THE EFFECTS OF FIRST IMPRESSIONS ON PREDICTING HONESTY OUTCOMES USING AUDIOVISUAL INTEGRATION

by

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To my parents, for your encouragement, endless love,

and all your sacrifice

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by

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People automatically and unconsciously process first impressions of faces and voices during social interactions. There are consequences to our first impressions because they can influence and predict a variety of societal outcomes including dating choices, voting behaviors, job interview success, and judicial court rulings. The implications of first impressions also affect perceptions of honesty. As a result, the first impressions we form influence how we evaluate honesty. Perceptions of honesty involve evaluations of how honest, truthful, or deceptive someone appears in a situation. In first impression research, perceptions of honesty (i.e., honesty evaluations) usually focus on high-stakes honesty judgments (e.g., judicial case rulings, police lineups, and police investigations). However, the effects of first impressions on perceptions of honesty are present in our daily social interactions and affect mundane aspects of our lives. For example, in our daily social interactions, we form first impressions of individuals, and this affects how we perceive the honesty of these individuals' opinions, preferences, excuses, or ideas (i.e., low-stakes honesty evaluations). The first goal of this project was to examine whether instantaneous first impression judgments of trustworthiness and dominance predict honesty

outcomes in a low-stakes situation. The results suggest that initial perception of trustworthiness predicts honesty evaluations but only during shorter durations of honesty evaluations. Thus, if participants are presented with longer durations to evaluate honesty, initial trustworthiness ratings do not predict honesty outcomes. The second goal was to examine the early stages of first impression trait judgments and honesty evaluations using thin slices (i.e., 8 and 15-second clip excerpts from video and audio). A minimum of 8 seconds was chosen to give participants enough time for top-down processing and in return, they will have enough information to be able to evaluate honesty. A maximum of 15 seconds was chosen to give participants extra time to process stimuli but not too much time so that there is less risk of attention loss.

The results suggest that when participants are given more time to evaluate honesty and trustworthiness the judgments are more positive, which supports the truth-bias theory. The third goal was to examine whether face and voice cues significantly influence perceptions of trustworthiness (video) and dominance (audio), respectively. Results were consistent with earlier findings that suggest voices are linked to dominance. Videos of individuals describing a movie they liked or disliked that are consistent or inconsistent with their true opinion were used.

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CHAPTER 1

FIRST IMPRESSIONS

As we are introduced to a new colleague, professor, or classmate we tend to form quick first impressions by examining their behavior, facial features, and emotional expressions. These first impressions determine if we trust the individual leading to whether we approach or evade further social interactions (Oosterhof & Todorov, 2008). In our formative years, our elders often reminded us that appearance is misleading, and that beauty is only skin-deep (Zebrowitz, 1997; Zebrowitz, 2017; Zebrowitz & Montepare, 2008). We tend to pass this wisdom along to our children, younger family members, or students; however, when we meet a new person, we unconsciously process their face, emotions, and behaviors forming first impressions. Even young children (i.e., ages 3-6) form first impressions from faces on traits like trustworthiness and dominance that are equivalent to adults (Cogsdill, Todorov, Spelke, & Banaji, 2014). In other words, young children quickly produce trait inferences from faces that are comparable to adults (Cogsdill et al., 2014). Infants also tend to focus their gaze toward attractive human faces (Slater et al., 1998) and when infants view attractive and unattractive animals (e.g., tigers); they frequently gravitate toward the attractive animals (Quinn, Kelly, Lee, Pascalis, & Slater, 2008). This suggests that infants and young children form trait inferences from faces early, which could also indicate an evolutionary function of first impressions (Cosmides & Tooby, 1992; Zebrowitz, 2017). Moreover, research suggests that trait inferences from faces are correlated to social outcomes. For instance, how positively or negatively an individual is judged based on their facial appearance affects a variety of social outcomes like political election results (Klofstad, 2017; Koppensteiner & Stephen, 2014; Mileva, Tompkinson, Watt, & Burton, 2020; Olivola &

Todorov, 2010; Rule et al., 2010; Todorov, Mandisodza, Goren, & Hall, 2005) and teacher evaluations (Ambady & Rosenthal, 1993; Laws, Apperson, Buchert, & Bregman, 2010). Zebrowitz (2017) argued that these findings are contradictory. Even though first impressions from faces may have an evolutionary function and are formed at an early age, they can be incorrect (Zebrowitz, 2017). After all, there is a reason our elders reminded us to not judge people based on appearance because humans can make errors. Yet, processing and inferring traits from first impressions of faces is automatic, swift, and produced at a young age (Zebrowitz, 2017). Individuals encounter this internal and unconscious conflict daily because traits from faces are automatically inferred, yet the brief exposure and fast judgment can lead to inaccuracies (Zebrowitz, 2017).

