30), see table 1.1. This finding suggests that the target gender effect found was driven by female pictures but not by female names.

Hypothesis 2 – Task-irrelevant categorizations. Next we assessed task-irrelevant evaluative categorization processes using a 2 (stimuli type: pictures vs. names) X 2 (task-irrelevant target evaluation: positive male/negative male) ANOVA. Results revealed a main effect of stimuli type, F (1, 26) = 4.46, $p < .05$, η^2 = .15. Verbal stimuli produced greater error rates (M = 4.14%, SE = 1.40) than pictorial stimuli (M = 1.73%, SE = .46). No other effects were found. We then assessed task-irrelevant evaluative categorization processes by comparing error rates between contextually inconsistent positive females and negative females using a 2 (stimuli type: pictures vs. names) X 2 (task-irrelevant target evaluation: positive female/negative female) ANOVA. Results revealed a main effect of stimulus type, F (1, 26) = 26.54, $p < .01$, η^2 = .51. Pictures produced greater error rates in participants (M = 10.80%, SE = 1.49) than names (M = 3.46%, SE = .97). A main effect of target evaluation was also found, F (1, 26) = 12.83, $p < .01$, η^2 = .32. Negative females produced greater error rates in participants (M = 8.89%, SE = 1.19) than positive females (M = 5.37%, SE = 1.11). However, results also revealed a stimulus type by target evaluation interaction, F (1, 26) = 14.89, $p < .01$, η^2 = .36. Participants' error rates were greater to names of positive females (M = 4.07%, SE = 1.34) than to names of negative females (M = 2.84%, SE = .77). On the other hand, error rates were greater to negative female pictures (M = 14.94%, SE = 2.16) than to positive female pictures (M = 6.67%, SE = 1.30), see Table 1.2.

2.4.2 ERP Data

Hypothesis 1 – Task-relevant categorizations. ERP analyses first focused on the effect of mode of stimulus presentation (pictorial/verbal) on task-relevant gender categorization processes. P3 peak amplitudes were compared between contextually inconsistent female and context-consistent male stimuli during sequences consisting of pictures and those consisting of names using a 2 (stimuli type: pictures vs. names) X 2 (task-relevant target gender: positive male/positive female) X 5 electrode recording site (FCZ, CZ, CPZ, PZ, POZ) ANOVA. Results revealed a main effect of electrode site, F (4, 23) = 22.00, $p < .01$, $\eta^2 = .79$. Greater P3 activation was found at the POZ, PZ and CPZ electrodes sites (M = 9.74 µV, SE = .63; M = 11.11 µV, SE = .59; and M = 9.83 µV, SE = .67, respectively) relative to the CZ and FCZ electrode sites (M = 8.18 µV, SE = .78, and M = 5.70 µV, SE = .73, respectively). This finding of greater P3 activation from the parietal region electrodes is consistent with past research using an oddball design to examine task-relevant and task-irrelevant categorical processing (see Ito & Cacioppo, 2000; Crites & Cacioppo, 1996). Therefore, all other analyses focused specifically on the CPZ, PZ and POZ electrode sites. Also, recently conducted research questions the utility of investigating interactions between recording site and experimental factors (Urbach & Kutas, 2006; 2002). Consequently, we do not report interactions between electrode site and other experimental variables.

As expected, results revealed an effect of target gender, F (1, 26) = 31.36, $p < .01$, $\eta^2 = .55$. Target females evoked greater P3 peak amplitude (M = 10.55 µV, SE = .73) in participants than target males (M = 7.27 µV, SE = .51), see *Figure 1.1*. This finding replicates past research using the P3 to examine task-relevant gender categorization processes (Corral et al., in preparation; Crites et al., in preparation). Results also revealed a significant interaction between stimulus type and target gender F (1, 26) = 9.55, $p < .01$, $\eta^2 = .27$. Greater P3 activation was evoked from female pictures (M = 11.66 μV, SE = .78) relative to female names (M = 9.45 μV, SE = .86), while greater P3 activation was evoked by male names (M = 7.63 μV, SE = .62) relative to male pictures (M = 6.92 μV, SE = .62), see Table 1.3.

Hypothesis 2 – Task-irrelevant categorizations. We hypothesized that an interaction between stimuli type and target evaluation would be revealed. That is, evaluative variations in stimuli were expected to be indexed by the P3 during the presentation of pictures but not names. In order to assess the effect of mode of stimuli presentation on evaluative, or task-irrelevant, categorizations, we used a 2 (stimulus type: pictures/names) X 2 (task-irrelevant target evaluation: positive male/negative male) X 3 electrode recording site (CPZ, PZ, POZ) ANOVA. Results revealed an effect of task-irrelevant evaluative categorization, F (1, 26) = 4.25, $p < .05$ $\eta^2 = .14$. The pattern of means, however, was in the opposite direction of what was hypothesized. Context consistent positive males produced larger P3s (M = 8.29 μV, SE = .552) than context inconsistent negative stimuli (M = 7.27 μV; SE = .600), see *Figure 1.2*. We did not find an interaction between stimulus type and target evaluation as was hypothesized, F (1, 26) = 2.19, p = 1.51. No other effect was found.

We then assessed task-irrelevant evaluative categorization processes by comparing P3 peak amplitudes of contextually inconsistent positive and negative females using a 2 (stimulus type: pictures/names) X 2 (task-irrelevant target evaluation: positive female/negative female) X 3 electrode recording site (CPZ, PZ, POZ) ANOVA. Results revealed a main effect of stimulus type, F (1, 26) = 17.08, $p < .01$, $\eta^2 = .40$. Pictures evoked larger P3 peak amplitude in participants (M = 12.73 μV, SE = .76) than names (M = 10.13 μV, SE = .72). A main effect of target evaluation was also found, F (1, 26) = 16.92, $p < .01$, $\eta^2 = .39$. Positive females evoked larger P3 peak amplitude (*M* = 12.16 μV, *SE* = .73) than negative females (*M* = 10.70 μV, *SE* = .66), see *Figure 1.3*.

Table 1.1: Error rates of behavioral responses to target gender according to type of stimuli presentation.

Error Rates to Target Gender by Stimuli Type		
Stimuli	**Names**	**Pictures**
Males	4.07%	2.35%
Females	4.07%	6.67%

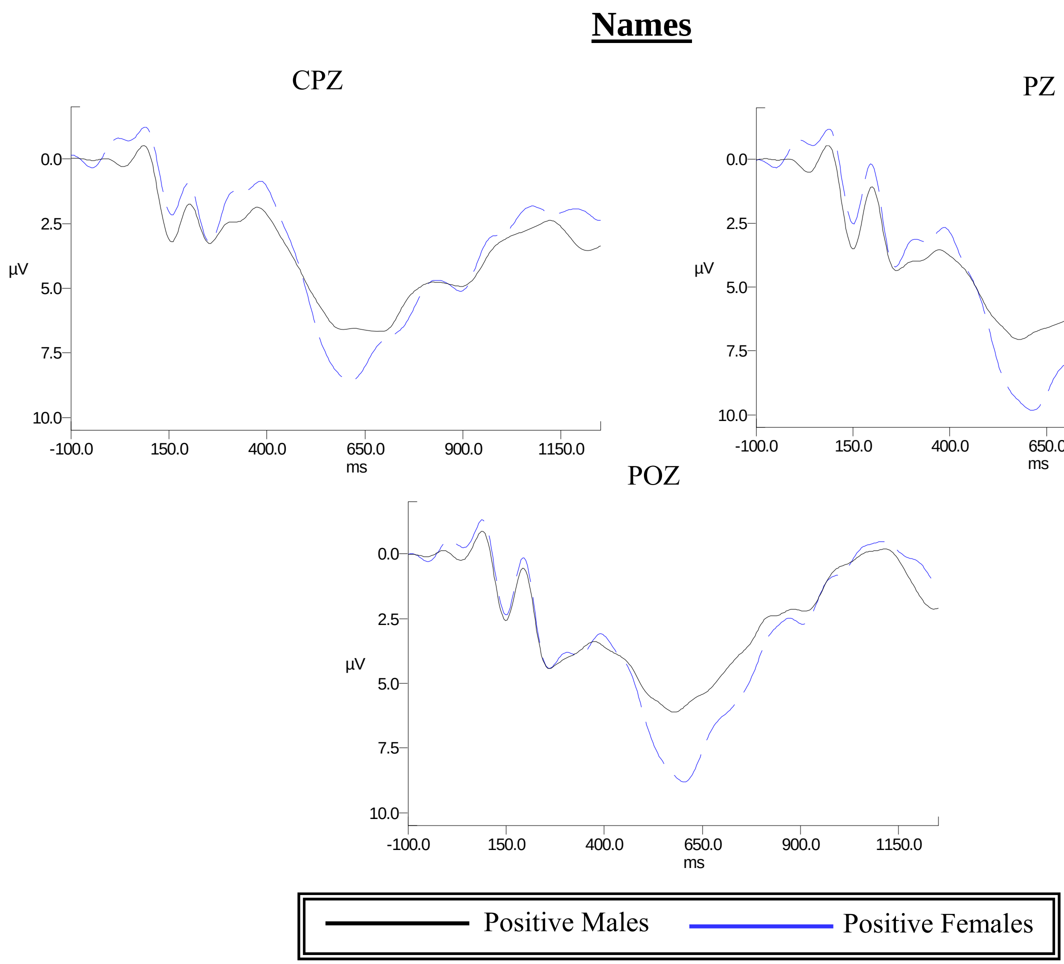
Table 1.2: Error rates of behavioral responses to target female stimuli during verbal and pictorial stimuli presentation

Error Rates to Target Females by Stimuli Type		
Stimuli	**Names**	**Pictures**
Positive females	4.07%	6.67%
Negative females	2.84%	14.94%

Table 1.3: P3 peak amplitude to target male and female verbal and pictorial stimuli.

P3 Peak Amplitude to Target Gender by Stimuli Type		
Stimuli	**Names**	**Pictures**
Males	7.63	6.92
Females	9.45	11.66

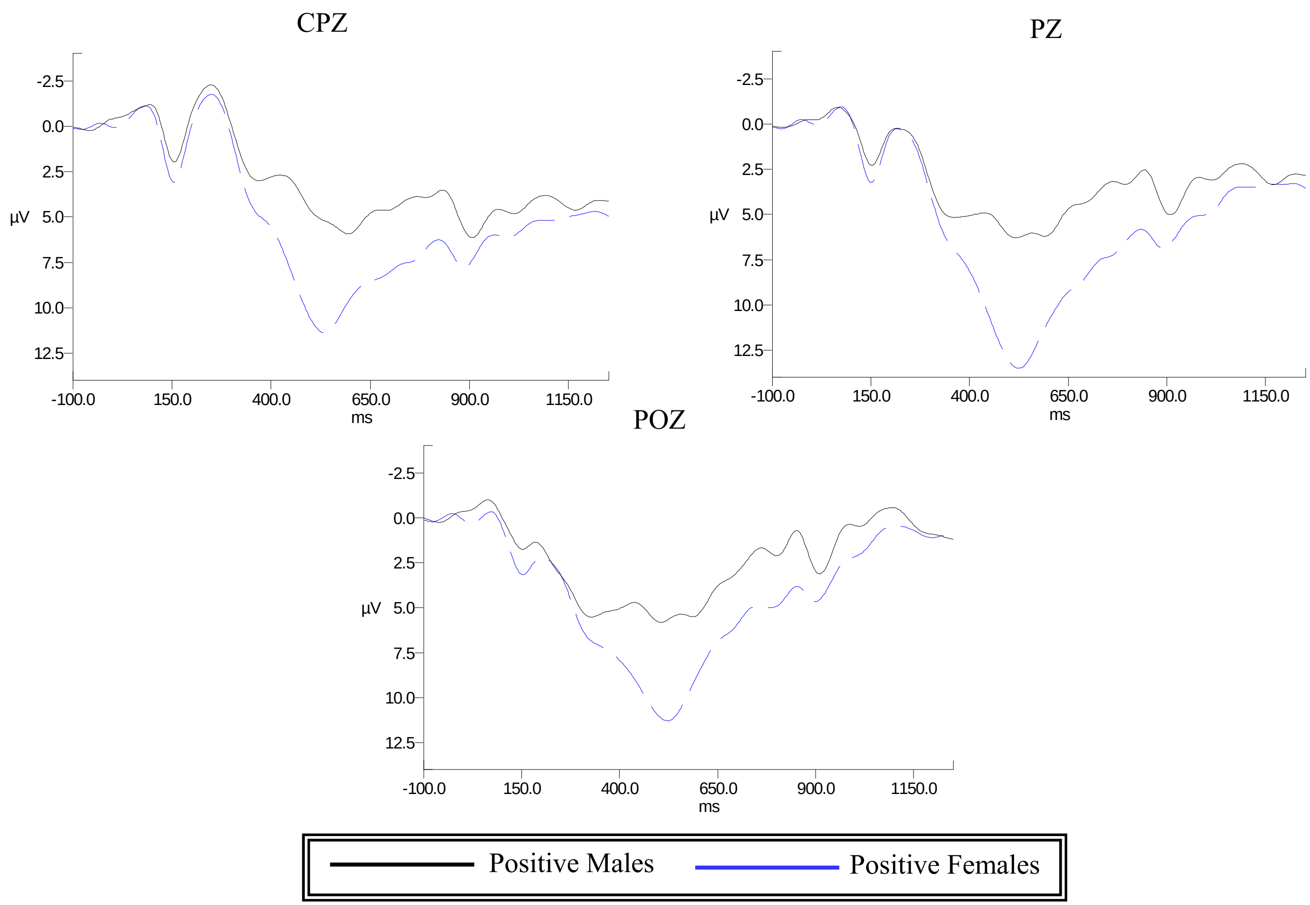
Note: Means are presented in microvolts



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

Figure 1.1: P3 peak amplitude to task-relevant categorization processes during the presentation of verbal stimuli: Context consistent positive males versus inconsistent positive females.

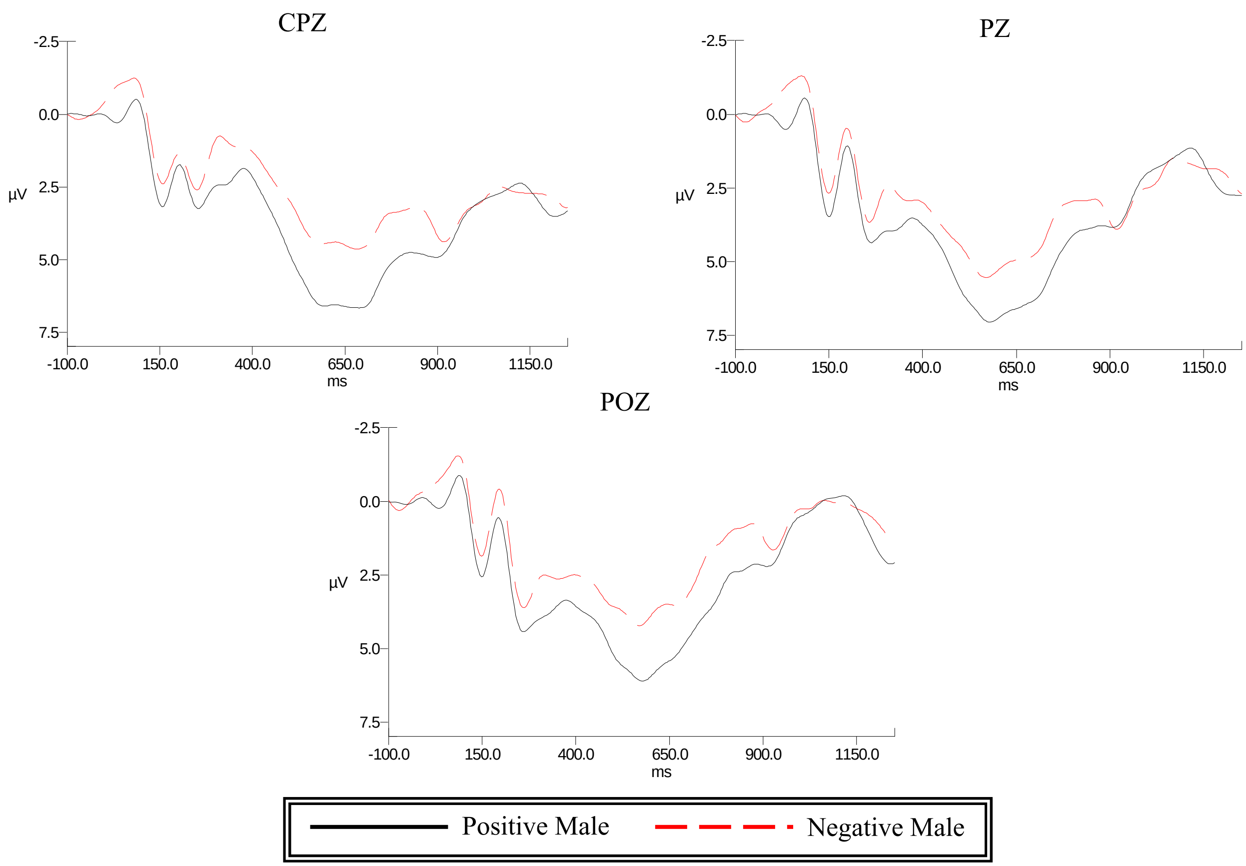
Pictures



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

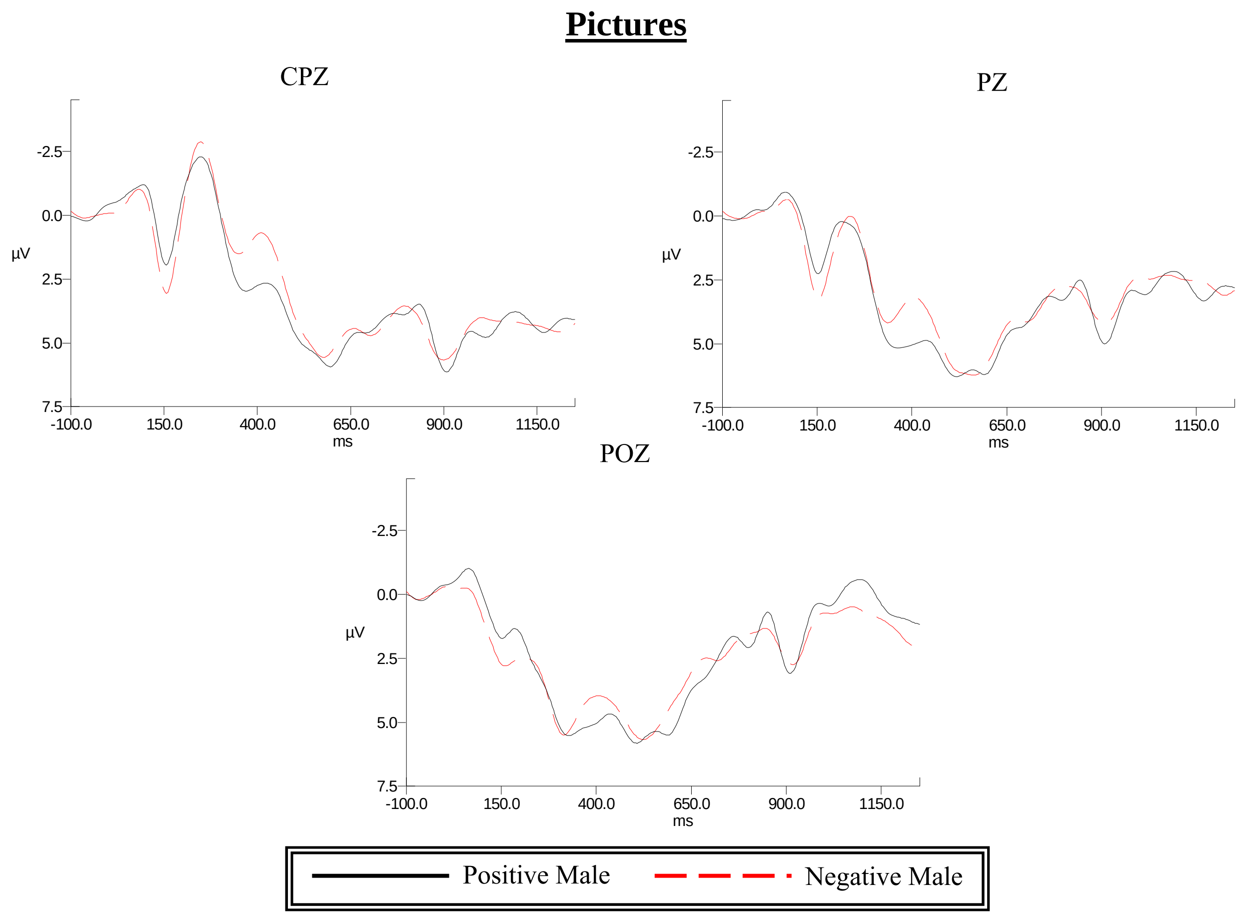
Figure 1.2: P3 peak amplitude to task-relevant categorization processes during the presentation of pictorial stimuli: Context consistent positive males versus inconsistent positive females.