Inferences from traits are formed automatically and without much individual effort (Carlston & Skowronski, 2005; Newman & Uleman, 1989; Uleman & Kressel, 2013; Uleman, Newman & Winter, 1992; Winter & Uleman, 1984). These quickly formed first impressions produce real-life implications and have a high probability of predicting outcomes in our daily behavior including the formation of platonic relationships (Human, Sandstrom, Biesanz, & Dunn, 2012; Sunnafrank & Ramirez, 2004), dating choices (Kerr et al., 2020), teacher evaluations (Ambady & Rosenthal, 1993; Laws et al., 2010) and political election outcomes (Klofstad, 2017; Koppensteiner & Stephen, 2014; Mileva et al., 2020; Olivola & Todorov, 2010; Rule et al., 2010; Todorov, Mandisodza, Goren, & Hall, 2005). Even though there is a high level of trait evaluation consensus between participants (Sutherland, Rhodes, Burton, & Young, 2020; Zebrowitz, Franklin, Hillman, & Boc, 2013; Zebrowitz & Montepare, 2008), this does not mean that first impressions represent veracity (e.g., trait judgments do not always correlate with an

individual's actual behavior (for a review, see Todorov, Olivola, Dotsch, & Mende-Siedlecki, 2015). Thus, first impressions are formed swiftly, require little cognitive effort, and they produce and predict real-life consequences. Perception of a person's traits, character, or facial features does not always correspond to a person's genuine behavior.

1.1 Forming First Impressions

From the day we are born, we are met with human faces and throughout our lives use human faces to infer identity and examine moods (Bruce & Young, 1986). Faces contain a myriad of information including gender, race, emotional expressions, and features (Bruce & Young, 1986). Furthermore, individuals form trait impressions from faces very quickly and unconsciously. In a series of experiments, Willis and Todorov (2006) examined how people infer the traits of unfamiliar faces with neutral expressions under significant time constraints (i.e., 100 ms, 500 ms, and 1000 ms). Participants formed reliable first impressions of traits like trustworthiness within 100 ms (Willis & Todorov, 2006). The authors hypothesized that the trait of attractiveness would produce the strongest correlation at each time point, but unexpectedly trustworthiness judgments produced the strongest correlational results at each time point (Willis & Todorov, 2006). In 2009, Todorov, Pakrashi, and Oosterhof continued this line of research and found that evaluating the trustworthiness of an unfamiliar face occurred at an average duration of 33 ms (Todorov, Pakrashi, & Oosterhof, 2009). These quick and stable trait impression judgments from faces extend to real-life circumstances as well. There is evidence that people can accurately judge sexual orientation from female faces (Rule, Ambady, & Hallett, 2009) and threat judgments from neutral expressions accurately within milliseconds (Bar, Neta, & Linz, 2006). Evidence of rapid first impression judgments of faces is also found in the brain. For

instance, the amygdala appears to encode attributes of untrustworthy faces automatically even when participants are not tasked with face evaluations. This suggests that evaluating trait inferences from faces is automatic and not always intentional (Engell, Haxby, & Todorov, 2007). Damage to bilateral regions of the amygdala causes a deficit in differentiating between trustworthy and untrustworthy faces (Adolphs, Tranel, & Damasio, 1998). Thus, first impressions are formed quickly, easily, and are linked to amygdala function.

Various personality traits (e.g., dominant, confident, caring, attractive, sociable, trustworthy) are used to form first impressions (Asch, 1946). These traits can be collapsed along two uncorrelated dimensions of dominance (e.g., negative traits) and trustworthiness (e.g., positive traits) for evaluations of faces (Oosterhof & Todorov, 2008). In other words, dominance and trustworthiness represent central dimensions. The authors also reported that the perception of trustworthiness is associated with emotionally expressive (e.g., positive, or negative) facial features (Oosterhof & Todorov, 2008). Therefore, the perception of trustworthiness may prompt an individual to decide whether to approach or avoid someone (Jones & Kramer, 2021; Oosterhof & Todorov, 2008). Facial features associated with dominance and trustworthiness are also largely based on approach and avoidance behaviors. For instance, data driven techniques (e.g., Neural Network Models) have been used to support the position that trustworthiness is associated with the mouth, while dominance is associated with the eyebrows, cheeks, or chin (Vernon, Sutherland, Young, & Hartley, 2014). Eye-tracking studies have indicated that trustworthy features are also associated with the eyes (Hermens Golubickis, & Macrae, 2018; Calvo, Krumhuber, & Frenandez-Martin, 2019). Additionally, eye-movement differences were reported with faces rated as dominant showing greater focus above the eyes while trustworthy

faces showed a focus below the eyes (Hermens et al., 2018). These studies also indicated that the emotion expressed by a face matters. Smiling and happy faces correlated significantly with high trustworthy ratings, while furrowed eyebrows and physical strength correlated to high dominance ratings (Oosterhof & Todorov, 2008; Vernon et al., 2014).