Names



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

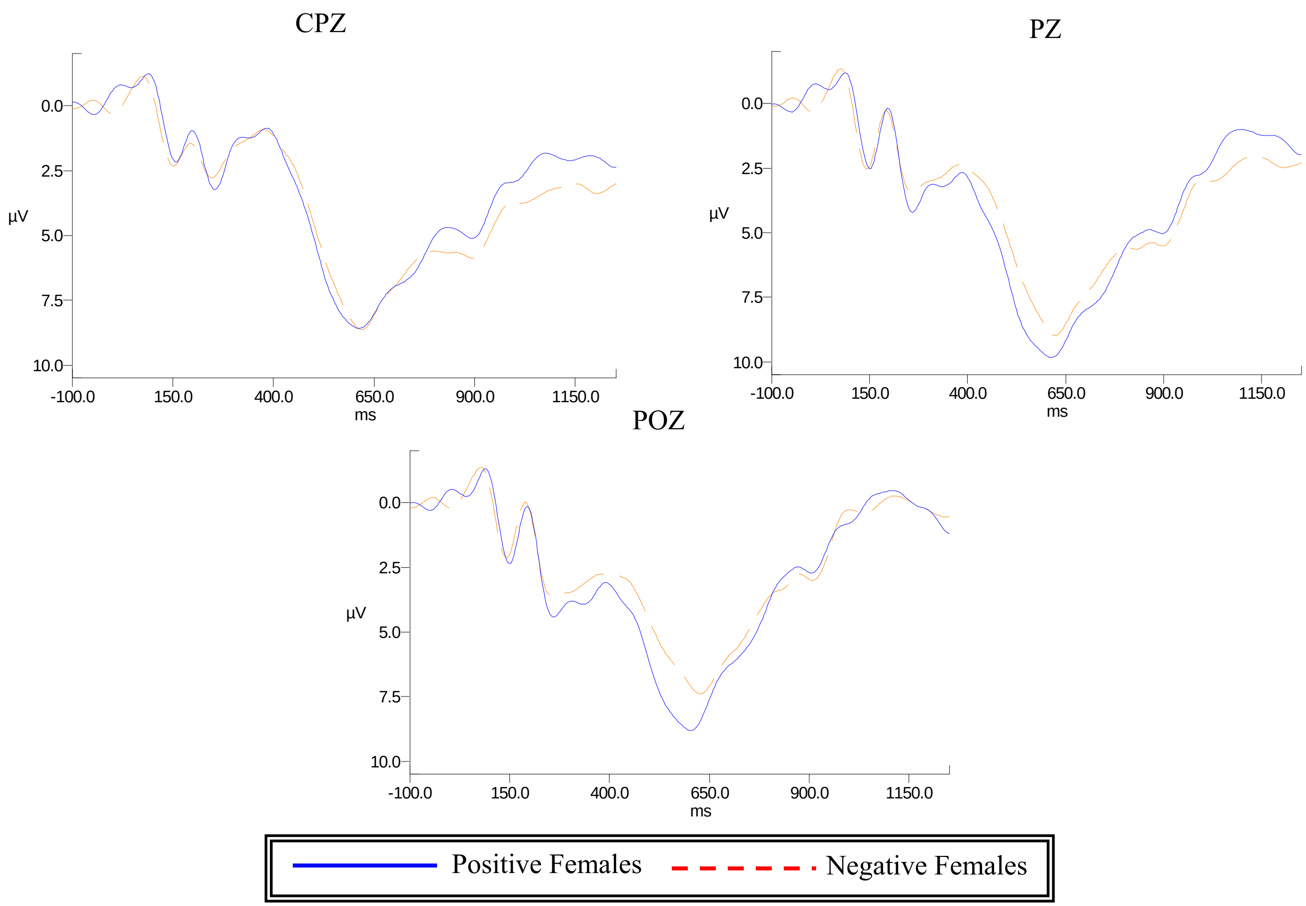
Figure 1.3: P3 peak amplitude to task-irrelevant categorization processes during the presentation of verbal stimuli: Context consistent positive males versus inconsistent negative males.



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

Figure 1.4: P3 peak amplitude to task-irrelevant categorization processes during the presentation of pictorial stimuli: Context consistent positive males versus inconsistent negative males.

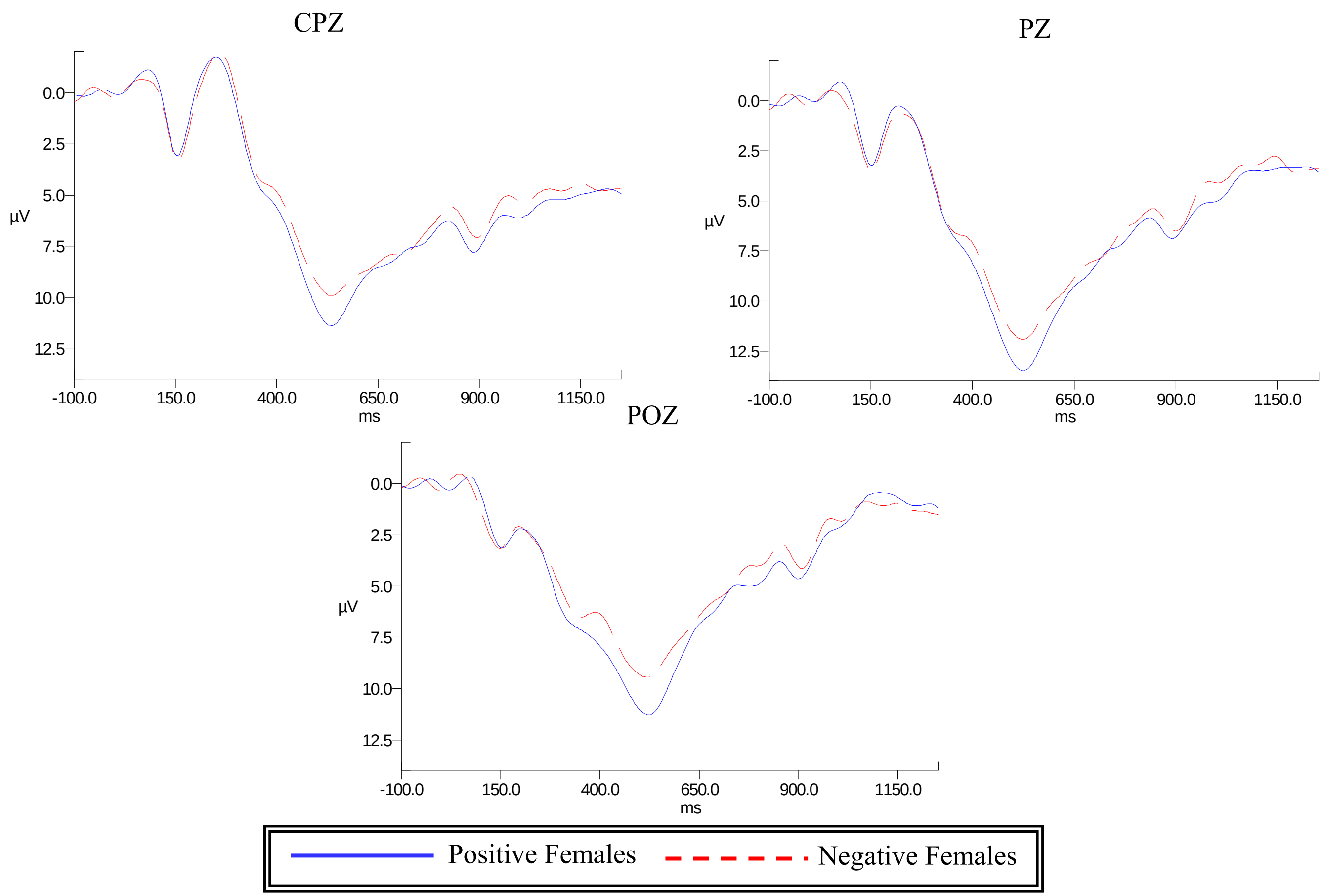
Names



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

Figure 1.5: P3 peak amplitude to task-irrelevant categorization processes during the presentation of verbal stimuli: Context consistent positive females versus inconsistent negative females.

Pictures



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

Figure 1.6: P3 peak amplitude to task-irrelevant categorization processes during the presentation of pictorial stimuli: Context consistent positive females versus inconsistent negative females.

2.5 DISCUSSION – STUDY 1

We hypothesized that the P3 would show evidence of task-relevant categorizations of gender during the presentation of both verbal and pictorial stimuli, replicating past findings of task-relevant categorization of gender (Corral et al., in preparation; Crites et al., in preparation). That is, context inconsistent females were expected to evoke larger P3 peak amplitudes than context consistent male during presentation of both names and pictures. As expected, results revealed a main effect of target gender; rarely presented females produced larger P3s than frequently presented males. Analysis of behavioral responses also revealed a main effect to target gender categorization, with greater error rates to target females than target males; however, the effect was found to be driven by female pictures and not female names.

The most theoretically relevant question, however, concerned whether task-irrelevant evaluative categorization processes would be facilitated by using pictorial relative to verbal stimuli. We predicted an interaction to be revealed. Pictures of negative males varying from the context only on the task-irrelevant dimension were expected to evoke larger P3 peak amplitudes than pictures of positive males that were consistent with the context. On the other hand, negative male names varying from the context only on the task-irrelevant dimension were expected to evoke similar P3s to those evoked by positive male names consistent with the context. If the P3 was found to be responsive to task-irrelevant evaluative categorizations of pictorial stimuli and not verbal stimuli, this would suggest that pictures have preferential access to an evaluative system. No interaction, however, was found. Pictures were not more efficient, relative to names, in eliciting the P3 to evaluative variations during the presentation of positive stimuli and negative stimuli.

The P3 results from study 1 extend findings from prior research on evaluative processing by demonstrating that unintentional, or task-irrelevant, categorical processing occurs similarly for pictorial and verbal stimuli. These findings suggest that although pictures may have the ability to evoke larger (or more pronounced) P3s during task-relevant categorization tasks, they do not have preferential access to an evaluative system relative to names. Thus, differences in the findings of the previous studies examining task-irrelevant evaluative categorizations (Crites et al., 1996; Ito & Cacioppo, 2000; Corral et al., in preparation) may instead be due to differences in how individuals evaluate novel versus familiar stimuli.

Chapter 3: Study 2

3.1 INTRODUCTION

Study 1 examined whether mode of stimulus presentation (verbal vs. pictorial) was a main factor in affecting unintentional evaluative categorization processing. Presenting pictures, however, did not affect task-irrelevant evaluative categorizations differently than presenting names. Thus, the main factor influencing task-irrelevant categorical processing of evaluative laden stimuli found by Ito and Cacioppo (2000) and Crites et al. (in preparation), but not by Crites et al. (1996) and Corral et al. (in preparation), is not due to the use of pictorial versus verbal stimuli.

It is possible that the main factor influencing unintentional evaluative categorization processes found in past research using the P3 (Ito & Cacioppo, 2000; Crites et al., in preparation) is novelty/familiarity of stimuli. As mentioned previously, findings from past research suggest that upon encountering a novel entity (object, individual, etc.), individuals automatically evaluate it (Duckworth, Bargh, Garcia & Chaiken, 2002). However, evaluations of entities that individuals are familiar with have likely taken place in the past. Therefore, individuals may no longer need to evaluate the entities during repeated encounters, especially when they are encountered in a context where there is no need to evaluate (see Sanbonmatsu, Posavac, Vanous, Ho & Fazio, 2007). Thus, stimuli that are novel to an individual may elicit unintentional evaluative processing, whereas stimuli that are familiar to an individual may not. To closely examine the novelty/familiarity factor, we conducted a second experiment employing a design similar to the one used in study 1. However, only pictures were used to present the stimuli. In addition, we did not have participants first provide personal evaluations of the stimuli, as in study 1, because this would have familiarized them with the stimuli, thus affecting the results.

Instead of having participants first evaluate the stimuli as positive or negative, we varied the stimuli on attractiveness as in Crites et al. (in preparation).

3.2 Overview and Hypotheses

Participants came to an ERP session where they completed a gender categorization task. The stimuli consisted of novel and familiar individuals that varied along the gender and evaluative (attractiveness) dimensions. Stimuli were rated on the attractiveness dimension by an independent set of raters. During the ERP session, brain activity was recorded while participants engaged in the gender task as they viewed sequences consisting of pictures of the novel stimuli and sequences consisting of familiar stimuli. As with study 1, we used a version of the oddball paradigm in which target stimuli were randomly interspersed among more frequent standard stimuli. We expected that target stimuli, varying from the context along the task-relevant gender dimension would produce larger P3 peak amplitude than the frequently presented stimuli that did not vary on either dimension during the presentation of novel and familiar stimuli. Using the oddball paradigm also allowed us to explore whether unintentional, automatic processing of the task-irrelevant attractiveness dimension occurred during the presentation of both types of stimuli. As in study 1, an interaction was hypothesized and we expected: 1) categorizations of gender to be revealed during the presentation of both novel and familiar stimuli; and 2) task-irrelevant evaluative categorizations to be revealed during the presentation of novel but not familiar stimuli.

3.3 METHODS

3.3.1 Pilot Study for Stimuli Selection

The pictures of unknown individuals used in the ERP study were first pilot tested for familiarity, attractiveness, and favorability by a different set of participants. Six hundred and forty pictures (340 males and 300 females) were screened and rated according to familiarity, attractiveness, and favorability by an independent set of raters. The pictures were obtained from various public internet sites (i.e., www.myspace.com '*rate my picture*,' where individuals upload pictures to be rated by others) and were screened by 6 people to ensure that (a) the picture was in color, (b) the individuals in the pictures were non-Hispanic White, (c) the individuals in the pictures did not vary drastically in age, (d) the pictures did not have distracting features (e.g., unusual hair styles, distracting backgrounds, unusual coloring, etc.), and (e) that the individuals' facial expressions did not vary drastically (e.g. laughing, angry, sad, etc.).The pictures were cropped and resized to uniform dimensions (290 X 400 pixels) and only the individual's face or face/shoulders was visible. These screened pictures were then rated by 200 participants who were instructed to rate the individuals in the pictures on one of three dimensions: familiarity, attractiveness or favorability (dimension on which to rate pictures was randomly selected by computer program for each participant).

Two hundred participants (115 females) were recruited from introduction to psychology courses and were given partial course credit for their participation. Eighty-seven percent of participants were Hispanic origin, 6% were non-Hispanic white, 2.5% were African American and 4.5% were of another ethnic origin. The age of participants ranged from 17 to 48 years old with an average age of 22. Participants were provided with a web link that gave them access to the study. Once at the web site, participants were explained: (a) the purpose of the study, (b) that their participation was completely voluntary and (c) that their answers would be kept confidential. Participants were also informed of whom they could contact should they have any questions or concerns. Participants were then instructed that if they decided to take part in the study they should continue and rate the pictures that would be presented one by one on the screen. Participants were randomly assigned to rate pictures on either familiarity, attractiveness, or on favorability of the presented individual.

Seventy-two participants rated the individuals in the pictures on the familiarity dimension, 64 rated them on attractiveness, and 64 rated them on favorability. The stimuli set of pictures were all of uniform dimension: 290 X 400 pixels. Ratings were made on a 7-point scale (-3 to +3) with 0 as neutral (see Appendix B for complete list of stimuli and ratings). Based on these ratings, a final set of 100 pictures were selected, 50 making up the novel set of stimuli (rating -3 and -2 on familiarity) and 50 making up the familiar set of stimuli (rating +3 and +2 on familiarity). The stimuli sets represented the two gender categories (male/female) and two attractiveness categories (neutral/unattractive). Each stimuli set consisted of 35 neutral males, five unattractive males, five neutral females, and five unattractive females. The context of neutral males was held constant across participants to keep as consistent as possible with study 1.

To control for attractiveness and favorability within the stimuli sets, each of the stimuli sets included 40 males that rated the most neutral on favorability (-1 to +1) but that also varied significantly on attractiveness (a minimum of 2 points on the 7-point scale). The 35 males chosen to make up the context rated significantly different on attractiveness from the 5 males that served as the oddball stimuli that varied only on the task-irrelevant evaluative dimension. Each of the stimuli sets also include 10 females that, like the males, rated most neutral on favorability but also varied significantly on attractiveness. Half, or 5, of the females within each set rated significantly more attractive than the other half of the females. See Appendix C for list of stimuli sets with associated ratings.