The current literature suggests that *spontaneous trait inferences* (STI) are formed when faces are initially encoded (for a review, see Uleman, Rim, Saribay, & Kressel, 2012). This is supported by false recognition tasks involving actors' faces (Todorov & Uleman, 2002; Todorov & Uleman, 2004). For instance, in false recognition tasks participants were presented with actors' faces paired with specific traits (Todorov & Uleman, 2004). During recall, the faces that had been associated with similar traits produced false recall judgments, which suggests that STIs form at the earlier encoding stage (Todorov & Uleman, 2004). There is also evidence that trait judgments of faces are processed holistically (Todorov, Loehr, & Oosterhof, 2010). Composite faces that combined two halves were rated as being more positive when the halves were matched for trustworthiness compared to faces that were mismatched on that trait, indicating that trait judgments are processed holistically (Todorov et al., 2010).

In addition to the literature on static face judgments, first impressions can also be influenced by observations of "thin slices" of behavior that are less than 5 minutes long (Ambady, Bernieri, & Richeson, 2000). These studies include additional cues such as body movement, voice, and dynamic facial expressions (Ambady et al., 2000). Thus, exposure to thin slices of behavior will generate involuntary initial impressions that can affect how one responds in subsequent social interactions (Ambady, 2010; Ambady, Bernieri, & Richeson, 2000; Ambady & Rosenthal, 1992).

1.1.1 Overgeneralization Hypotheses

First impressions are formed at a young age, last throughout our lifetime, and can bias people toward inaccurate judgments about others. Zebrowitz (2017) argued that this finding is contradictory because first impressions may serve an important evolutionary function, yet first impression judgments can be incorrect (Zebrowitz, 2017). Thus, Zebrowitz (2017) proposed an overgeneralization hypothesis as a possible explanation for this contradiction (Zebrowitz 2011; Zebrowitz & Montepare, 2008). The overgeneralization hypothesis states that when faces possess certain featural characteristics associated with trustworthiness or dominance people judge the individual to behave in accordance with those traits (Zebrowitz 2011; Zebrowitz & Collins, 1997; Zebrowitz & Montepare, 2008). For example, people are widely protective of babies and this automatic response can also lead them to feel protective of adults who have babyface features, as they evoke a protective tendency (Zebrowitz, 2017). This is known as the baby-face overgeneralization effect (Zebrowitz, 2017). Other examples of overgeneralization effects include the familiar-face effect, unfit-face effect, and emotional-face effect (Zebrowitz, 2017). The emotional-face effect may explain why certain faces are perceived as being more trustworthy. The emotional-face overgeneralization effect states that social adaptation leads people to learn which emotional expressions should be avoided or approached (Zebrowitz, 2017). Since people then overgeneralize, their first impression judgments might be influenced by facial structures that they have learned to associate with positive or negative emotional expressions (Zebrowitz, 2017). Thus, individuals having facial features perceived as being associated with trustworthiness might present a positive first impression, even if their actual behaviors are untrustworthy. Said, Todorov, and Sebe (2009) asked participants to evaluate

neutral faces and found that facial structures that are linked to positive or negative emotional expressions affected trait judgments. This finding supports the emotional-face-overgeneralization effect (Said, Todorov, & Sebe, 2009). We can postulate that facial structures that have a predisposition to resemble positive and negative expressions might influence inferences of traits like trustworthiness and dominance in a positive and negative direction, respectively.

1.1.2 Implications of First Impressions

Quick first impressions produce real-life consequences that can affect societal outcomes. As individuals experience novel social interactions, they generate involuntary initial impressions that affect how they respond or make decisions (Ambady, 2010; Ambady et al., 2000; Ambady & Rosenthal, 1992). For instance, prior research suggests that first impressions influence and predict political election outcomes, the success of companies, job evaluations, how we form relationships, and our dating choices.

Research findings indicate that voting behaviors are impacted by first impressions. Voting decisions can be made within as little as 100 ms (Olivola & Todorov, 2010) and these rapid decisions are based on trait inferences from thin slice presentations of social information (Koppensteiner & Stephan, 2014; Todorov et al., 2005). Across cultures, first impressions can impact voting behaviors. Rule et al. (2010) reported that Japanese and American participants' amygdala activation levels in a functional imaging study accurately predicted the political candidates that they would most likely vote for. Additionally, Koppensteiner and Stephan (2014) asked participants who were presented with 15-second silent video clips to rate personality traits and voting likelihood. Results indicated that favorable first impressions of the politicians affected voting probability. Similarly, Mileva, Tompkinson, Watt, and Burton (2020) examined

first impressions of student election candidates from 2-6 second silent video clips, audio-only clips, and integrated audiovisual clips. They found that trustworthiness was the trait that most correlated with election outcomes across conditions (Mileva et al., 2020). Also, Klofstad (2017) found that voting decisions were influenced by positive perceptions of competence based on faces and voices. This indicates that first impressions of faces and voices can influence voting decisions in an integrated manner. Overall, these findings suggest that first impressions can predict outcomes or decisions at both neural and behavioral levels.