Analyses were conducted to examine attractiveness of stimuli using a Games-Howell ANOVA. Novel males making up the context were significantly more attractive than the novel unattractive males (M*diff* = 2.12, *SE* = .073, p < .01). The novel females selected to vary from the context only on the task-relevant dimension (but not the task-irrelevant evaluative dimension) were also significantly more attractive than the novel unattractive females (M*diff* = 2.75, *SE* = .04, p < .01). Males making up the context for the familiar set of stimuli were significantly more attractive than familiar unattractive males (M*diff* = 2.45, *SE* = .09, p < .01). Familiar females that varied from the context only on the task-relevant gender dimension were also significantly more attractive than familiar unattractive females that varied from the context on both the task-relevant gender and task-irrelevant evaluative dimension (M*diff* = 2.19, *SE* = .33, p < .01).

3.3.2 ERP Session Participants

The final sample included data from 28 participants (15 male) after data from 4 were excluded (all due to excessive electrical artifacts). Participants ranged in age from 18 to 41 with an average age of 23. Twenty-two (or 79%) were Hispanic. Participants mostly consisted of students in introductory to psychology courses who took part in the experiment for partial course credit; they registered for the experiment through Experimetrix. A small number of other UTEP students who were not enrolled in introductory to psychology courses, also completed the study for the experience of participating in an ERP experiment. Participants included in the sample achieved accuracy scores above 90% during the gender categorization task.

3.3.3 Procedure

When participants arrived for the ERP session, the experimenter explained the risks and benefits of the experiment, thoroughly described the procedure, and asked participants to read and sign an informed consent form. The experimenter then prepared the participants for EEG recording by placing an elastic cap containing EEG electrodes on the participant. Once the preparations were complete, the participants were taken to an isolated room and seated in a comfortable recliner placed approximately 0.5 m in front of a monitor on which the experimental stimuli were displayed. The participants were informed that the experiment consisted of a gender categorization task and that the stimuli would appear in 12 sequences of 50 with rest periods in between each sequence. Participants were instructed to press one of two buttons with their dominant index finger indicating gender of the individual in the picture (1 for 'male' and 2 for 'female'). Before the participants started the task, the experimenter made sure they clearly understood the instructions, turned on a white noise machine to help mask external noise, and left the experimental chamber. Participants then initiated the task by pressing a button on the keypad.

The task consisted of 12, 50-stimulus sequences. Six of the sequences consisted of novel stimuli and the other six of familiar stimuli. The ordering of the 12 the sequences was random across participants. The 50 stimuli within each sequence were also randomly presented to participants. Participants were able to initiate the sequences by pressing a key on a key pad. The first of 50 stimuli appeared 500 ms after participants initiated each sequence. Each stimulus appeared for 700 ms and the inter-stimulus interval was 1300 ms. As previously mentioned, the pictorial stimuli sets used for the ERP session consisted of 50 individuals. The 50 individuals in each set varied on two social dimensions: attractiveness and gender. The experimenter selected a set of 50 familiar stimuli, 35 neutral males, 5 neutral females, 5 unattractive males, and 5 unattractive females and a set of 50 unfamiliar stimuli, 35 neutral males, 5 neutral females, 5 unattractive males, and 5 unattractive females, from the pictures the independent set of 200 participants had previously rated.

The combination of stimuli used allowed for the female and unattractive stimuli to be presented less frequently than the neutral male stimuli (i.e., unattractive and female categories were made inconsistent to evoke a larger peak amplitude of the P3). The context consisted of 35 neutral male stimuli that were dependent on raters' attractiveness, familiarity, and favorability scores of the individuals depicted in the pictures.

3.3.4 Data Acquisition and Reduction

Data acquisition and reduction steps were the same as in experiment 1.

3.4 RESULTS

3.4.1 Behavioral Data

As in study 1, we first analyzed the effect of mode of stimuli presentation (novel/familiar) on gender and evaluative categorizations by examining behavioral data. Error rates were compared between contextually inconsistent and context-consistent stimuli during sequences consisting of novel and those consisting of familiar stimuli. A log linear transformation was first conducted to correct for skewness found in the distribution of accuracy scores (see Bargh & Chartrand, 2000). For ease of interpretation, mean scores are presented in percentages.

Hypothesis 1 – Task-relevant categorizations. As in study 1 error rates were first compared between contextually inconsistent neutral female and context-consistent neutral male stimuli during sequences consisting of novel and those consisting of familiar individuals using a 2 (stimulus type: novel/familiar) X 2 (task-relevant target gender: neutral male/neutral female) ANOVA. Results revealed a target gender effect, F (1, 27) = 23.57, $p < .01$, $\eta^2 = .47$. Participants had greater error rates to inconsistent neutral females (M = 3.27%, SE = .57) than to context-consistent neutral males making up the context (M = .66%, SE = .37). However results also revealed a significant interaction between stimulus type and target gender, F (1, 27) = 13.48, $p <$ .01, $\eta^2 = .34$. Error rates produced by novel neutral males and novel neutral females were similar (M = .36%, SE = .20, and M = .83%, SE = .33, respectively). On the other hand, greater error rates were produced by familiar neutral females (M = 5.71%, SE = 1.08) relative to familiar neutral males (M = .95%, SE = .62) (see Table 1.1), suggesting that the target gender effect found was driven by familiar females and not by novel females.

Hypothesis 2 – Task-irrelevant categorizations. Next we assessed task-irrelevant evaluative categorization processes. Similar to study 1, we compared error rates between contextually inconsistent unattractive male and context-consistent neutral male stimuli during sequences consisting of novel and those consisting of familiar individuals using a 2 (stimulus type: novel/familiar) X 2 (task-irrelevant target evaluation: neutral male/unattractive male) ANOVA. Results revealed a main effect of stimuli type, F (1, 27) = 4.96, $p < .05$, $\eta^2 = .15$. Familiar stimuli produced greater error rates (M = 2.20%, SE = .59) than novel stimuli (M = 1.07%, SE = .25). Results also revealed a main effect of target evaluation, F (1, 27) = 9.43, $p <$ .01, $\eta^2 = .26$. Unattractive males produced greater error rates (M = 2.62%, SE = .58) than context-consistent neutral males (M = .66%, SE = .37) suggesting that although participants were only involved in a gender categorization task, task-irrelevant evaluative categorization took place.

We then assessed task-irrelevant evaluative categorization processes by comparing error rates between contextually inconsistent positive females and negative females. Results revealed a main effect of stimulus type, F (1, 27) = 26.37, $p < .01$, $\eta^2 = .49$. Participants' error rates were greater to familiar stimuli (M = 5.48%, SE = .85) than to novel stimuli (M = 1.07%, SE = .23). No other effect was found.

3.4.2 ERP Data

Hypothesis 1 – Task-relevant categorizations. ERP analyses first focused on the effect of mode of stimulus presentation (novel vs. familiar) on task-relevant gender categorization processes. P3 peak amplitudes were compared between contextually inconsistent female and context-consistent male stimuli during sequences consisting of novel and those consisting of familiar stimuli using a 2 (stimulus type: novel/familiar) X 2 (task-relevant target gender: neutral male/neutral female) X 5 electrode recording site (FCZ, CZ, CPZ, PZ, POZ) ANOVA. Results revealed a main effect of electrode site, F (4, 24) = 20.20, $p < .01$, $\eta^2 = .77$. As in study 1, greater P3 activation was found at the POZ, PZ and CPZ electrodes sites (M = 8.77 µV, SE = .79; M = 10.25 µV, SE = .71; and M = 9.40 µV, SE = .68, respectively) relative to the CZ and FCZ electrode sites (M = 8.35 µV, SE = .69, and M = 6.53 µV, SE = .67, respectively). Therefore, all other analyses focus on CPZ, PZ and POZ electrode sites. As mentioned previously, research that has been recently conducted questions the utility of investigating interactions between recording site and experimental factors (Urbach & Kutas, 2006; 2002). Therefore, we do not report interactions between electrode site and other experimental variables. As hypothesized, results revealed an effect of target gender, F (1, 27) = 91.41, $p < .01$, $\eta^2 = .77$. Target females evoked greater P3 peak amplitude (M = 10.83 µV, SE = .70) in participants than target males (M = 6.49 µV, SE = .60). These results replicate past research using the P3 to examine task-relevant gender categorization processes (Corral et al., in preparation; Crites et al., in preparation), as well as findings from study 1. No other effect was found.

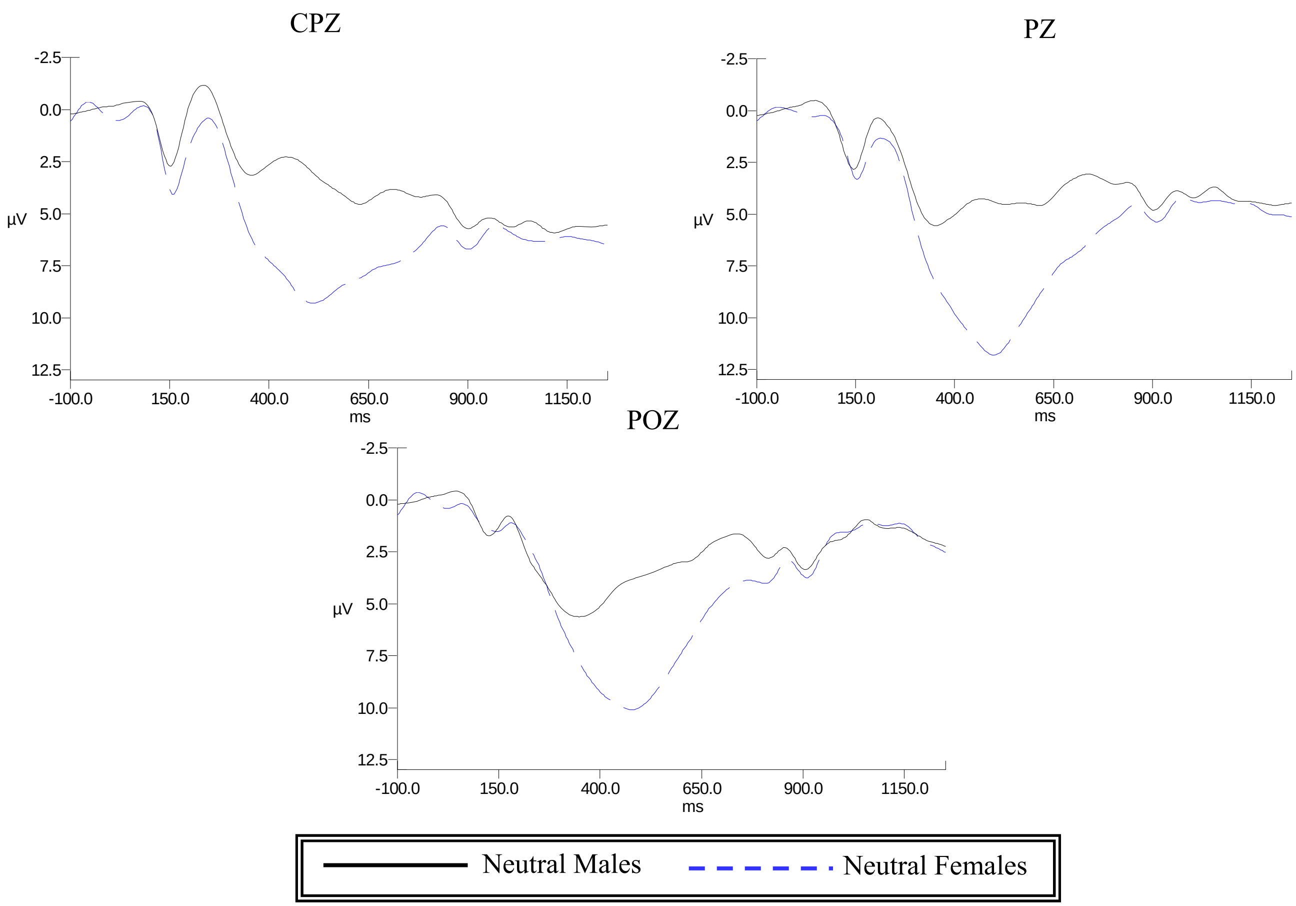
Hypothesis 2 – Task-irrelevant categorizations. As in study 1, we hypothesized that an interaction between stimuli type and target evaluation would be revealed. That is, variations of stimuli attractiveness were expected to be indexed by the P3 during the presentation of novel but not familiar stimuli. In order to assess the effect of mode of stimuli presentation on task-irrelevant categorizations, we used a 2 (stimulus type: novel/familiar) X 2 (task-irrelevant target evaluation: neutral male/unattractive male) X 3 electrode recording site (CPZ, PZ, POZ) ANOVA. Results revealed an effect of task-irrelevant evaluative categorization, F (1, 27) = 6.38, $p < .05$, $\eta^2 = .19$. Context inconsistent unattractive males produced larger P3s (M = 8.13 μV, SE = .74) than context consistent neutral males (M = 7.08 μV; SE = .67). No interaction was found between stimulus type and target evaluation, F (1, 27) = .03, p = .86. The results suggest that although categorization of target attractiveness was not relevant to the task, it took place similarly for both novel and familiar stimuli.

We also assessed task-irrelevant evaluative categorization processes by comparing contextually inconsistent neutral females to unattractive females. Results revealed a main effect of target evaluation, F (1, 27) = 6.97, $p < .01$, $\eta^2 = .21$. Neutral females evoked larger P3 peak amplitude in participants (M = 10.83 μV, SE = .70) than unattractive females (M = 10.05 μV, SE = .73), suggesting that variations of attractiveness affect evaluative categorization processes even when noting attractiveness differences in stimuli is not relevant to the task.

Table 2.1: Error rates of behavioral responses to target neutral male and neutral female novel and familiar stimuli

Error Rates to Target Gender by Stimuli Type		
Stimuli	**Novel**	**Familiar**
Males	0.83%	0.95%
Females	0.36%	5.71%

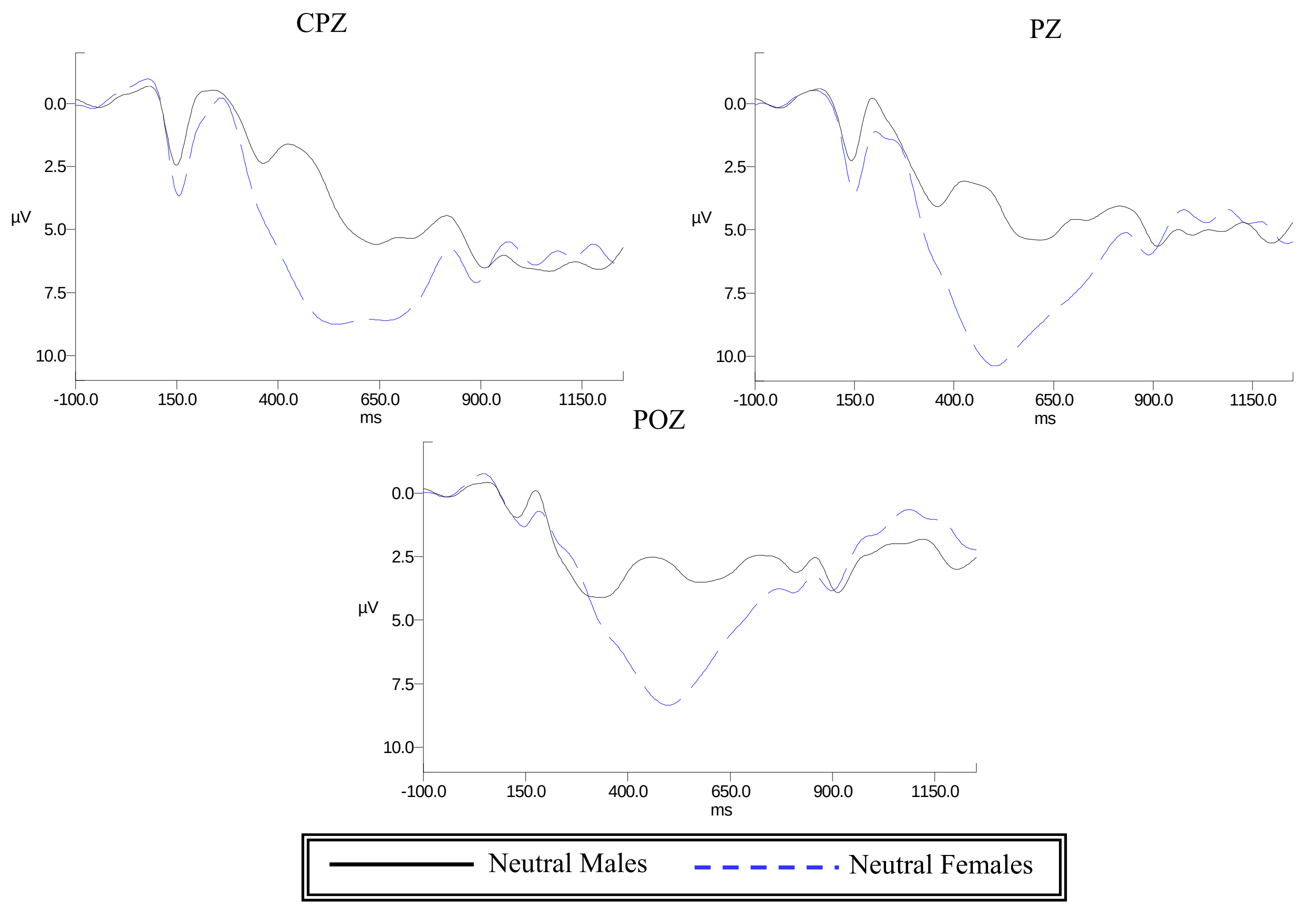
Novel



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

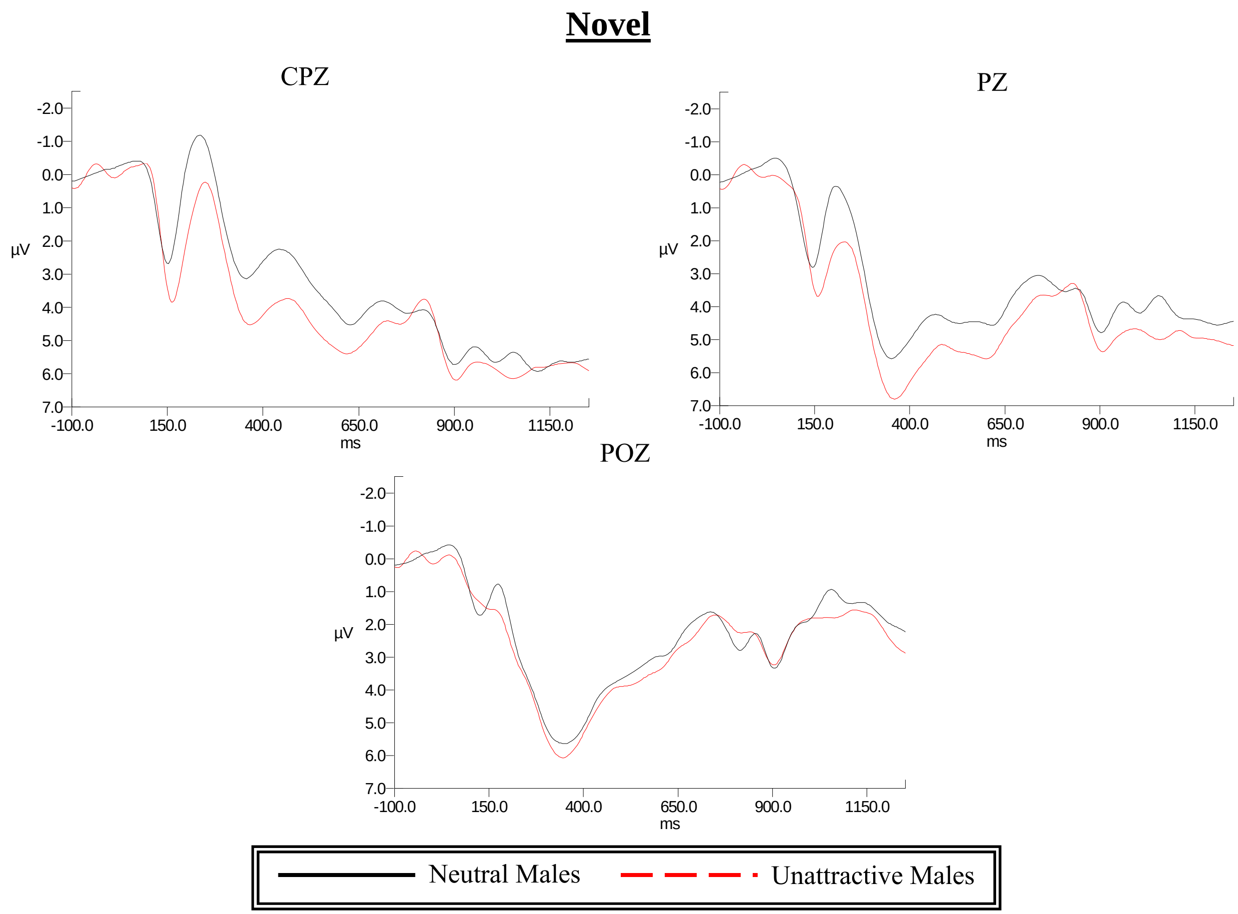
Figure 2.1: P3 peak amplitude to task-relevant categorization processes during the presentation of novel stimuli: Context consistent positive males versus inconsistent positive females.

Familiar



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

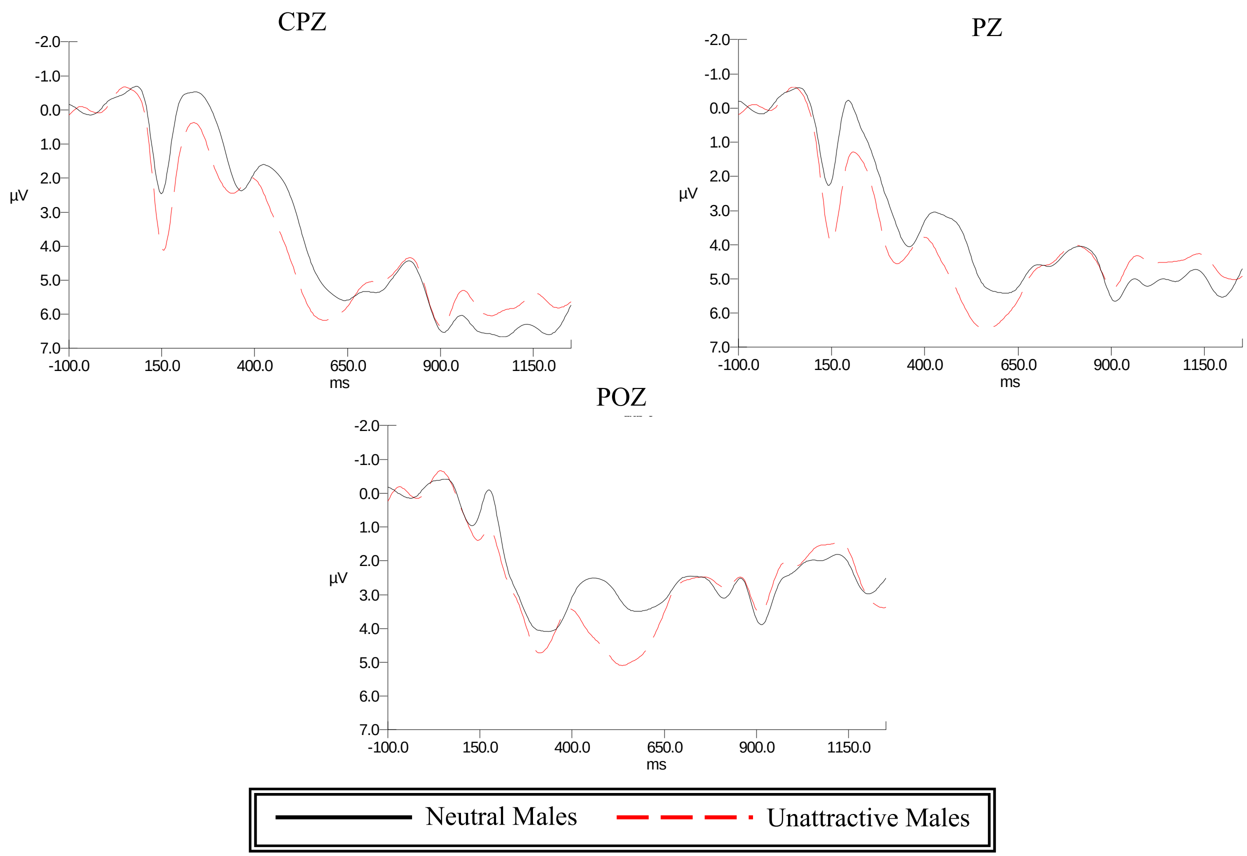
Figure 2.2: P3 peak amplitude to task-relevant categorization processes during the presentation of familiar stimuli: Context-consistent positive males versus inconsistent positive females.



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

Figure 2.3: P3 peak amplitude to task-irrelevant categorization processes during the presentation of novel stimuli: Context consistent positive males versus inconsistent negative males.

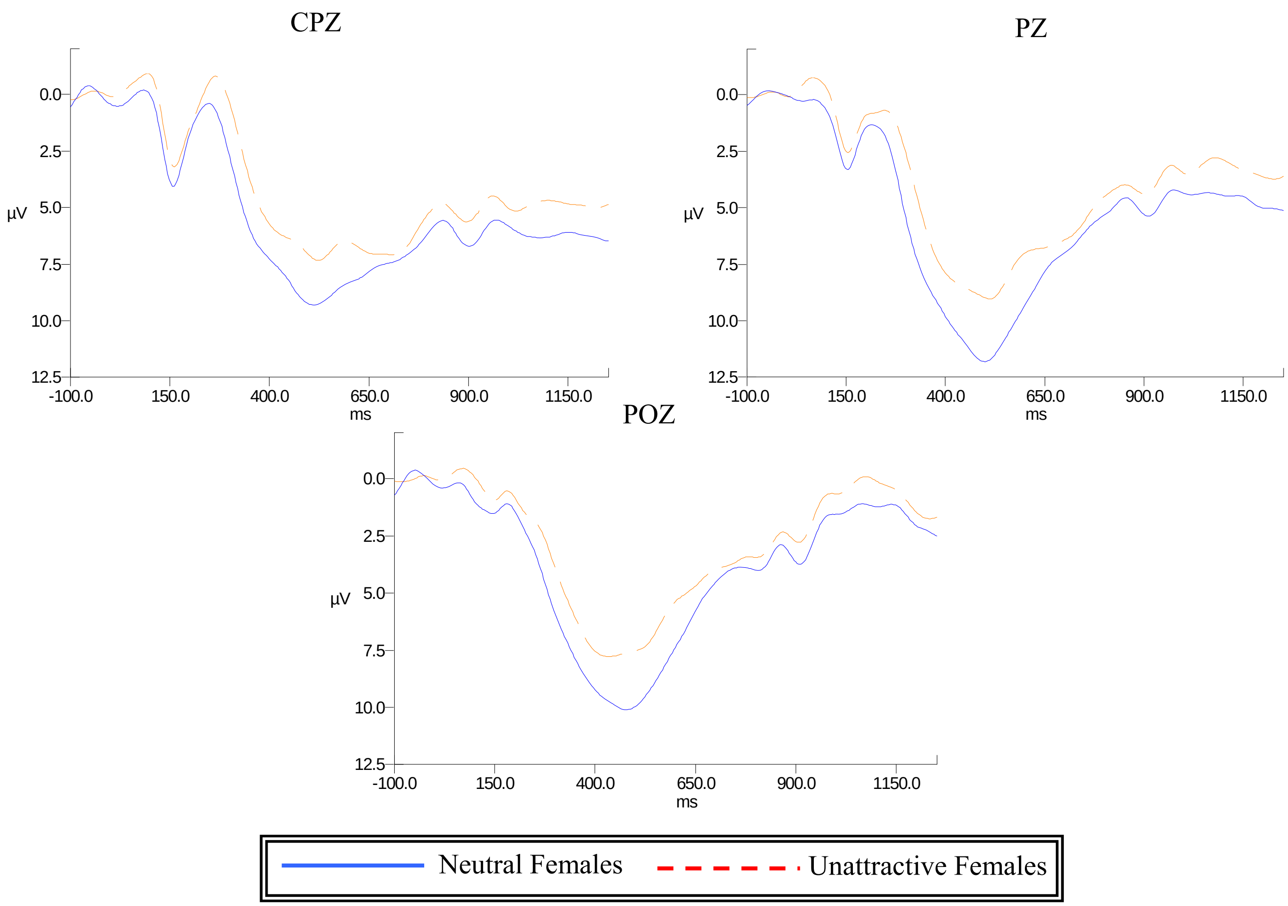
Familiar



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

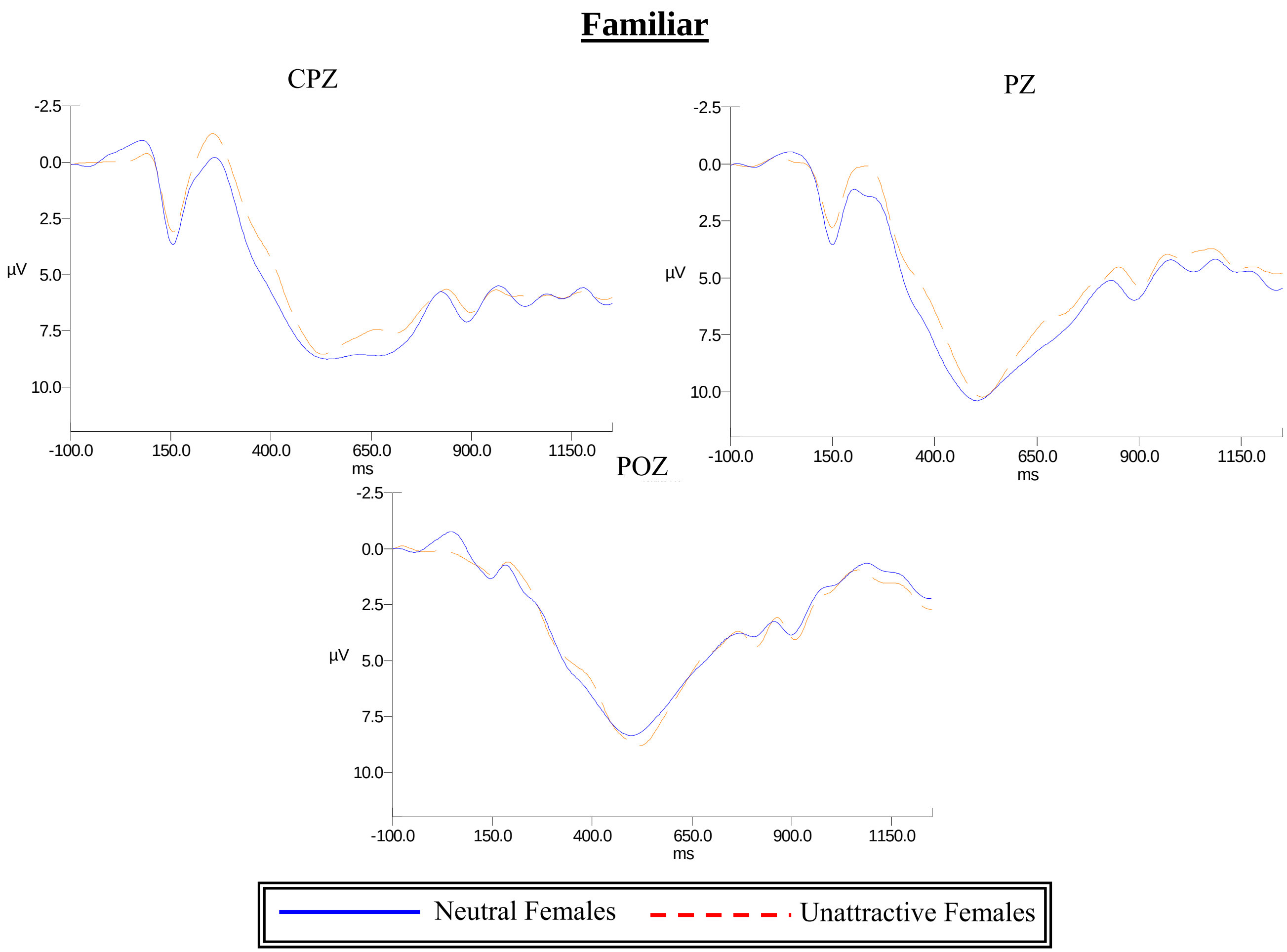
Figure 2.4: P3 peak amplitude to task-irrelevant categorization processes during the presentation of familiar stimuli: Context consistent positive males versus inconsistent negative males.

Novel



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

Figure 2.5: P3 peak amplitude to task-irrelevant categorization processes during the presentation of novel stimuli: Context inconsistent positive females versus negative females.



Note: Microvolts are presented on the Y axis, with positives going down, and milliseconds are presented on the X axis.

Figure 2.6: P3 peak amplitude to task-irrelevant categorization processes during the presentation of familiar stimuli: Context inconsistent positive females versus negative females.

3.5 DISCUSSION – STUDY 2

We expected results from study 2 to reveal task-relevant categorization of gender during the presentation of both familiar and novel stimuli, replicating findings from study 1. On the other hand, task-irrelevant categorizations of attractiveness were expected to be indexed by the P3 only during the presentation of novel stimuli, and not during the presentation of familiar stimuli. That is, even though participants were not engaged in an evaluation task, unattractive males were also expected to evoke larger P3s than frequently presented neutral males during the presentation of novel stimuli, but not familiar stimuli. This finding would suggest that novelty/familiarity of a perceived entity is a main factor in eliciting automatic, or unintentional, evaluative processing.

Replicating results from study 1, the P3 showed evidence of task-relevant categorizations of gender. Females (regardless of attractiveness) varying from the context on the gender dimension evoked significantly larger P3s in participants than neutral males that were consistent with the context, during the presentation of both novel and familiar stimuli. Findings also revealed task-irrelevant categorization of attractiveness. Unattractive males that were inconsistent with the context evoked larger P3s than neutral males consistent with the context, regardless of novelty/familiarity of the stimuli; the interaction that was hypothesized between stimulus type and task-irrelevant evaluative categorizations was not found. These findings suggest that task-irrelevant, evaluative categorical processing occurs similarly for both familiar and novel stimuli. Thus, novelty/familiarity of stimuli is not the driving factor influencing results from previous research producing opposing findings on evaluative categorization processes using the P3 (Ito & Cacioppo, 2000; Crites et al., 1996; Corral et al., in preparation; Crites et al., in preparation).

Chapter 4: General Discussion

The main purpose of the present research was to examine task-irrelevant evaluative categorization processes by using the P3 as a measure of assessment. The evaluative categorization (as either positive or negative, good or bad) of perceived entity is believed to influence behavioral responses that are important for individuals' survival (avoid or approach responses), as well as for their long-term goals (see Fazio, 2000; Katz, 1960; Pratkanis, Breckler, & Greenwald, 1989; Shavit, 1990; Smith, Bruner & White, 1956). Therefore, this research aimed to shed light on whether evaluative categorical processing is influenced by the nature of the stimulus presented (e.g. picture vs. word and novel vs. familiar). Past research using the P3 to examine task-irrelevant evaluative categorization processes has produced mixed results. Researchers who used novel pictures as stimuli have found that the P3 is sensitive to unintentional evaluative categorical processes (Ito and Cacioppo, 2000; Crites et al., in preparation) whereas researchers using familiar words did not (Crites & Cacioppo, 1996; Corral et al., in preparation). These mixed findings leads us to question whether unintentional categorical processing is influenced by the use of pictorial versus verbal stimuli or the use of novel versus familiar stimuli.

The first study analyzed whether pictorial stimuli, as opposed to verbal stimuli, are more effective at eliciting unintentional evaluative categorization. We examined the effect of type of stimulus on the activation of task-irrelevant evaluative categorization by using names and pictures of well-known males and females that the participants personally liked or disliked. The stimuli varied along both gender (task-relevant) and evaluative (task-irrelevant) dimensions. However, participants were asked to categorize the stimuli only along the task-relevant gender dimension.

Study 1 extends findings from prior research on categorical processing by demonstrating that unintentional, or task-irrelevant, evaluative categorizations are not influenced differentially with the presentation of pictures versus words. The results revealed evidence of task-irrelevant evaluative categorization processes, yet, it was the frequently presented positive males that evoked larger P3s than infrequent negative males. However, this effect was not conditioned on whether the stimuli were pictorial or verbal. The P3 results also revealed task-relevant categorization of gender. Target females that varied from the context on the task-relevant gender dimension produced larger P3 peak amplitudes than the frequently presented males during the presentation of both pictures and names. This finding supports past research using the P3 to examine task-relevant categorical processing of gender (Corral et al., in preparation; Crites et al., in preparation).

The objective of study 2 was to examine whether differences found in previous studies examining task-irrelevant evaluative categorizations (Crites et al., 1996; Ito & Cacioppo, 2000; Corral et al., in preparation) were, therefore, a result of individuals differentially evaluating novel compared to familiar stimuli. We used a design similar to the one used in study 1 to examine the effect of novelty/familiarity of stimuli on task-irrelevant evaluative categorical processing, however with two exceptions: 1) we used only pictures to present the stimuli and 2) stimuli were normed on attractiveness by an independent set of raters so as to avoid participants' familiarization with the novel set of stimuli.