Prior research indicates that initial impressions influence the evaluation of employees and the accomplishments of companies. For instance, the success of companies was found to correlate with positive first impressions of CEOs and lawyers (Gorn, Jiang, & Johar, 2008; Re & Rule, 2016; Rule & Ambady, 2008; Rule & Ambady, 2011). Additionally, faces of financial services providers that had features commonly associated with trust were rated as more trustworthy in behavior compared to those with faces that had untrustworthy features (Dean, 2017). Similarly, decisions regarding job applications and hiring have been reported to be impacted by first impressions (Barrick, Swider, & Stewart, 2010; Rucker, Taber, & Harrison, 1981; Wingate & Bourdage, 2019). Likewise, when naïve participants rated the non-verbal behavior of teachers based on video clips shorter than 30 seconds, ratings were correlated with teacher evaluations carried out by actual students (Ambady & Rosenthal, 1993). Follow-up studies with shorter duration silent video clips (6 and 15 seconds) further indicated that first impressions predicted the rating quality of later teacher evaluations (Ambady & Rosenthal, 1993). Additionally, student evaluations at the start and the end of the semester were

significantly correlated indicating that first impressions also have a lasting effect on evaluations (Laws et al., 2010).

First impressions can also predict outcomes in forming and maintaining both platonic and romantic relationships. Earlier research indicated that when students formed positive initial impressions of classmates, they were more likely to sit closer to those classmates and sustain lasting relationships (Sunnafrank & Ramirez, 2004). Another study found that initial first impressions among college students predicted subsequent friendships (Human, et al., 2012). Appearance-based choices like whom to date can also be affected by first impressions with positive judgments increasing interest in pursuing a romantic relationship (Kerr et al., 2020). By contrast, negative first impressions lead to avoidance of further interactions (Blascovich, Mendes, Hunter, & Lickel, 2000). Thus, first impressions can have lasting positive or negative consequences in relationships and dating partner preferences.

These examples illustrate a small portion of the traits and features that are associated with real-world impressions because the literature on the consequences of first impressions is vast (for a review, see Todorov et al., 2015). In conclusion, first impressions are potent, influence people for long periods of time, and have critical positive or negative repercussions on social behavior. They can be studied via multisensory channels, instead of only employing static images of faces. Employing ecologically valid research environments that capture realistic interactions will enable a more comprehensive understanding of first impression consequences. This has been a longtime goal of first impression research and thin-slice judgments are a means to accomplish this goal (Ambady, 2010; Ambady et al., 2000; Ambady & Rosenthal, 1992).

1.1.3 Effects of First Impressions on Honesty Outcomes

The consequences of quick first impression formations have been examined on a variety of social outcomes like the examples provided in the previous section. First impression formations can also affect perceptions of honesty (i.e., honesty judgments or evaluations). As a result, the first impressions we form influence how we evaluate honesty. Honesty evaluations are assessments of how honest, truthful, or deceptive someone appears in a situation. In first impression research, honesty evaluations usually involve high-stakes situations (e.g., judicial case rulings, police lineups, and police investigations). For instance, the first impressions formed by the jury, police officers, eyewitnesses, and investigators can affect perceptions of honesty (i.e., honesty judgment or evaluation). High-stakes honesty evaluations are associated with increased cognitive load processing, emotional arousal or attachment, and consequences (Caso, Gnisci, Vrij, & Mann, 2005; Porter & ten Brinke, 2010; ten Brinke, & Porter, 2012). Currently, most research examines the effects of first impressions on high-stakes honesty outcomes. However, the effects of trait impressions on perceptions of honesty are present in our daily social interactions and affect mundane aspects of our lives. For example, in our daily social interactions, we quickly form first impressions of people. These first impressions affect how we judge these individuals' opinions, preferences, excuses, feelings, or ideas (DePaulo et al., 2003; Hancock, 2007). Moreover, the influence of first impressions has not been adequately explored in low-stakes honesty outcomes. Low-stakes honesty outcomes are associated with minimal consequences, decreased emotional arousal or attachment, and cognitive load processing (Caso et al., 2005; Porter & ten Brinke, 2010; ten Brinke, & Porter, 2012).