The P3 results showed evidence of task-irrelevant evaluative categorization processing but the evidence was not exclusive to novel stimuli. The results revealed a main effect of task-irrelevant target evaluation with unattractive males evoking larger P3 peak amplitudes than neutral males, and neutral females evoking larger P3 peak amplitudes than unattractive females, during the presentation of both novel and familiar stimuli. Behavioral results also showed a task-irrelevant evaluative categorization effect for target males, with unattractive males producing lower accuracy scores than neutral males; these behavioral results were also not dependent on type of stimuli.

Replicating findings from study 1, the P3 results showed evidence of task-relevant gender categorization. Context inconsistent females evoked larger P3 peak amplitudes than context consistent males. Behavioral results also showed an effect of task-relevant target gender categorization; however, the effect was driven by familiar females. That is, familiar females produced lower accuracy scores than familiar males in participants whereas novel females produced similar accuracy scores to those produced by novel males.

Findings from the present studies suggest that the difference in results found by past research examining task-irrelevant evaluative categorical processing was not due to either the use of pictorial versus verbal stimuli or novel versus familiar stimuli. Opposing findings may instead be due to other differences in stimuli used. Ito and Cacioppo (2000), for example, found evidence of task-irrelevant evaluative categorizations by using selected stimuli from the International Affective Picture System (IAPS: Center for the Study of Emotion and Attention, 1995) that varied on evaluative (positive/negative) and non-evaluative dimensions (people/no people). Crites and Cacioppo (1996) also used stimuli that varied on evaluative (positive/negative) and non-evaluative (foods that were vegetables or non-vegetables) dimensions but did not find evidence of task-irrelevant categorizations. The feelings or emotions that are elicited by the stimuli used by Ito and Cacioppo (2000), however, may be different than those elicited by the stimuli used by Crites and Cacioppo (1996). For example, individuals may pay more attention to animals that elicit fear or negative emotions (e.g. spiders, snakes, etc.) than those that elicit positive emotions (bunnies, puppies, etc.) because such animals would threaten their safety and survival, thus highlighting a negativity bias in motivational significance (see Ito, Larsen, Smith & Cacioppo, 1998). Negative foods, on the other hand, may not be perceived as threatening by individuals.

In addition, the abstractness versus concreteness of evaluative laden features or characteristics of the stimuli used in the different studies may also play a role in how individuals process evaluative information. Crites et al. (in preparation) and study 2 of the present research varied the stimuli on attractiveness while Crites & Cacioppo (1996) and Corral et al. (in preparation) varied the stimuli on the unique attitudinal ratings of participants. Characteristics that define attractiveness in individuals may be more concrete (e.g. huge nose, asymmetrical features, bad skin, etc.) and easily identifiable than those that make up attitudes towards individuals (e.g. the perception of a person as nice, sincere, rude, self-centered, etc.) or other entities (e.g. food perceived as tasting good, bland, spicy, etc.). Thus, stimuli that are composed of more concrete characteristics may be more efficient at eliciting task-irrelevant evaluative categorizations than stimuli composed of more abstract characteristics.

The findings from the present research regarding target attractiveness have important implications. For example, some researchers argue that upon perceiving individuals, we may categorize them automatically (Allport, 1954), especially by the more practiced or dominant social dimensions (e.g. gender, race and age) (Brewer, 1988; Fiske, 1998; Fiske & Neuberg, 1990). The processing of individuals' attractiveness, however, also seems to happen automatically and this may affect behavior towards the individuals being perceived. Past research, for example, has found that attractive individuals may have more promising experiences in the labor market than unattractive individuals (Andreoni & Petrie, 2008).

Individuals' attractiveness may also play a role in the criminal justice system. That is, jurors may punish defendants more severely if their criminal victims are attractive relative to unattractive (Callan & Ellard, 2007). In addition, research has found that defendants that are unattractive may also receive more severe sentences than defendants that are attractive; however, attractiveness may interact with other basic defendant and juror characteristics (e.g., gender and race) (Abwender & Hough, 2001). Public policy has attempted to address discrimination based on individual's gender, race and age; however, the present research suggests that individual's attractiveness may also play an important role in how we behave towards individuals, thus meriting further attention.

In sum, the present research adds to the body of literature on categorical processing by showing that task-irrelevant evaluative categorization processes are not directly influenced by whether the type of stimulus presented is pictorial versus verbal or novel versus familiar. That is, pictures and novel stimuli were not found to have preferential access to an evaluative system relative to words and familiar stimuli. However, the present findings imply that the motivational significance of the stimulus perceived, as well as the abstractness or concreteness of features or characteristics composing the stimulus, may have an affect on how individuals processes evaluative laden stimuli and on the efficiency with which these are categorized, even when it is irrelevant to task goals. Therefore, we call for future research to examine the influence these factors may have on task-irrelevant categorical processing.

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Appendix A

Pre-Session Stimuli List

Alanis Morissette
Alejandra Guzman
Alicia Keys
Alicia Silverstone
Alyson Hannigan
Alyssa Milano
Amanda Bynes
Amanda Peet
America Ferrera
Amy Poehler
Amy Winehouse
Angelina Jolie
Angie Harmon
Anna Nicole Smith
Anna Paquin
Anne Hathaway
Anne Robinson
Ashlee Simpson
Ashley Olsen
Audrey O'Day
Audrey Hepburn
Avril Lavigne
Barbara Eden
Barbara Streisand
Barbara Walters
Belinda Peregrin
Beyonce Knowles
Brett Butler
Brigitte Nielsen
Britney Spears
Brittany Snow
Brooke Hogan
Brooke Shields
Calista Flockhart
Cameron Diaz
Candace Cameron
Candice Bergen
Caprice Bourret
Carrie Underwood
Cate Blanchett
Catherine Zeta Jones
Celine Dion
Cher
Christina Aguilera
Christina Applegate
Christina Milian
Cindy Crawford
Cindy Lauper
Condoleezza Rice
Courtney Cox-Arquette
Courtney Love
Cristina Saralegui
Cynthia Nixon
Danielle Fishel
Demi Moore
Denise Richards
Denisse Guerrero
Drew Barrymore
Elisabeth Hasselbeck
Elisha Cuthbert
Ellen Degeneres
Ellen Page
Eva Longoria-Parker
Eva Mendes
Famke Janssen
Farrah Fawcett
Fergie
Fiona Apple
Fran Drescher
Germaine Greer
Gillian Anderson
Gloria Estefan
Gloria Trevi
Goldie Hawn
Gwen Stefani
Gwyneth Paltrow
Halle Berry
Heather Locklear
Heidi Fleiss
Heidi Klum
Helen Hunt
Hillary Clinton
Hillary Duff
Jada Pinkett Smith
Jamie Lynn Spears
Janeane Garofalo
Jane Curtin
Jane Krakowski
Jane Leeves
Janet Jackson
Janis Joplin
Jenna Elfman
Jenna Jameson
Jenna Von Oy
Jennifer Aniston
Jennifer Garner
Jennifer Hudson
Jennifer Lopez
Jennifer Love Hewitt
Jessica Alba
Jessica Simpson
Jessica Tandy
Jodie Foster
Julia Louis-Dreyfus
Julia Roberts
Kate Beckinsale
Kate del Castillo
Kate Hudson

Kate Moss
Kate Winslet
Katherine Heigl
Kathy Ireland
Kathie Lee Gifford
Katie Couric
Katie Holmes
Katy Perry
Katy Sagal
Keira Knightley
Kelly Clarkson
Kelly Osbourne
Kelly Ripa
Kim Basinger
Kim Catrall
Kim Jong-il
Kim Kardashian
Kirsten Dunst
Kirstie Alley
Kristen Johnson
Kristen Kreuk
Kristin Davis
Laura Flynn Boyle
Laura Prepon
Lauren Conrad
Linda Blair
Linda Carter
Lindsay Lohan
Lisa Kudrow
Liv Tyler
Lucille Ball
Lucy Lawless
Lucy Lui
Madonna
Maggie Gyllenhaal
Maite Perroni
Mandy Moore
Maria Elena Salinas
Mariah Carey
Marilyn Monroe
Martha Stewart
Mary Kate Olsen
Megan Fox
Meg Ryan
Melissa Joan Hart
Mena Suvari
Michelle Obama
Mila Kunis
Miley Cyrus
Mischa Barton
Monica Lewinsky
Natalie Imbruglia
Natalie Maines
Natalie Portman
Nicole Kidman
Nicole Richie
Nikki Hilton
Omarosa Stallworth
Oprah Winfrey
Pamela Anderson
Paris Hilton
Patricia Arquette
Patricia Richardson
Paula Abdul
Paulina Rubio
Pink
Portia DeRossi
Queen Latifah
Rachael Ray
Rachel Bilson
Rachel McAdams
Reese Witherspoon
Renee Zellweger
Rihanna
Rosanna Arquette
Roseanne Barr
Rose McGowan
Rosie O' Donnel
Sally Jesse Raphael
Salma Hayek
Sandra Bullock
Sara Gilbert
Sarah Jessica Parker
Sarah Michelle Gellar
Sarah Palin
Scarlett Johansson
Selena
Serena Williams
Shakira
Sharon Osbourne
Sienna Miller
Sinéad O'Connor
Suzanne Somers
Tammy Faye Messner
Tara Reid
Tea Leoni
Thalia
Tila Tequila
Tina Fey
Tyra Banks
Uma Thurman
Vanessa Hudgens
Vanessa Williams
Venus Williams
Victoria Beckham
Whoopi Goldberg
Winona Ryder
Yasmine Bleeth
Yoko Ono
50 Cent
Adam Sandler
Akon
Alejandro Fernandez
Alex Rodriguez
Al Franken
Al Gore
Allen Iverson
Al Sharpton
Anderson Cooper
Andre Agassi

Andrew Dice Clay
Anthony Hopkins
Antonio Banderas
Apolo Anton Ohno
Arnold Schwarzenegger
Axl Rose
Barack Obama
B.B. King
Beck
Ben Affleck
Ben Savage
Ben Stiller
Bill Clinton
Bill Cosby
Bill Gates
Bill Maher
Bill Murray
Bill O'Reilly
Billy Bob Thornton
Billy Corgan
Billy Crystal
Bobby Knight
Bob Dole
Bob Hope
Bob Marley
Bob Ross
Bob Saget
Bono
Bow Wow
Brad Pitt
Brian Austin Green
Brian McBride
Bronson Pinchot
Bruce Campbell
Bruce Lee
Bruce Springsteen
Bruce Willis
Burt Reynolds
Carlos Mencia
Carlos Salinas de Gortari
Carlos Santana
Carson Daly
Carson Kressley
Cat Stevens
Cat Stevens
Channing Tatum
Charles Manson
Charlie Sheen
Charlton Heston
Chris Brown
Chris Farley
Chris Martin
Chris Rock
Christian Chavez
Christopher Knight
Christopher Walken
Chris Tucker
Cindy McCain
Colin Farrell
Colin Powell
Common
Conan O'Brien
Cuauhtemoc Blanco
Dan Marino
Danny Devito
Dan Rather
Dave Chappelle
Dave Navarro
David Beckham
David Cross
David Koresh
David Letterman
David Spade
Deion Sanders
Dennis Miller
Dennis Rodman
Denzel Washington
Derek Jeter
Dick Cheney
Diego Luna
Donald Rumsfeld
Donald Trump
Donovan McNabb
Drake Bell
Drew Carey
Dr. Phil McGraw
Dwayne Johnson
Ed McMahon
Edward Norton
Eli Manning
Elton John
Eminem
Emmitt Smith
Enrique Iglesias
Felipe Calderon
Fidel Castro
Frankie Muniz
Frank Sinatra
Fred Durst
Gael Garcia Bernal
Garth Brooks
Gary Busey
Gene Simmons
George Carlin
George Lopez
George W. Bush
Geraldo Rivera
Glenn Danzig
Harrison Ford
Heath Ledger
Henry Rollins
Howard Dean
Howard Stern
Hugh Hefner
Hugh Jackman
Hugo Chavez
Hulk Hogan
Ice Cube
Ike Turner
Jack Black

Jackie Chan
Jack Osbourne
Jaime King
Jai Rodriguez
Jake Gyllenhaal
Jaleel White
James Hetfield
Jamie Foxx
Ja Rule
Jay Leno
Jay Z
Jean Claude Van Damme
Jeff Gordon
Jeffrey Dahmer
Jeremy Edwards
Jerry Falwell
Jerry Garcia
Jerry Lewis
Jerry Manthey
Jerry Rice
Jerry Seinfeld
Jesse Jackson
Jim Belushi
Jim Carrey
Jimi Hendrix
Jim Morrison
Jimmy Carter
Jimmy Kimmel
Joe Biden
Joe Jonas
Joe Montana
John Belushi
John Cusack
John Edwards
John F. Kennedy
John Kerry
John Lennon
John Malkovich
John Mayer
John McCain
John McCrick
Johnny Depp
Johnny Knoxville
John Roberts, Jr.
John Stamos
John Travolta
Jonathan Davis
Jon Bon Jovi
Jon Stewart
Jorge Ramos
Juanes
Juan Gabriel
Jude Law
Julio Iglesias
Justin Timberlake
Kanye West
Karl Rove
Keanu Reeves
Kelsey Grammer
Ken Lay
Kevin Bacon
Kevin Jonas
Kevin Smith
Kirk Cameron
Kobe Bryant
Kuno Becker
Kurt Cobain
Kyan Douglas
Lance Bass
Landon Donovan
Larry King
Lars Ulrich
LeBron James
Leonardo DiCaprio
Lil Wayne
Lionel Richie
Ludacris
Luis Miguel
Lyndon B. Johnson
Mark Anthony
Mark Linn-Baker
Mark Wahlberg
Martin Luther King, Jr.
Martin Sheen
Matt Damon
Matthew Broderick
Matthew McConaughey
Mel Gibson
Michael Cera
Michael Douglas
Michael Jackson
Michael J. Fox
Michael Jordan
Michael Keaton
Michael Moore
Michael Phelps
Michael Stipe
Mike Myers
Mike Tyson
Milo Ventimiglia
Mister Rogers
Moby
Morgan Freeman
Muhammad Ali
Nelly
Ne-Yo
Nick Jonas
Nick Lachey
Nicolas Cage
Notorious B.I.G.
O.J. Simpson
Omar Epps
Omarion
Osama Bin Laden
Oscar de la Hoya
Ozzy Osbourne
Pat Robertson
Paul Newman
Paul Reubens
Paul Walker

P. Diddy
Pepe Aguilar
Peri Gilpin
Peter Jackson
Peyton Manning
Pharrell Williams
Phil Jackson
Pierce Brosnan
Poncho Herrera
Pope Benedict XVI
Pope John Paul II
Quentin Tarantino
Rafael Marquez
Ralph Nader
Randy Jackson
Ray Charles
Reginald Veljohnson
Regis Philbin
Richard Gere
Richard Nixon
Richard Ramirez
Richard Simmons
Rick James
Ricky Martin
R. Kelly
Robert DeNiro
Robert Downey, Jr.
Robert Smith
Robin Williams
Rob Zombie
Roger Moore
Ronald Reagan
Ron Jeremy
Ross Perot
Rush Limbaugh
Russell Crowe
Ryan Nyquist
Ryan Reynolds
Ryan Seacrest
Ryan Stiles
Saddam Hussein
Sammy Sosa
Samuel L. Jackson
Scott Peterson
Sean William Scott
Seth Rogen
Shaquille O'Neal
Shawn Michaels
Shia Lebouf
Simon Cowell
Snoop Dogg
Spike Lee
Stephen Colbert
Stephen King
Steve Buscemi
Steve Carell
Steve Harvey
Steven Spielberg
Strom Thurmond
Sylvester Stallone
Taylor Swift
Ted Bundy
Ted Nugent
Terrell Owens
Tim Burton
Tim Robbins
Tobey Maguire
Tom Arnold
Tom Brady
Tom Brokaw
Tom Cruise
Tom Green
Tom Hanks
Tommy Lee
Tommy Lee Jones
Tom Welling
Tony Blair
Tony Hawk
Tony Romo
T-Pain
Travis Barker
Trent Reznor
Troy Aikman
Tucker Carlson
Tupac Shakur
Tyson Beckford
Usher
Vanilla Ice
Vicente Fernandez
Vicente Fox
Vin Diesel
Weird Al Yankovic
Wentworth Miller
Willie Nelson
Will Smith
Woody Allen
Woody Harrelson
Yo Yo Ma
Zach Braff
Zac Efron

Appendix B

Pilot Study Stimuli Ratings of Public Figures

	Familiarity N = 72		Attractiveness N = 64		Favorability N = 64	
Stimuli	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Aaron Ashmore	0.71	1.92	0.16	1.45	0.52	1.58
Adam Sandler	2.69	0.94	0.17	1.39	1.20	1.53
Alejandra Guzman	-0.60	2.71	-0.98	1.41	0.03	1.78
Alejandro Fernandez	0.49	2.47	0.67	1.31	0.41	1.79
Allison Mack	-0.07	2.43	1.02	1.27	1.14	1.37
Alyson Hannigan	1.62	1.97	-0.05	1.48	0.73	1.43
Alyssa Milano	1.03	2.24	1.61	1.32	1.58	1.23
Amanda Bynes	2.21	1.50	1.25	1.52	1.47	1.25
Amanda Peet	1.51	1.75	1.45	1.39	1.11	1.57
Amy Poehler	1.53	1.89	0.09	1.29	0.72	1.45
Amy Winehouse	1.50	2.10	-1.51	1.57	-0.83	1.72
Anderson Cooper	0.36	2.35	0.77	1.84	0.88	1.46
Andre Agassi	0.31	2.34	0.02	1.51	0.75	1.43
Angelina Jolie	2.79	0.80	2.05	1.46	1.72	1.52
Anna Lynne McCord	-0.04	2.04	1.22	1.45	1.05	1.29
Anna Paquin	0.47	2.11	0.73	1.58	0.73	1.49
Anne Hathaway	2.31	1.44	1.08	1.45	1.56	1.32
Anthony Kiedis	-0.59	2.39	-1.17	1.40	-0.48	1.75
Antonio Banderas	2.49	1.39	1.02	1.42	1.28	1.57
Apolo Anton Ohno	-0.71	2.29	-0.66	1.59	-0.39	1.53
Ashlee Simpson	2.28	1.24	1.53	1.36	1.25	1.45
Audrey O'Day	0.64	2.25	1.22	1.29	0.70	1.54
Avril Lavigne	2.47	1.19	1.45	1.47	1.13	1.60
Beck	-1.32	2.06	-1.00	1.43	-0.52	1.66
Becki Newton	-0.14	2.21	1.39	1.26	1.31	1.23
Ben Affleck	2.14	1.65	1.00	1.74	1.03	1.46
Benicio del Toro	0.79	2.26	-0.92	1.73	-0.38	1.73
Ben Stiller	2.55	1.17	0.39	1.36	1.30	1.52
Bethany Joy Galleati	0.13	1.94	0.81	1.56	1.06	1.22
Bill Murray	1.99	1.80	-0.97	1.48	0.30	1.83
Billy Corgan	-1.01	2.19	-0.94	1.49	-0.28	1.35
Blake Lively	0.31	2.16	1.17	1.43	1.20	1.35
Bob Saget	1.74	1.90	-0.86	1.60	0.33	1.65
Bono	1.83	2.04	-0.72	1.36	0.08	1.80
Brad Pitt	2.63	1.15	1.66	1.70	1.63	1.57