As previously mentioned, most research investigates the effects of first impressions on high-stakes honesty outcomes. For instance, mock police lineups suggest that faces with features linked to criminality are more likely to be chosen as the culprits (Flowe & Humphries, 2011). While people with facial features associated with the criminal acts that they are tried for receive guilty verdicts, regardless of the evidence (Dumas & Testé, 2006). Thus, first impressions of the defendants affect real-life or high-stake decisions like being selected in a police lineup and receiving a guilty sentence even with a lack of evidence. Furthermore, the race and traits of the suspects also affect the consequences of judicial rulings. Research indicates that individuals get more severe sentences with Afrocentric facial features (Blair, Judd, & Chapleau, 2004) and that suspects with stereotypical Black features are more likely to receive death penalties (Eberhardt, Davies, Vaughns, & Johnson, 2006). Traits like trustworthiness also affect perceptions of guilt with participants rating offenders convicted of life sentences as more trustworthy, than those convicted of the death penalty (Wilson & Rule, 2016). Additionally, participants paired faces to the length of sentences accurately without additional context (Wilson & Rule, 2016). Moreover, the gender and weight of the individual influence perceptions of guilt. For instance, Schvey, Puhl, Levandoski, and Brownell (2013) found that men rate overweight women as increasingly more guilty than lean female defendants. Perceptions of guilt were also affected by the level of masculine physical appearance (i.e., low, medium, high) across gender (Ward, Flowe, & Humphries, 2012). These studies suggest that how one is perceived on various traits (e.g., trustworthiness) and features (e.g., race, weight, gender) does not correlate with actual behavior (Rule, Krendl, Ivcevic, & Ambady, 2013). Thus, how an individual infers or perceives a trait or feature of a target does not necessarily translate to being consistent with the actual behavior of

the target. Therefore, one can rate someone as very trustworthy and then judge their behavior positively, when their actual behavior is dishonest.

According to Porter and ten Brinke (2009), these erroneous judgments based on the initial impressions of traits, features, or emotional expressions are consistent with Dangerous Decision Theory (DDT) (Porter, ten Brinke, & Gustaw, 2010). DDT posits that a perceiver's initial rating of trustworthiness will have long-lasting effects and will guide the perceiver's evaluations, even when the perceiver receives updated information on the target that counters their verdict (Porter & ten Brinke, 2009; Porter et al., 2010). For instance, if a juror (i.e., perceiver) initially judged an offender (i.e., target) as untrustworthy, they are more likely to ignore or suppress counterarguments brought up by the judge or other jury members due to the long-lasting effects of the first impression trait of trustworthiness (Porter & ten Brinke, 2009; Porter et al., 2010). To further examine DDT, Baker, Porter, Brinke, and Mundy (2016) asked individuals to assess dichotomous honesty (i.e., judging if someone is lying or not) judgments and rate trustworthiness after viewing twenty audio or video (i.e., the average length of 17 seconds) clips of relatives imploring for the return of their loved one. Half of the individuals from the videos had been sentenced for the murder of the missing person, while the other half of the individuals from the videos had been acquitted (Baker, Porter, Brinke, & Mundy, 2016). The participants rated the level of honesty expressed in video or audio clips before or after rating the trustworthiness of static images of the individuals (Baker et al., 2016). The authors examined the relationship between trustworthiness and honesty evaluations (Baker et al., 2016). For example, participants who rated individuals from still images as more trustworthy also rate that person as more honest when viewing the video of that person and vice versa. However, the investigators were not

interested in examining whether the participants were accurate in their honesty assessments because humans are often prone to commit errors when detecting deception (Bond & DePaulo, 2006; Hartwig & Bond, 2011; Meissner & Kassin, 2002). Additionally, people often do agree on whom they perceive as trustworthy and are not able to reliably predict people's real-life behavior from their perceptions of trustworthiness (e.g., no significant difference of trustworthy ratings between military heroes and offenders) (Rule, et al., 2013). The results of the Baker et al. (2016) study indicated that ratings of trustworthiness and honesty were significantly correlated, which suggests that how one rates the first impressions of trustworthiness (e.g., rating a still image of a face from video) will correlate with honesty evaluations. This outcome is consistent with O'Sullivan's (2003) and Korva, Porter, O'Conner, Shaw, and ten Brinke's (2013) findings that perception of trustworthiness had a positive relationship with honesty evaluations and that trustworthy looking individuals evoke strong biases in the observer consistent with the predictions of DDT. Moreover, it should be noted that the authors predicted that ratings of facial trustworthiness would not correlate with honesty evaluations in the audio condition (Baker et al., 2016). The DDT framework relies on facial appearance and in the audio condition, there is no facial appearance to influence honesty judgments (Baker et al., 2016). Lastly, Baker et al. (2016) suggested that the influence of quick first impressions of trustworthiness should be further explored in a low-stakes honesty situation. To summarize, initial judgments of trustworthiness that were assessed from facial images were correlated with honesty judgments, which were measured using dynamic behavior displayed in video format. In other words, if individuals rated someone as trustworthy, they also evaluated them as more honest in the video condition (i.e.,

family members imploring for the return of their loved one), even if the individual in the video was lying and vice versa (Baker et al., 2016).