Brian Austin Green	-0.24	2.11	0.53	1.61	0.50	1.57
Britney Spears	2.82	0.54	1.31	1.47	0.98	1.75
Brittany Snow	1.06	2.02	1.59	1.35	1.41	1.32
Bronson Pinchot	-0.71	2.24	-0.68	1.42	-0.09	1.41
Brooke Shields	1.43	2.04	0.77	1.67	0.81	1.67
Bruce Campbell	-0.32	2.15	-1.03	1.61	0.17	1.60
Bruce Willis	2.63	0.98	0.83	1.55	1.42	1.62
Calista Flockhart	1.05	1.86	0.11	1.49	0.42	1.37
Cameron Diaz	2.70	0.68	1.22	1.61	1.64	1.35
Carrie Underwood	1.97	1.58	2.08	1.17	1.84	1.36
Carson Daly	1.26	2.23	0.02	1.33	0.63	1.58
Carson Kressley	-0.35	2.31	-0.95	1.50	-0.08	1.60
Cate Blanchett	0.61	2.14	0.89	1.40	1.02	1.42
Catherine Zeta Jones	2.37	1.30	2.13	1.24	1.81	1.33
Celine Dion	0.50	2.36	0.56	1.59	0.36	1.58
Channing Tatum	0.49	2.38	1.22	1.66	0.70	1.84
Charlie Sheen	1.89	1.74	-0.13	1.53	0.66	1.55
Chase Crawford	0.07	2.18	1.39	1.59	1.03	1.60
Cher	1.67	2.21	-0.41	1.68	0.31	1.75
Chris Martin	-0.19	2.35	-0.42	1.60	0.20	1.47
Christina Aguilera	2.11	1.65	0.73	1.50	0.69	1.92
Christina Applegate	1.84	1.71	1.19	1.42	1.28	1.33
Christina Ricci	2.13	1.45	0.28	1.36	0.98	1.44
Christopher Cuomo	-0.71	2.01	0.02	1.25	0.20	1.37
Christopher Knight	0.10	2.49	-0.83	1.40	0.14	1.54
Christopher Walken	2.26	1.38	-1.25	1.67	0.33	1.87
Cindy Crawford	1.49	1.89	1.44	1.41	1.14	1.36
Cindy Lauper	-0.11	2.21	-1.09	1.38	-0.09	1.46
Claire De Ravin	-1.29	2.01	0.83	1.53	0.56	1.61
Clint Howard	-0.18	2.53	-2.36	1.12	-1.23	1.67
Clive Owen	0.65	2.34	0.73	1.65	0.67	1.44
Colin Farrell	2.18	1.47	1.41	1.63	1.11	1.65
Conan O' Brien	1.04	2.40	-1.20	1.69	0.06	1.78
Courtney Cox Arquette	1.68	1.93	1.34	1.41	1.22	1.50
Courtney Love	0.10	2.43	0.19	1.75	0.11	1.43
Cynthia Nixon	1.36	2.08	0.02	1.57	0.53	1.66
Danielle Fishel	1.21	1.97	0.43	1.55	0.39	1.51
Dan Marino	0.48	2.41	-0.88	1.55	0.08	1.63
Danny Trejo	1.32	2.11	-1.80	1.63	-0.31	2.12
Dave Navarro	0.73	2.50	-0.80	1.66	-0.83	1.84
David Beckham	1.79	1.82	1.71	1.73	1.35	1.56

David Spade	1.89	1.86	-0.64	1.56	0.64	1.66
Demi Moore	2.31	1.33	1.53	1.26	1.23	1.31
Denise Richards	1.86	1.57	0.94	1.57	0.83	1.56
Diego Luna	0.42	2.48	0.56	1.56	0.77	1.72
D J Qualls	1.10	2.17	-1.61	1.38	-0.17	1.88
Donatella Versace	-0.78	2.35	-2.30	1.23	-1.70	1.54
Drake Bell	1.76	1.95	0.23	1.69	0.39	1.70
Drew Barrymore	2.17	1.67	1.03	1.17	1.28	1.30
Edward Norton	1.51	1.92	0.19	1.61	0.97	1.44
Ed Westwick	-0.40	2.27	0.06	1.42	0.25	1.63
Eli Manning	-0.07	2.55	0.41	1.44	0.50	1.53
Ellen Page	1.84	1.76	1.36	1.34	1.73	1.22
Elton John	0.63	2.43	-1.56	1.54	-0.52	1.75
Eminem	2.30	1.49	0.02	1.80	0.00	1.81
Enrique Iglesias	2.22	1.68	0.64	1.60	0.28	1.79
Erica Durance	-0.11	2.12	1.56	1.19	1.38	1.23
Eric Dane	0.33	2.22	1.63	1.65	1.41	1.58
Evan Rachel Wood	-0.53	2.14	1.72	1.27	1.67	1.32
Fergie	2.43	1.21	0.45	1.70	0.34	1.55
Fran Drescher	0.48	2.31	0.27	1.57	0.72	1.44
Frankie Muniz	2.25	1.35	-0.38	1.36	0.44	1.36
Gael Garcia Bernal	0.49	2.52	1.19	1.69	1.17	1.54
Gary Busey	0.81	2.14	-1.77	1.53	-0.98	1.54
Gene Simmons	0.26	2.56	-1.83	1.56	-0.89	1.65
Goldie Hawn	1.33	1.97	-0.02	1.52	0.00	1.60
Greg Grunberg	-1.74	1.98	-0.52	1.26	-0.23	1.35
Gwen Stefani	2.43	1.38	1.13	1.61	1.22	1.52
Gwyneth Paltrow	2.25	1.31	1.36	1.19	1.33	1.47
Heather Locklear	1.67	1.73	1.34	1.45	1.06	1.54
Heath Ledger	1.96	1.92	1.22	1.54	1.17	1.66
Heidi Fleiss	-1.10	2.03	-0.81	1.38	-0.31	1.69
Heidi Klum	1.41	1.88	1.78	1.40	1.61	1.38
Helena Bonham Carter	0.54	2.20	0.41	1.14	0.44	1.64
Helen Hunt	1.14	2.12	-0.10	1.40	0.59	1.62
Henry Rollins	0.07	2.32	-0.41	1.52	0.28	1.60
Hillary Duff	2.58	1.02	2.02	1.19	1.75	1.49
Howard Stern	1.25	2.23	-1.58	1.45	-0.70	1.60
Hugh Jackman	1.61	2.01	1.23	1.75	1.20	1.32
Jack Black	2.74	0.67	-0.73	1.48	0.48	2.01
Jack Coleman	-0.59	2.20	-0.86	1.32	0.23	1.39
Jack Osbourne	1.26	2.22	-1.84	1.38	-0.86	1.68

Jaime King	0.24	1.86	0.98	1.18	0.91	1.57
Jai Rodriguez	-0.79	2.17	0.31	1.37	0.42	1.55
Jake Gyllenhaal	2.42	1.14	1.61	1.24	1.56	1.42
Jamie Lynn Spears	2.24	1.46	1.09	1.42	0.95	1.54
Janeane Garofalo	-0.08	2.28	-0.02	1.32	0.38	1.41
Jared Padelecki	0.23	2.29	0.94	1.54	1.16	1.48
Jason Priestley	0.78	2.14	0.58	1.59	0.56	1.56
Jason Segel	-0.43	2.62	0.88	1.37	0.83	1.66
Jenna Elfman	0.01	2.13	0.69	1.18	0.77	1.38
Jennifer Aniston	2.72	0.79	1.98	1.41	1.73	1.42
Jennifer Garner	2.22	1.45	1.73	1.35	1.47	1.33
Jennifer Lopez	2.67	0.95	1.61	1.23	1.31	1.50
Jennifer Love Hewitt	2.58	1.08	2.08	1.12	1.78	1.33
Jensen Ackles	-0.40	2.18	1.59	1.32	0.97	1.44
Jerry Manthey	-1.47	1.78	0.00	1.54	0.56	1.36
Jerry Seinfeld	1.74	2.00	-0.58	1.42	0.66	1.51
Jessica Alba	2.65	0.75	2.14	1.26	1.86	1.44
Jessica Stroup	-0.08	2.09	1.81	1.26	1.66	1.31
Jim Belushi	1.35	2.02	-1.13	1.35	0.33	1.53
Jim Carrey	2.52	1.38	0.13	1.47	1.47	1.50
Jimmy Kimmel	1.32	2.17	0.08	1.29	0.39	1.57
Jocelyn Wildenstein	-1.35	2.28	-2.59	1.08	-2.20	1.38
Jodie Foster	1.04	2.02	0.42	1.38	0.66	1.30
Joe Jonas	1.35	2.05	0.48	1.92	0.17	1.79
Joe Perry	-1.04	2.29	-1.81	1.51	-1.11	1.61
John C Reilly	1.89	1.75	-1.80	1.40	-0.03	2.02
John Cusack	1.89	1.59	0.20	1.37	0.72	1.41
John Edwards	0.39	2.20	-0.20	1.37	0.17	1.40
John Mayer	1.18	2.16	0.92	1.50	0.55	1.61
Johnny Depp	2.51	1.16	1.42	1.60	1.05	1.77
John Stamos	2.11	1.39	1.53	1.30	1.52	1.18
John Travolta	2.56	1.07	0.52	1.68	1.14	1.54
Jon Bon Jovi	1.35	2.03	0.17	1.51	0.13	1.66
Jon Cryer	-0.08	2.40	-0.78	1.37	0.25	1.41
Jon Stewart	1.30	2.19	0.36	1.49	0.67	1.44
Jorge Ramos	0.50	2.36	0.27	1.62	0.59	1.65
Juanes	0.25	2.54	0.20	1.46	0.75	1.75
Jude Law	1.30	2.17	1.47	1.46	1.03	1.52
Julia Louis Dreyfus	0.76	2.33	0.41	1.37	0.75	1.69
Julia Roberts	2.50	1.02	1.17	1.33	1.31	1.54
Justin Chambers	1.25	1.91	1.02	1.60	1.14	1.45

Justin Timberlake	2.49	1.35	0.95	1.79	1.27	1.55
Kate Beckinsale	1.40	1.78	2.13	1.18	1.86	1.30
KatedelCastillo	0.88	2.46	1.67	1.16	1.42	1.37
Kate Hudson	2.00	1.73	1.80	1.20	1.73	1.17
Kate Moss	-0.17	2.33	0.83	1.43	0.53	1.38
Kate Winslet	1.19	2.11	1.63	1.08	1.34	1.44
Katherine Heigl	1.34	1.92	0.92	1.74	1.19	1.41
Kathy Ireland	-0.56	2.14	0.63	1.64	0.72	1.40
Katie Holmes	0.97	2.43	0.92	1.25	0.73	1.71
Katy Perry	0.24	2.23	0.23	1.57	0.53	1.54
Keanu Reeves	2.18	1.68	0.63	1.50	0.98	1.42
Keira Knightley	2.17	1.57	2.17	1.15	1.95	1.23
Kelly Osbourne	1.00	2.08	-0.25	1.58	0.16	1.49
Kelly Ripa	1.67	1.72	1.63	1.40	1.37	1.37
Kelsey Grammer	0.78	2.30	-1.13	1.40	0.19	1.66
Kevin Bacon	1.89	1.62	-0.33	1.55	0.47	1.49
Kevin Jonas	1.07	2.14	-0.03	1.65	-0.25	1.66
Kevin Smith	-0.19	2.54	-1.03	1.57	-0.30	1.63
Kim Catrall	1.56	2.17	0.17	1.59	0.45	1.67
Kim Kardashian	1.78	1.86	2.08	1.26	1.50	1.62
Kirk Cameron	-0.12	2.26	-0.56	1.39	0.06	1.58
Kirsten Dunst	2.53	1.00	1.41	1.39	1.52	1.38
Kirstie Alley	2.08	1.54	-0.31	1.38	0.06	1.50
Kristen Kreuk	0.51	2.24	1.39	1.49	1.17	1.44
Kristin Davis	1.32	2.33	1.05	1.31	1.22	1.27
Kuno Becker	-0.52	2.40	-0.14	1.64	0.45	1.83
Kyan Douglas	-1.10	1.91	0.41	1.55	0.55	1.49
Lance Bass	1.96	1.71	0.06	1.67	0.31	1.72
Landon Donovan	-0.21	2.33	0.70	1.43	0.34	1.68
Lara Flynn Boyle	0.43	2.20	0.25	1.58	0.33	1.33
Laura Prepon	1.25	2.17	1.20	1.31	1.16	1.48
Lauren Conrad	1.63	1.87	1.83	1.35	1.77	1.54
Leighten Meester	-0.65	2.10	0.30	1.59	0.63	1.60
Lena Headey	0.50	2.04	1.73	1.29	1.25	1.38
Leonardo DiCaprio	2.52	1.20	1.27	1.55	1.02	1.60
Linda Blair	-0.47	2.15	0.13	1.25	0.33	1.46
Lindsay Lohan	2.44	1.38	1.42	1.35	1.19	1.54
Lisa Kudrow	1.99	1.79	0.48	1.25	1.05	1.40
Liv Tyler	1.90	1.89	1.52	1.39	1.50	1.46
Liza Minelli	0.05	2.38	-0.91	1.41	-0.33	1.52
Lori Loughlin	1.32	1.73	1.03	1.36	1.34	1.18

Luis Miguel	0.71	2.51	-0.41	1.79	0.16	1.82
Luke Wilson	2.58	1.00	1.14	1.37	1.20	1.50
Lyle Lovett	-0.66	2.33	-2.13	1.18	-0.98	1.75
Madonna	2.19	1.69	0.84	1.47	0.91	1.56
Maggie Gyllenhaal	1.61	1.84	0.61	1.49	0.91	1.48
Maite Perroni	-0.27	2.59	1.70	1.06	1.72	1.30
Mandy Moore	1.81	1.82	1.88	1.15	1.69	1.22
Mariah Carey	2.58	1.08	1.53	1.50	1.11	1.67
Mark Anthony	2.15	1.57	-0.86	1.68	0.23	1.71
Mark Wahlberg	1.82	1.71	1.14	1.71	1.47	1.43
Mary Kate Olsen	2.50	1.14	1.58	1.29	0.95	1.59
Matt Damon	2.11	1.64	1.17	1.32	1.39	1.43
Matthew Broderick	1.40	2.16	1.91	1.32	0.75	1.45
MatthewMcConaughey	2.49	1.06	0.33	1.57	1.39	1.44
Matt Lauer	-0.03	2.32	-0.22	1.58	0.11	1.39
Megan Fox	1.49	1.89	1.52	1.04	1.33	1.54
Meg Ryan	1.79	1.78	-0.98	1.28	0.80	1.24
Mel Gibson	2.59	1.09	1.38	1.86	0.81	1.70
Mena Suvari	1.45	1.86	-2.41	1.27	1.16	1.41
Michael Berryman	-1.26	2.28	-0.39	1.62	-1.42	1.88
Michael Cera	1.90	1.86	-0.05	1.46	0.95	1.66
Michael Keaton	1.37	1.95	-0.58	1.78	0.55	1.64
Michael Phelps	1.47	2.32	-0.13	1.44	0.61	1.87
Michael Rosenabaum	0.37	2.49	-0.81	1.47	0.30	1.40
Michael Stipe	-0.92	2.17	-0.95	1.33	-0.11	1.50
Mike Myers	2.07	1.77	2.08	1.15	0.69	1.78
Mila Kunis	1.82	1.51	1.20	1.45	1.81	1.14
Milo Ventimiglia	0.37	2.26	-0.08	1.30	0.81	1.53
Monica Lewinsky	-0.08	2.23	-0.63	1.33	-0.36	1.57
Natalie Imbruglia	-0.42	2.11	0.28	1.53	0.25	1.35
Natalie Maines	-0.43	2.20	-0.11	1.32	0.48	1.39
Natalie Portman	2.32	1.51	2.05	1.23	2.00	1.07
Neil Patrick Harris	1.51	1.83	0.16	1.53	0.34	1.31
Nick Jonas	1.17	2.22	0.31	1.55	0.06	1.76
Nick Lachey	2.00	1.42	1.52	1.48	1.13	1.71
Nicolas Cage	2.57	1.02	-0.05	1.63	0.81	1.62
Nicole Kidman	2.07	1.72	1.52	1.47	1.31	1.37
Nicole Richie	2.08	1.53	0.19	1.64	0.09	1.72
Nikki Hilton	1.60	1.87	1.02	1.50	0.80	1.44
Oscar de la Hoya	2.11	1.73	1.08	1.49	0.95	1.65
Owen Wilson	2.49	1.35	0.33	1.68	1.09	1.59

Ozzy Osbourne	2.04	1.86	-1.64	1.68	-0.06	2.01
PamelaA nderson	1.51	1.91	-0.03	1.64	-0.23	1.80
Paris Hilton	2.76	0.74	1.13	1.68	0.61	2.05
Patricia Arquette	-0.38	2.32	-0.22	1.43	0.14	1.30
Paulina Rubio	0.74	2.43	0.48	1.51	0.77	1.56
Paul Reubens	0.82	2.36	-1.38	1.43	-0.48	1.82
Paul Walker	1.71	1.90	1.77	1.32	1.25	1.64
Penelope Cruz	1.92	1.80	1.11	1.50	1.14	1.41
Peri Gilpin	-0.11	2.06	0.92	1.40	1.08	1.33
Pierce Brosnan	2.11	1.63	1.19	1.74	1.31	1.18
Portia DeRossi	0.36	1.91	1.50	1.27	0.89	1.42
Quentin Tarantino	0.39	2.36	-1.42	1.54	-0.41	1.66
Rachel Bilson	2.01	1.45	1.80	1.25	1.61	1.45
Rachel Dratch	0.18	2.71	-1.70	1.34	-0.31	1.70
Rachel McAdams	2.16	1.51	1.63	1.30	1.56	1.46
Rebecca Romijn	1.31	1.93	1.63	1.37	1.58	1.33
Reese Witherspoon	2.25	1.50	1.19	1.49	1.42	1.37
Renee Zellweger	1.82	1.76	0.30	1.42	0.30	1.62
Richard Gere	2.21	1.36	0.81	1.59	1.41	1.38
Ricky Martin	2.26	1.34	1.53	1.31	0.97	1.70
Robert Downey Jr	1.57	2.05	0.38	1.54	0.70	1.51
Ron Perlman	-0.21	2.53	-2.05	1.42	-0.69	2.08
Rosanna Arquette	-0.59	2.33	-1.28	1.44	-0.66	1.56
Roseanne Barr	1.07	2.40	-1.09	1.35	-0.38	1.57
Rose McGowan	0.76	1.92	0.09	1.32	0.23	1.49
Rosie O'Donnel	2.25	1.60	-1.42	1.37	-0.84	1.49
Russell Crowe	2.19	1.47	0.55	1.72	0.80	1.44
Ryan Reynolds	1.49	1.98	1.27	1.45	1.33	1.44
Ryan Seacrest	1.44	1.94	0.52	1.65	0.86	1.60
Ryan Stiles	1.61	1.93	-1.23	1.26	0.41	1.72
Sam Champion	-1.51	1.99	-0.83	1.55	-0.53	1.59
Sam Witwer	-0.38	2.08	0.44	1.68	0.58	1.45
Sandra Bernhard	-0.93	2.35	-1.98	1.16	-1.16	1.73
Sandra Bullock	2.68	0.85	2.17	0.98	1.70	1.31
Sara Gilbert	-0.35	2.48	-1.14	1.39	-0.61	1.63
Sarah Jessica Parker	2.39	1.38	0.56	1.49	1.03	1.63
Sarah Silverman	0.93	2.38	-0.23	1.27	0.41	1.70
Scarlett Johansson	2.03	1.67	2.17	1.08	1.81	1.14
Sean Penn	1.38	2.11	-0.52	1.51	0.28	1.66
Seth Rogen	1.33	2.28	-0.13	1.39	0.48	1.73
Shakira	1.47	2.28	1.84	1.28	1.58	1.56