This brings me to the first aim of my dissertation project. To examine the DDT framework in a low-stakes honesty situation and due to the lack of research on the consequences of first impressions in low-stakes honesty outcomes, the first aim will examine whether first impression traits predict or influence the subsequent perception of honesty in the video condition. Even though deception and honesty are closely linked (Jenkins, Zhu, & Hsu, 2016) and at times used interchangeably (e.g., dishonest, deceptive), I will not examine whether individuals can accurately detect if someone is lying or telling the truth. Rather, I am interested in whether the perception of trustworthiness and dominance will influence judgments of honesty. In other words, do instantaneous first impression formations based on the traits of trustworthiness and dominance predict, or influence, how participants evaluate the honesty of a movie opinion? For instance, if someone formed a positive first impression of an individual based on a still image displaying a neutral facial expression and subsequently rated them as being trustworthy, would they then evaluate them as honest in the thin slice judgment (i.e., video only), even if their behavior is dishonest (i.e., lying). Videos of individuals describing a movie they liked or disliked that are consistent or inconsistent with their true opinion will be used for the honesty evaluation. Participants will rate their initial impressions of the individuals using a still image of that person displaying a neutral facial expression from the video. The specific hypotheses for this aim are detailed in Chapter 3 under the Aim 1 section.

CHAPTER 2

THIN SLICES AND AUDIOVISUAL INTEGRATION

2.1 The Effects of Thin Slice Durations

In first impression research, thin slices represent short behavior streams (Ambady et al., 2000; Ambady, 2010; Ambady & Rosenthal, 1992) and are usually presented via brief video or audio clips. There is a lack of consensus on the optimal duration of thin slices. Current research suggests that the duration of thin slices depends on the behavior that is being studied (for review, see Murphy & Hall, 2021). In first impression research, thin audio and video slices have been used to predict teacher performance (Ambady & Rosenthal 1993), student election voting outcomes (Mileva et al., 2020), and honesty evaluations (Baker et al., 2016). The duration of thin slices in these first impression studies varied between 3 to 60 seconds.

For my dissertation project, I will use 8 and 15-second clips. These will be selected from longer duration videos of individuals describing an opinion about a movie that was consistent or inconsistent with their true opinion. A minimum of 8 seconds was chosen to give participants enough time for top-down processing and in return, they will have enough information to be able to evaluate honesty. A maximum of 15 seconds was chosen to give participants extra time to process stimuli but not too much time so that there is less risk of attention loss.

For Aim 2, I will examine whether honesty evaluations will be judged as more honest when thin slices increase from shorter to longer durations. Thin slices of longer duration will provide participants with more details about why the target does or does not (i.e., individual from the video) like the movie. When participants receive longer thin slices with more verbal and non-verbal information regarding the targets' true or false opinion of the movie, participants will

judge them to be more honest. This is based on the truth-bias and Truth-Default Theory (TDT). TDT suggests that people are more likely to rate others as honest unless they are primed to distrust them (Levine, 2014). Levine (2014) argued that TDT and truth-bias are not interchangeable ideas. Truth-bias suggests individuals will assume others are truthful even when prompted to suspect deceit (Levine, Park, & McCornack, 1999). On the other hand, TDT suggests that humans will unconsciously or passively default to assume others are honest in social interactions unless prompted to suspect dishonesty (Levine, 2014). The evidence for truth-bias is vast. For instance, large-scale surveys demonstrate that people are generally honest in their daily lives (Serota, Levine, & Boster, 2010), and results from a meta-analysis indicate that 50% of honesty evaluations are rated as truthful (Bond & DePaulo, 2006). Evidence for TDT is still emerging. A recent study suggests that even when participants are primed to expect deceit, they are still more likely to be biased toward truth (Clare & Levine, 2019). Also, participants do not voluntarily assume dishonesty in unprimed circumstances (e.g., deception is present, but the participant is unaware) because messages are assumed to be honest (Clare & Levine, 2019).

Truth-bias was measured by the number of times that participants assumed honesty in a particular situation (Levine, 2014). However, I am not interested in the percentage of times the participants rated a message as honest in one sitting. Rather, I will investigate whether increasing the duration of thin slices causes honesty evaluations to significantly increase as more honest. Thus, I will examine whether the assumption of honesty prevails (i.e., truth-bias and TDT) as exposure times increase. Lastly, to my knowledge, this would be the first study to examine if humans default to perceiving others as mostly honest when thin slices increase from shorter to longer durations.