Shia LeBouf	2.01	1.67	1.06	1.55	1.03	1.53
Sienna Miller	0.32	2.10	1.48	1.33	1.00	1.30
Simon Cowell	2.14	1.69	-0.34	1.46	0.05	1.66
Sophia Bush	0.84	2.14	1.77	1.48	1.59	1.28
Stephen Colbert	0.57	2.39	-0.28	1.33	0.78	1.60
Stephen King	-0.26	2.31	-1.52	1.55	-0.64	1.59
Stephen Tyler	1.81	1.90	-1.64	1.62	-0.27	2.09
Steve Buscemi	2.03	1.55	-1.61	1.30	0.00	1.63
Steve Carell	2.25	1.46	0.14	1.30	1.31	1.45
Summer Glau	-0.21	2.02	1.06	1.08	0.91	1.20
Sylvester Stallone	2.19	1.64	-0.52	1.59	0.41	1.87
Tara Reid	2.00	1.44	1.77	1.11	1.28	1.49
Taylor Swift	1.31	2.03	1.97	1.13	1.36	1.44
Tea Leoni	1.51	1.56	0.95	1.17	1.48	1.18
Thomas Dekker	-0.90	2.02	-0.23	1.59	0.16	1.63
Tim Burton	-0.93	2.18	-1.69	1.26	-0.59	1.63
Tim Robbins	0.42	2.17	-0.08	1.54	0.14	1.51
Tobey Maguire	1.93	2.01	0.78	1.69	1.34	1.25
Tom Arnold	1.00	2.20	-1.79	1.35	-0.27	1.61
Tom Brady	1.00	2.22	1.08	1.66	0.92	1.60
Tom Cruise	2.65	0.94	1.14	1.56	0.95	1.78
Tom Green	0.78	2.47	-1.25	1.50	0.20	1.56
Tom Hanks	2.44	1.27	-0.30	1.53	0.83	1.77
Tommy Lee	1.44	2.04	-0.39	1.47	-0.16	1.50
Tom Welling	1.93	1.70	1.66	1.51	1.52	1.36
Tony Hawk	1.06	2.36	0.41	1.64	0.77	1.55
Tony Romo	0.94	2.49	0.66	1.41	0.48	1.57
Tori Spelling	1.05	2.12	-0.63	1.52	-0.09	1.72
T R Knight	0.37	2.22	0.08	1.46	0.58	1.52
Uma Thurman	1.68	1.94	0.45	1.42	0.66	1.59
Victoria Beckham	2.19	1.44	1.64	1.55	0.84	1.68
Vince Vaughn	2.36	1.58	0.53	1.62	0.97	1.56
Vin Diesel	2.53	1.27	1.58	1.51	1.45	1.68
Wentworth Miller	0.51	2.22	1.42	1.51	1.23	1.43
Willem Dafoe	1.62	2.01	-1.59	1.40	0.05	1.72
Woody Harrelson	1.19	2.21	-1.11	1.67	0.27	1.77
Zac Efron	1.78	1.71	1.50	1.61	1.09	1.68
Zachary Quinto	-0.51	2.26	0.27	1.60	0.14	1.50
Zach Braff	1.47	1.94	-0.31	1.40	0.53	1.51

Pilot Study Stimuli Ratings of Unknown Individuals

	Familliarity N = 72		Attractiveness N = 64		Favorability N = 64	
Stimuli	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
f600	-2.39	1.07	0.63	1.29	0.48	1.36
f601	-2.00	1.43	0.56	1.39	0.67	1.37
f602	-2.08	1.36	0.81	1.54	0.45	1.45
f603	-2.54	0.92	0.23	1.27	0.50	1.53
f604	-2.49	1.10	-0.27	1.65	-0.14	1.37
f605	-1.97	1.36	0.29	1.24	0.36	1.56
f606	-2.74	0.67	-1.28	1.39	-0.72	1.61
f607	-2.56	0.91	-1.22	1.30	-0.41	1.54
f608	-2.24	1.29	0.95	1.36	1.00	1.25
f609	-2.34	1.25	0.32	1.27	-0.23	1.47
f610	-2.40	1.20	-0.36	1.31	0.17	1.30
f611	-2.38	1.27	0.20	1.29	0.50	1.33
f612	-2.15	1.29	1.06	1.41	0.53	1.69
f613	-1.89	1.55	1.50	1.26	1.33	1.41
f614	-2.44	1.07	-0.98	1.34	-0.20	1.35
f615	-2.38	1.14	0.64	1.48	0.25	1.46
f616	-2.56	1.10	-1.50	1.30	-0.81	1.53
f617	-2.22	1.42	0.19	1.30	0.25	1.53
f618	-2.18	1.47	0.75	1.10	0.50	1.33
f619	-2.54	0.87	-0.84	1.39	-0.34	1.57
f620	-2.58	1.02	-1.27	1.42	-1.22	1.40
f621	-2.42	1.14	0.09	1.29	0.08	1.49
f622	-2.66	0.75	-0.22	1.46	-0.02	1.53
f623	-2.77	0.54	-1.84	1.45	-0.98	1.60
f624	-2.46	1.24	-1.16	1.38	-0.83	1.35
f625	-2.54	0.80	-0.64	1.48	-0.08	1.49
f626	-2.43	1.20	-0.55	1.40	0.06	1.45
f627	-2.60	0.88	-1.73	1.26	-0.98	1.59
f628	-2.55	0.96	-0.91	1.47	-0.02	1.54
f629	-2.40	1.15	-0.48	1.41	-0.22	1.67
f630	-2.22	1.45	0.44	1.34	0.47	1.45
f631	-2.58	0.82	-0.31	1.40	-0.09	1.72
f632	-2.51	1.01	-0.81	1.32	-0.44	1.45
f633	-2.12	1.34	0.91	1.38	0.72	1.33
f634	-2.64	0.77	-0.17	1.32	-0.02	1.46
f635	-2.42	1.14	-0.06	1.35	0.20	1.21
f636	-2.57	0.92	-1.73	1.39	-0.83	1.45

f637	-2.43	1.09	-0.81	1.36	-0.06	1.32
f638	-2.39	1.03	-0.36	1.31	0.00	1.28
f639	-2.44	1.15	0.45	1.33	0.47	1.40
f640	-2.37	1.16	0.70	1.43	0.23	1.69
f641	-2.21	1.41	1.23	1.24	0.59	1.59
f642	-2.67	0.86	-1.41	1.44	-0.39	1.44
f643	-2.45	1.19	-0.48	1.31	-0.30	1.61
f644	-2.43	1.15	-0.25	1.53	-0.03	1.47
f645	-1.88	1.62	0.94	1.53	0.89	1.46
f646	-2.68	0.93	-0.98	1.29	-0.89	1.45
f647	-2.61	0.83	-1.36	1.48	-0.63	1.29
f648	-2.42	1.16	-0.75	1.46	-0.36	1.56
f649	-2.18	1.21	0.81	1.33	0.53	1.46
f650	-2.15	1.45	-0.20	1.48	0.22	1.39
f651	-2.14	1.58	0.41	1.37	0.47	1.47
f652	-2.60	0.79	-0.98	1.40	-0.47	1.70
f653	-2.38	1.08	-0.59	1.38	0.13	1.40
f654	-2.45	1.09	-0.77	1.38	-0.06	1.26
f655	-2.65	0.75	-0.95	1.27	-0.36	1.55
f656	-2.47	1.02	-0.97	1.32	-0.50	1.41
f657	-2.42	1.29	-1.23	1.33	-0.84	1.39
f658	-2.41	1.13	0.16	1.30	0.34	1.46
f659	-1.66	1.75	0.81	1.37	1.06	1.37
f660	-2.59	1.03	-1.28	1.36	-0.78	1.36
f661	-2.58	1.00	-0.47	1.18	-0.42	1.56
f662	-2.28	1.42	0.33	1.54	0.44	1.34
f663	-2.47	1.11	0.30	1.44	0.13	1.61
f664	-2.41	1.20	-0.39	1.47	0.06	1.30
f665	-2.26	1.30	0.75	1.31	0.53	1.34
f666	-2.39	1.18	0.83	1.25	0.98	1.46
f667	-2.47	1.06	-0.63	1.37	-0.02	1.34
f668	-2.51	1.03	-0.72	1.33	-0.27	1.54
f669	-2.61	0.74	0.28	1.23	0.33	1.41
f670	-2.50	0.89	-1.13	1.51	-0.47	1.37
f671	-2.56	1.06	-1.48	1.35	-0.81	1.44
f672	-2.65	0.73	-0.81	1.31	-0.53	1.43
f673	-2.51	1.10	-1.02	1.55	-0.59	1.60
f674	-2.22	1.36	-0.05	1.36	0.25	1.52
f675	-1.69	1.66	0.30	1.54	0.66	1.32
f676	-2.40	1.10	-0.38	1.27	-0.05	1.40
f677	-2.61	0.83	-0.14	1.34	0.30	1.32

f678	-2.56	0.97	0.34	1.46	0.22	1.47
f679	-2.33	1.23	0.22	1.46	0.47	1.39
f680	-2.64	0.77	-1.14	1.42	-0.70	1.54
f681	-2.56	0.93	-1.34	1.48	-0.63	1.68
f682	-2.60	0.89	-1.09	1.29	-0.55	1.39
f683	-2.68	0.76	-1.70	1.29	-0.89	1.70
f684	-2.68	0.86	-1.13	1.50	-0.81	1.33
f685	-2.44	1.20	-0.23	1.34	-0.19	1.33
f686	-2.67	0.84	-0.95	1.37	-0.67	1.20
f687	-2.65	0.75	-0.95	1.28	-0.52	1.53
f688	-2.64	0.81	-1.23	1.34	-0.52	1.51
f689	-2.67	0.75	-1.73	1.29	-1.23	1.50
f690	-2.47	0.99	0.64	1.38	0.97	1.30
f691	-2.32	1.22	0.67	1.25	0.25	1.46
f692	-2.14	1.42	0.66	1.31	0.56	1.28
f693	-2.60	0.88	-1.52	1.45	-0.78	1.47
f694	-2.54	0.95	-1.06	1.19	-0.44	1.38
f695	-2.56	1.05	-1.08	1.37	-0.44	1.54
f696	-2.40	1.19	0.02	1.49	0.33	1.37
f697	-2.19	1.39	1.05	1.05	1.06	1.30
f698	-2.40	1.11	-0.29	1.25	-0.09	1.44
f699	-2.29	1.31	0.75	1.31	0.45	1.56
f700	-2.53	1.07	-0.69	1.25	-0.36	1.59
f701	-2.50	1.01	0.56	1.42	-0.03	1.31
f702	-2.33	1.24	0.27	1.20	0.39	1.52
f703	-2.22	1.33	1.08	1.41	0.88	1.54
f704	-2.58	0.80	0.50	1.56	0.36	1.28
f705	-2.57	0.92	-1.61	1.52	-1.30	1.38
f706	-2.44	1.19	-0.78	1.43	0.02	1.36
f707	-2.40	0.97	0.20	1.35	0.16	1.20
f708	-2.63	0.83	-0.53	1.36	0.05	1.48
f709	-2.66	0.79	-1.59	1.29	-0.97	1.28
f710	-2.39	1.03	-0.11	1.40	-0.17	1.68
f711	1.89	1.80	0.98	1.64	1.33	1.31
f712	-2.54	0.95	-0.55	1.60	-0.10	1.52
f713	-2.65	0.84	-1.27	1.36	-0.64	1.63
f714	-2.49	0.96	-0.30	1.49	-0.47	1.39
f715	-2.63	0.96	-0.89	1.30	-0.05	1.45
f716	-2.38	1.28	-0.52	1.41	-0.33	1.44
f717	-2.46	0.99	-0.09	1.31	0.38	1.46
f718	-2.32	1.26	-0.34	1.31	0.19	1.34

f719	-2.33	1.17	-0.59	1.43	0.05	1.40
f720	-2.36	1.26	0.78	1.20	0.61	1.32
f721	-2.48	1.03	-0.25	1.38	0.31	1.37
f722	-2.56	1.03	-0.95	1.40	-0.50	1.63
f723	-2.53	0.95	-0.47	1.37	0.11	1.33
f724	-2.47	1.06	-0.44	1.47	-0.19	1.61
f725	-2.13	1.48	-0.16	1.44	0.31	1.37
f726	-2.63	0.94	-1.36	1.52	-0.81	1.50
f727	-2.36	1.19	-0.06	1.21	0.00	1.35
f728	-1.70	1.66	0.84	1.44	0.69	1.45
f729	-2.53	0.92	-0.34	1.35	-0.03	1.37
f730	-2.18	1.33	1.22	1.42	1.30	1.33
f731	-2.63	0.70	-0.88	1.23	-0.20	1.50
f732	-2.35	1.24	0.47	1.28	0.66	1.34
f733	-2.42	1.18	0.41	1.29	0.28	1.44
f734	-2.62	0.92	-1.13	1.42	-0.47	1.50
f735	-2.38	1.19	-0.23	1.46	0.20	1.57
f736	-2.26	1.21	-0.10	1.32	0.33	1.40
f737	-2.50	0.96	-0.69	1.36	-0.19	1.51
f738	-2.51	0.93	-0.22	1.29	0.08	1.26
f739	-2.38	1.16	0.08	1.36	0.30	1.15
f740	-2.41	1.25	-1.30	1.45	-0.81	1.27
m1	-2.59	0.85	-0.66	1.50	-0.39	1.48
m10	-2.43	1.27	-0.72	1.29	-0.77	1.35
m100	-2.26	1.47	-0.41	1.49	-0.19	1.52
m101	-2.46	0.90	-0.73	1.32	-0.38	1.42
m102	-2.47	1.22	-0.45	1.37	-0.38	1.46
m103	-2.61	0.76	-1.00	1.30	-0.36	1.19
m104	-2.60	0.94	-1.47	1.28	-1.34	1.34
m105	-2.58	1.04	-1.59	1.29	-0.97	1.32
m106	-2.61	0.70	-0.27	1.45	-0.23	1.33
m107	-2.42	0.94	-0.19	1.38	-0.09	1.60
m108	-2.55	1.01	-1.92	1.40	-1.16	1.73
m109	-2.61	0.76	-0.72	1.33	-0.25	1.37
m11	-2.11	1.33	1.00	1.39	0.27	1.35
m110	-2.43	1.34	-1.08	1.44	-0.47	1.60
m111	-2.49	0.93	0.41	1.38	0.36	1.49
m112	-2.68	0.72	-0.56	1.38	-0.31	1.59
m113	-2.68	0.70	-1.33	1.48	-1.30	1.33
m114	-2.58	0.76	-1.23	1.42	-1.11	1.25
m115	-1.67	1.60	0.52	1.52	0.84	1.34

m116	-2.56	0.99	-1.41	1.46	-0.86	1.45
m117	-2.50	1.07	-1.75	1.38	-1.20	1.46
m118	-2.65	0.94	-1.63	1.36	-1.08	1.44
m119	-2.29	1.27	-0.39	1.41	-0.11	1.61
m12	-2.33	1.05	-0.33	1.25	-0.02	1.50
m120	-2.50	1.02	-0.27	1.55	-0.38	1.43
m121	-2.57	1.03	-1.14	1.23	-0.36	1.48
m122	-2.41	1.22	-0.05	1.36	0.20	1.14
m123	-2.21	1.37	0.23	1.42	-0.11	1.51
m124	-2.43	1.14	-0.03	1.57	-0.33	1.48
m125	-2.47	1.01	-0.98	1.33	-0.52	1.46
m126	-2.42	0.96	-0.44	1.59	0.02	1.29
m127	-2.61	1.01	-0.23	1.48	-0.33	1.39
m128	-2.58	0.95	-0.84	1.71	-0.91	1.43
m129	-1.96	1.45	-0.17	1.52	-0.38	1.41
m13	-2.22	1.39	0.86	1.34	0.52	1.51
m130	-2.68	0.71	-0.27	1.34	0.03	1.47
m131	-2.22	1.50	-0.50	1.41	-0.52	1.67
m132	-2.51	1.09	-0.56	1.57	-0.38	1.34
m133	-2.43	1.20	-0.20	1.26	-0.09	1.44
m134	-2.43	1.21	-0.27	1.51	0.16	1.60
m135	-2.59	0.86	-0.27	1.58	0.20	1.43
m136	-2.65	0.91	-1.56	1.50	-1.08	1.38
m137	-2.72	0.68	-0.81	1.33	-0.69	1.49
m138	-2.38	1.05	-0.31	1.39	-0.34	1.41
m139	-2.68	0.83	-1.73	1.47	-1.53	1.53
m14	-2.04	1.29	0.39	1.56	0.02	1.59
m140	-2.60	0.86	-1.17	1.39	-0.80	1.46
m141	-2.64	0.86	-0.72	1.46	-0.52	1.35
m142	-2.55	1.01	-0.91	1.38	-0.36	1.29
m143	-2.60	0.78	-1.00	1.44	-0.72	1.62
m144	-2.15	1.26	-0.45	1.52	-0.28	1.43
m145	-2.63	0.92	-1.19	1.26	-0.83	1.25
m146	-2.31	1.33	0.13	1.50	-0.06	1.57
m147	-2.75	0.62	-1.53	1.41	-0.75	1.64
m148	-2.51	0.99	-0.19	1.40	-0.11	1.30
m149	-2.49	0.99	-0.14	1.46	-0.11	1.40
m15	-2.24	1.36	0.52	1.44	0.05	1.46
m150	-2.42	1.09	-0.28	1.41	-0.22	1.35
m151	-2.57	1.06	-1.22	1.43	-0.67	1.43
m152	-2.60	0.99	-0.81	1.45	-0.31	1.46

m153	-2.49	0.99	-1.36	1.34	-0.60	1.43
m154	-1.99	1.41	0.70	1.55	0.39	1.67
m155	-2.36	1.21	-0.30	1.43	0.14	1.32
m156	-2.42	1.05	-0.61	1.51	-0.02	1.49
m157	-2.53	1.06	-1.36	1.34	-0.89	1.48
m158	-2.25	1.20	1.22	1.47	0.77	1.53
m159	-1.72	1.67	0.66	1.29	0.25	1.25
m16	-2.19	1.39	0.17	1.46	0.09	1.28
m160	-2.52	1.02	-1.45	1.33	-0.97	1.32
m161	-2.39	1.33	-0.91	1.46	-0.34	1.35
m162	-2.51	0.87	-0.36	1.33	0.06	1.50
m163	-2.29	1.42	-0.41	1.73	0.08	1.52
m164	-2.49	1.01	-1.30	1.32	-0.67	1.44
m165	-2.47	0.85	-0.08	1.33	-0.39	1.26
m166	-2.47	1.02	-0.48	1.59	-0.23	1.44
m167	-2.51	0.96	-0.08	1.30	-0.44	1.41
m168	-2.53	0.97	-0.13	1.44	-0.17	1.52
m169	-2.22	1.27	-0.08	1.63	0.19	1.36
m17	-2.79	0.84	-2.17	1.50	-1.52	1.53
m170	-2.38	1.17	0.03	1.50	0.38	1.51
m171	-2.57	0.90	-0.55	1.40	-0.47	1.10
m172	-2.68	0.69	-0.39	1.47	-0.02	1.52
m173	-2.44	1.12	-0.08	1.69	0.36	1.38
m174	-2.58	0.93	-0.78	1.57	-0.44	1.48
m175	-2.45	1.00	-0.45	1.30	-0.61	1.53
m176	-2.58	0.97	-0.44	1.56	-0.34	1.61
m177	-2.53	0.82	0.27	1.60	0.16	1.62
m178	-2.54	0.96	-0.47	1.21	-0.39	1.48
m179	-2.42	1.21	-0.11	1.46	-0.19	1.73
m18	-2.44	1.35	-0.42	1.39	-0.33	1.46
m180	-2.70	0.78	-0.66	1.37	-0.38	1.59
m19	-2.55	1.01	-0.64	1.31	-0.06	1.58
m2	-2.54	0.90	0.08	1.44	-0.47	1.59
m20	-2.42	1.10	-0.36	1.42	-0.48	1.46
m21	-2.68	0.66	-1.44	1.23	-1.17	1.42
m22	-2.34	1.25	0.28	1.62	0.44	1.39
m23	-2.31	1.45	0.69	1.36	0.34	1.47
m24	-2.50	0.87	-0.66	1.34	-0.64	1.61
m25	-2.64	0.77	-0.77	1.60	-0.39	1.30
m26	-2.36	1.03	0.27	1.51	0.23	1.73
m27	-2.63	0.97	-1.59	1.42	-1.03	1.43

m28	-2.53	0.99	-0.98	1.47	-0.36	1.44
m29	-2.57	1.14	-1.54	1.58	-1.05	1.45
m3	-2.64	0.76	-0.43	1.29	-0.34	1.30
m30	-1.79	1.64	0.83	1.43	0.73	1.28
m31	-2.48	1.13	-0.98	1.41	-0.38	1.45
m32	-2.53	0.96	-1.14	1.41	-0.52	1.33
m33	-2.52	0.99	-0.36	1.38	0.05	1.43
m34	-2.66	0.79	-0.58	1.47	-0.36	1.41
m35	-2.78	0.48	-1.75	1.26	-1.22	1.52
m36	-2.47	1.14	-0.69	1.30	-0.61	1.34
m37	-2.60	0.76	-0.98	1.29	-0.20	1.40
m38	-2.63	0.76	-1.36	1.54	-1.03	1.53
m39	-2.64	0.88	-0.42	1.58	-0.20	1.47
m4	-2.44	1.22	-0.95	1.42	-0.25	1.52
m40	-2.19	1.37	0.20	1.43	0.19	1.34
m41	-2.60	0.83	-1.27	1.46	-1.00	1.52
m42	-2.61	0.74	-1.11	1.47	-0.78	1.35
m43	-2.64	0.77	-1.22	1.42	-0.92	1.46
m44	-2.56	1.01	-1.30	1.45	-0.92	1.54
m45	-1.63	1.87	0.78	1.67	0.89	1.50
m46	-2.70	0.66	-1.02	1.43	-0.88	1.49
m47	-2.40	1.07	0.03	1.32	0.31	1.26
m48	-2.56	1.05	-0.81	1.46	-0.66	1.47
m49	-2.13	1.46	0.94	1.63	0.69	1.45
m5	-2.26	1.46	0.48	1.50	0.52	1.47
m50	-2.25	1.35	-0.45	1.38	0.00	1.27
m51	-2.61	0.78	-1.08	1.59	-0.84	1.35
m52	-2.63	0.85	-1.44	1.44	-1.02	1.47
m54	-2.53	1.06	-1.14	1.32	-0.61	1.40
m55	-2.21	1.41	0.11	1.47	-0.02	1.46
m56	-2.58	0.88	-0.86	1.34	-0.50	1.48
m57	-2.52	1.20	-0.22	1.50	-0.67	1.41
m58	-2.46	1.27	-1.05	1.55	-0.98	1.46
m59	-2.60	0.83	-0.86	1.32	-0.48	1.43
m6	-2.18	1.44	0.31	1.47	-0.08	1.40
m60	-2.18	1.43	0.67	1.43	0.38	1.51
m61	-0.83	2.04	1.84	1.29	1.03	1.67
m62	-2.32	1.33	0.34	1.49	0.08	1.53
m63	-2.44	1.05	0.34	1.41	0.41	1.29
m64	-2.46	1.15	-0.38	1.60	-0.31	1.36
m65	-2.63	0.76	-1.55	1.42	-0.88	1.44

m66	-2.00	1.67	0.05	1.67	0.13	1.47
m67	-1.78	1.53	-0.58	1.45	-0.19	1.25
m68	-2.51	0.92	-0.23	1.39	0.08	1.59
m69	-2.40	1.12	0.27	1.58	0.30	1.40
m7	-2.11	1.46	0.11	1.68	-0.42	1.81
m70	-2.43	1.27	-1.53	1.31	-1.19	1.49
m71	-2.76	0.52	-1.23	1.39	-0.55	1.38
m72	-2.22	1.15	0.03	1.54	0.11	1.53
m73	-2.18	1.44	0.23	1.51	0.34	1.52
m74	-2.51	0.91	0.52	1.31	0.36	1.52
m75	-2.40	1.17	-1.28	1.37	-1.16	1.36
m76	-2.01	1.58	0.80	1.46	0.52	1.56
m77	-2.47	1.08	-0.17	1.49	0.11	1.32
m78	-2.60	0.85	-0.31	1.45	-0.38	1.45
m79	-2.61	0.90	-0.31	1.37	-0.08	1.26
m8	-2.40	1.23	-0.23	1.35	0.09	1.34
m80	-2.58	0.93	-1.38	1.72	-0.84	1.50
m81	-2.04	1.53	0.64	1.49	0.16	1.67
m82	-2.49	1.09	0.41	1.56	0.45	1.70
m83	-2.43	1.21	-0.91	1.34	-0.30	1.48
m84	-2.50	0.93	-0.50	1.39	-0.05	1.31
m85	-2.42	1.20	-1.33	1.39	-0.84	1.25
m86	-2.42	1.26	-0.98	1.50	-0.22	1.59
m87	-2.44	1.23	-0.50	1.43	-0.33	1.48
m88	-2.45	1.01	0.47	1.59	0.14	1.37
m89	-2.41	1.14	0.31	1.41	0.17	1.58
m9	-2.49	1.05	-1.33	1.27	-1.20	1.39
m90	-2.43	1.09	0.17	1.48	0.25	1.67
m91	-2.56	0.79	0.08	1.77	-0.58	1.60
m92	-2.60	0.78	-0.14	1.48	-0.11	1.40
m93	-2.36	1.26	-0.08	1.58	0.22	1.41
m94	-2.51	1.08	-0.91	1.39	-0.34	1.53
m95	-2.14	1.27	0.63	1.45	0.36	1.34
m96	-2.54	0.98	-1.03	1.38	-0.73	1.27
m97	-2.42	0.95	0.39	1.27	0.19	1.58
m98	-2.57	0.87	-1.31	1.31	-0.69	1.65
m99	-2.47	1.06	-0.97	1.39	-0.20	1.24

Appendix C

Novel Stimuli Ratings

Neutral Males						
	Familiarity		Attractiveness		Favorability	
Stimulus Name	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**
m11	-2.11	1.33	1.00	1.39	0.27	1.35
m111	-2.49	0.93	0.41	1.38	0.36	1.49
m123	-2.21	1.37	0.23	1.42	-0.11	1.51
m13	-2.22	1.39	0.86	1.34	0.52	1.51
m14	-2.04	1.29	0.39	1.56	0.02	1.59
m146	-2.31	1.33	0.13	1.50	-0.06	1.57
m15	-2.24	1.36	0.52	1.44	0.05	1.46
m16	-2.19	1.39	0.17	1.46	0.09	1.28
m170	-2.38	1.17	0.03	1.50	0.38	1.51
m177	-2.53	0.82	0.27	1.60	0.16	1.62
m22	-2.34	1.25	0.28	1.62	0.44	1.39
m23	-2.31	1.45	0.69	1.36	0.34	1.47
m26	-2.36	1.03	0.27	1.51	0.23	1.73
m40	-2.19	1.37	0.20	1.43	0.19	1.34
m47	-2.40	1.07	0.03	1.32	0.31	1.26
m49	-2.13	1.46	0.94	1.63	0.69	1.45
m5	-2.26	1.46	0.48	1.50	0.52	1.47
m55	-2.21	1.41	0.11	1.47	-0.02	1.46
m6	-2.18	1.44	0.31	1.47	-0.08	1.40
m60	-2.18	1.43	0.67	1.43	0.38	1.51
m62	-2.32	1.33	0.34	1.49	0.08	1.53
m63	-2.44	1.05	0.34	1.41	0.41	1.29
m68	-2.51	0.92	0.05	1.67	0.08	1.59
m69	-2.40	1.12	0.27	1.58	0.30	1.40
m72	-2.22	1.15	0.03	1.54	0.11	1.53
m73	-2.18	1.44	0.23	1.51	0.34	1.52
m74	-2.51	0.91	0.52	1.31	0.36	1.52
m76	-2.01	1.58	0.80	1.46	0.52	1.56
m81	-2.04	1.53	0.64	1.49	0.16	1.67
m82	-2.49	1.09	0.41	1.56	0.45	1.70
m88	-2.45	1.01	0.47	1.59	0.14	1.37
m89	-2.41	1.14	0.31	1.41	0.17	1.58
m90	-2.43	1.09	0.17	1.48	0.25	1.67
m95	-2.14	1.27	0.63	1.45	0.36	1.34
m97	-2.42	0.95	0.39	1.27	0.19	1.58
Group Means	**-2.29**		**0.39**		**0.24**	

Unattractive Males						
	Familiarity		Attractiveness		Favorability	
Stimulus Name	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
m105	-2.58	1.04	-1.59	1.29	-0.97	1.32
m108	-2.55	1.01	-1.92	1.40	-1.16	1.73
m117	-2.50	1.07	-1.75	1.38	-1.20	1.46
m118	-2.65	0.94	-1.63	1.36	-1.08	1.44
m35	-2.78	0.48	-1.75	1.26	-1.22	1.52
Group Means	**-2.61**		**-1.73**		**-1.13**	

Neutral Females						
	Familiarity		Attractiveness		Favorability	
Stimulus Name	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
f612	-2.15	1.29	1.06	1.41	0.53	1.69
f633	-2.51	1.01	0.91	1.38	0.72	1.33
f645	-1.88	1.62	0.94	1.53	0.89	1.46
f697	-2.19	1.39	1.05	1.05	1.06	1.30
f703	-2.22	1.33	1.08	1.41	0.88	1.54
Group Means	**-2.19**		**1.01**		**0.82**	

Unattractive Females						
	Familiarity		Attractiveness		Favorability	
Stimulus Name	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
f623	-2.77	0.54	-1.84	1.45	-0.98	1.60
f627	-2.60	0.88	-1.73	1.26	-0.98	1.59
f636	-2.57	0.92	-1.73	1.39	-0.83	1.45
f683	-2.68	0.76	-1.70	1.29	-0.89	1.70
f689	-2.67	0.75	-1.73	1.29	-1.23	1.50
Group Means	**-2.66**		**-1.75**		**-0.98**	

Familiar Stimuli Ratings

Neutral Males						
	Familiarity		Attractiveness		Favorability	
Stimulus Name	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**	**Mean**	**Std. Deviation**
Adam Sandler	2.69	0.94	0.17	1.39	1.20	1.53
Ben Affleck	2.14	1.65	1.00	1.74	1.03	1.46
Colin Farrell	2.18	1.47	1.41	1.63	1.11	1.65
Drake Bell	1.76	1.95	0.23	1.69	0.39	1.70
Edward Norton	1.51	1.92	0.19	1.61	0.97	1.44
Eminem	2.30	1.49	0.02	1.80	0.00	1.81
Enrique Iglesias	2.22	1.68	0.64	1.60	0.28	1.79
Heath Ledger	1.96	1.92	1.22	1.54	1.17	1.66
JoeJ onas	1.35	2.05	0.48	1.92	0.17	1.79
John Cusack	1.89	1.59	0.20	1.37	0.72	1.41
John Travolta	2.56	1.07	0.52	1.68	1.14	1.54
Johnny Depp	2.51	1.16	1.42	1.60	1.05	1.77
Jon Bon Jovi	1.35	2.03	0.17	1.51	0.13	1.66
Justin Chambers	1.25	1.91	1.02	1.60	1.14	1.45
Keanu Reeves	2.18	1.68	0.63	1.50	0.98	1.42
Lance Bass	1.96	1.71	0.06	1.67	0.31	1.72
Leonardo DiCaprio	2.52	1.20	1.27	1.55	1.02	1.60
Luke Wilson	2.58	1.00	1.14	1.37	1.20	1.50
Matt Damon	2.11	1.64	1.17	1.32	1.39	1.43
Matthew McConaughey	2.49	1.06	1.38	1.86	1.39	1.44
Neil PatrickHarris	1.51	1.83	0.16	1.53	0.34	1.31
Nick Lachey	2.00	1.42	1.52	1.48	1.13	1.71
Oscar de la Hoya	2.11	1.73	1.08	1.49	0.95	1.65
Owen Wilson	2.49	1.35	0.33	1.68	1.09	1.59
Pierce Brosnan	2.11	1.63	1.19	1.74	1.31	1.18
Ricky Martin	2.26	1.34	1.53	1.31	0.97	1.70
Robert Downey Jr	1.57	2.05	0.38	1.54	0.70	1.51
Russell Crowe	2.19	1.47	0.55	1.72	0.80	1.44
Ryan Reynolds	1.49	1.98	1.27	1.45	1.33	1.44
Ryan Seacrest	1.44	1.94	0.52	1.65	0.86	1.60
Shia Le Bouf	2.01	1.67	1.06	1.55	1.03	1.53
Tobey Maguire	1.93	2.01	0.78	1.69	1.34	1.25
Tom Cruise	2.65	0.94	1.14	1.56	0.95	1.78
Vince Vaughn	2.36	1.58	0.53	1.62	0.97	1.56
Zac Efron	1.78	1.71	1.50	1.61	1.09	1.68
Group Means	**2.04**		**0.80**		**0.90**	

Unattractive Males						
	Familiarity		Attractiveness		Favorability	
Stimulus Name	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
John C Reilly	1.89	1.75	-1.80	1.40	-0.03	2.02
Ozzy Osbourne	2.04	1.86	-1.64	1.68	-0.06	2.01
stephen Tyler	1.81	1.90	-1.64	1.62	-0.27	2.09
Steve Buscemi	2.03	1.55	-1.61	1.30	0.00	1.63
Willem Dafoe	1.62	2.01	-1.59	1.40	0.05	1.72
Group Means	**1.88**		**-1.66**		**-0.06**	

Neutral Females						
	Familiarity		Attractiveness		Favorability	
Stimulus Name	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Ashlee Simpson	2.28	1.24	1.53	1.36	1.25	1.45
Demi Moore	2.31	1.33	1.53	1.26	1.23	1.31
Mariah Carey	2.58	1.08	1.53	1.50	1.11	1.67
Mena Suvari	1.45	1.86	1.52	1.04	1.16	1.41
Nicole Kidman	2.07	1.72	1.52	1.47	1.31	1.37
Group Means	**2.14**		**1.53**		**1.21**	

Unattractive Females						
	Familiarity		Attractiveness		Favorability	
Stimulus Name	Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Alyson Hannigan	1.62	1.97	-0.05	1.48	0.73	1.43
Amy Winehouse	1.50	2.10	-1.51	1.57	-0.83	1.72
Kirstie Alley	2.08	1.54	-0.31	1.38	0.06	1.50
Pamela Anderson	1.51	1.91	-0.03	1.64	0.00	1.60
Rosie O'Donnel	2.25	1.60	-1.42	1.37	-0.84	1.49
Group Means	**1.79**		**-0.66**		**-0.18**	

Curriculum Vita

Guadalupe Corral was born in Durango, Mexico, on December 15, 1967, to Ismael and Maria Anatolia Corral. She entered the University of Texas at El Paso (UTEP) in the fall of 1999 where she double majored in psychology and sociology. She was actively involved in several honor societies such as Psi Chi and the International Golden Key Honor Society at UTEP. Guadalupe was awarded with the most outstanding senior award in both psychology and sociology and graduated with *Summa Cum Laude* honors she completed her Bachelors of Arts degree at UTEP in May 2003. Guadalupe went on to pursue her Master's degree in the Sociology department at UTEP and graduated in July 2005. Guadalupe was accepted to the Social Cognitive Neuroscience Doctoral Program in the Department of Psychology at UTEP in fall of 2005 and was a recipient of both the National Defense Science and Engineering Graduate Fellowship and the Alliance for Graduate Education and the Professoriate (AGEP) Fellowship. During her doctoral studies, Guadalupe conducted research on evaluative and social categorization processes in Dr. Stephen L. Crites' laboratory. Guadalupe continued to work in Dr. Crites' laboratory until completion of her dissertation research.

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