Next, I am interested in investigating whether trait judgments will become more negative when thin slices are increased from shorter to longer durations. Thus, dominance trait ratings will be rated as more dominant, and trustworthy trait ratings will be rated as less trustworthy with increased exposure times. Previous research by Willis and Todorov (2006) established several features of this slice effects on ratings. They reported a minimal exposure time required to form stable trait impressions of faces is 100 ms. When exposure times were increased to 500 ms trait ratings became more negative, however, at 1000 ms there were no significant changes in trait ratings. Therefore, due to the increased exposure time (i.e., 100 ms to 500 ms) participants had the ability to evaluate traits in more detail and by 1 second the trait impressions were unchanged (Willis & Todorov, 2006). My project only has two exposure times (i.e., 8 and 15-second clips), and more than 15 seconds of exposure will be needed for traits to remain unchanged. Overall, I am hypothesizing that in the early stages of trait formations and honesty evaluations individuals will be judged as more honest, but their first impression of traits will become more negative.

2.2 Audiovisual Integration

The voice is often described as an "auditory face" due to its similarity to face processing (for review, see Schirmer 2018). According to Belin (2017), there are three key similarities between faces and voices. First, neural data demonstrates that both voices and faces have dedicated cortical areas in the brain that respond to the relevant stimuli (Belin, 2017). For instance, the fusiform face area (FFA) for faces (Bernstein & Yovel, 2015; Kanwisher, McDermott, & Chun, 1997) and temporal voice areas (i.e., superior temporal gyrus and sulcus) for audition (Belin, Zatorre, Lafaille, Ahad, & Pike, 2000; Sammler, Grosbras, Anwander, Bestelmeyer, & Belin, 2015). Additionally, emotional expression perception has been localized

to the same frontal lobe regions (i.e., the dorsomedial prefrontal cortex and the inferior frontal gyrus) for faces and voices (Dricu & Fürhholz, 2016). Second, faces and voices give us the ability to identify individuals (Belin, 2017). The ability to recognize individuals either from faces or voices is essential for social interactions. However, people can experience recognition deficits for either faces or voices. The inability to recognize faces is known as prosopagnosia (Bodamer,1947), which can occur due to brain lesions or can be genetically inherited (Duchaine & Nakayama, 2006). The inability to identify the voice of a speaker is known as phonagnosia (Van Lancker, Cummings, Kreiman, & Dobkin, 1988; Van Lancker, Kreiman, & Cummings, 1989). Current findings also suggest that there are cases of genetically inherited or "developmental phonagnosia" (Garrido et al., 2009; Roswandowitz et al., 2014; Xu et al., 2015). Third, social evaluations from personality traits are formed for both faces and voices (Belin, 2017). In other words, we form impressions of faces and voices from brief social interactions. Social attributions for both faces (Oosterhof & Todorov, 2008) and voices (McAleer, Todorov, & Belin, 2014) can be collapsed on two uncorrelated dimensions of dominance (e.g., negative traits) and trustworthiness (e.g., positive traits). Two-dimensional models are not exclusive to faces and voices. Comparable two-dimensional models are found in social evaluations of relationship preferences (Fletcher, Simpson, & Thomas, 2000), stereotypical groups (Cuddy, Fiske, & Glick, 2008; Fiske, Cuddy, & Glick, 2007), and judgments of semantic features (Osgood, 1969). Moreover, the dimensions of trustworthiness and dominance correspond to the social perception dimensions of warmth and competence (Sutherland, Oldmeadow, & Young, 2016; Walker & Vetter, 2016).

There are many other similarities between voices and faces. For example, people prefer faces and voices that are comprised of average features and facial metrics. Previous research demonstrates that composite faces (i.e., formed from average faces) (Langlois & Roggman, 1990) and voices morphed from composites of average voices are rated as more attractive (Bruckert et al., 2010). Furthermore, the integration of faces and voices occurs in a highly automatic way. Even when participants are asked to ignore one modality, they still tend to integrate faces and voices (Gelder & Vroomen, 2000). The main difference between voices and faces is temporal processing. Impressions are formed much quicker from faces but take more time to develop based on voices (Schirmer, Meck, & Penney, 2016; Schirmer, Ng, Escoffier, & Penney, 2016).

2.2.1 Voice and Dominance

The connection between voice and dominance has been studied extensively. Seminal papers by Morton (1977) and Ohala (1984) argue that lower vocal pitch is linked to dominance and aggression not just among humans but across other species as well. Voice pitch is determined by fundamental frequency or F0 (Titze, 2000). There are differences between male and female voice pitch. On average males have lower voice pitch than females (Titze, 2000). Also, voice can be evaluated on various types of social trait judgments. For instance, voices have been examined on personality traits like trustworthiness, dominance, and attractiveness (detailed examples in the upcoming section). Studies also suggest that lower pitch and dominance are more strongly linked in male voices than in female voices (McAleer et al., 2014; Tusing & Dillard, 2000).

2.2.2 Trait Evaluations and Audiovisual Integration

There are a limited number of studies that have examined the impact of integrated audiovisual stimuli and social trait judgments. Currently, most studies have separately investigated the influence of faces and voices on trait judgments. Vocal cues have been paired with various personality judgments. For instance, evidence investigating the role of voices in personality judgments suggests that men with lower voice pitch are rated as more attractive (Feinberg, Jones, Little, Burt, & Perrett, 2005). Moreover, lower voice pitch is rated as more dominant in both sexes (Borkowska & Pawlowski, 2011; Collins, 2000; Hodges-Simeon, Gaulin, & Puts, 2010; Puts, Gaulin, & Verdolini, 2006; Puts, Hodges, Cárdenas, & Gaulin, 2007). Higher pitch voices are judged as less agreeable and more neurotic (Scherer, 1978). In a study by Stern et al. (2021), participants' own voice recordings were analyzed and compared with their individual personality judgments. They found that lower voice pitch is correlated with participants that are more extroverted and dominant (Stern et al., 2021).

The few studies that have examined paired voices and faces provide us with clues regarding the integrative processing of audio and visual channels. Plus, these studies also give us an idea of which signals dominate or drive particular social trait judgments. A study by Zuckerman demonstrated that the trait of attractiveness was equally affected by both modalities (Zuckerman, Miyake, & Hodgins, 1991). Mook and Mitchell (2019) expanded this research further by varying the levels of facial and vocal attractiveness. They found that altering the attractiveness of voices does not significantly affect facial attractiveness ratings (Mook & Mitchell, 2019). However, when facial attractiveness is altered voices are judged to be less attractive (Mook & Mitchell, 2019). These authors suggested that faces and voices impact the

trait of attractiveness unequally with facial cues holding more weight for the trait of attractiveness (Mook & Mitchell, 2019). Additionally, the impact of audiovisual integration has been researched with traits including trustworthiness and dominance. When participants rated trustworthiness in a voice only, face only, and face and voice paired condition, the results suggest that facial cues affect trustworthiness ratings significantly more than voices (Tsankova et al., 2015). A similar result confirmed this finding. In a paradigm consisting of a simultaneous face and voice condition with varying levels of facial and vocal pitch valence, results indicated that trustworthiness judgments are impacted by faces (Mileva, Tompkinson, Watt, & Burton, 2018). On the other hand, dominance judgments were impacted by voices (Mileva et al., 2018). A study by Rezlescu et al. (2015) reported slightly different findings. They reported that trustworthiness ratings are equally impacted by both face and voice signals (Rezlescu et al., 2015). Furthermore, their results established that attractiveness and dominance are significantly impacted by face and voice cues, respectively (Rezlescu et al., 2015). The inconsistencies between these results may be due to the type of stimuli presented. Rezlescu asked participants to rate brief vowel (e.g., audio of individuals saying vowels A, E, O) utterances, while both Tsankova and Mileva employed paradigms with full sentences (e.g., audio of individuals reading a sentence). Therefore, Rezlescu's findings do not represent social situations that are encountered in an ecological setting.

2.2.3 First Impressions and Audiovisual Integration

Studying faces and voices with paired and unpaired paradigms provides us with some evidence about the signals that influence particular trait judgments. The next step is to examine how face and voice channels affect trait judgments in an ecologically valid setting. Only a few

studies have analyzed the effects of voice and face signals on social outcomes. Likewise, most of these studies analyzed the effects of voices and faces on social outcomes separately. For instance, in the courtroom, a lawyer will have an edge if their voice is judged as less masculine (Chen et al., 2016). Furthermore, facial trustworthiness is linked to how one rates guilt with participants rating offenders convicted of life sentences as more trustworthy than those convicted of the death penalty (Wilson & Rule, 2016). Voting behaviors are also influenced by voice and face signals. For instance, voting outcomes were demonstrated to be positively influenced by candidates with lower-pitched voices (Tigue, Borak, O'Connor, Schandl, & Feinberg, 2012). Plus, male candidates increasingly benefit from lower-pitched voices (Tigue et al., 2012). A study by Klofstad (2017) suggests that when competent faces are paired with lower-pitched voices it will influence voting choices. Additionally, Koppensteiner and Stephan (2014) asked participants who were presented with 15-second silent video clips to rate personality traits and voting likelihood. Results indicated that favorable first impressions of the politicians affected voting probability. Similarly, Mileva, Tompkinson, Watt, and Burton (2020) examined first impressions of student election candidates from 2-6 second silent video clips, audio-only clips, and integrated audiovisual clips. They found that trustworthiness was the trait that most correlated with election outcomes across conditions (Mileva et al., 2020). Overall, impressions of voices and faces indicate that voting behaviors (Koppensteiner & Stephan, 2014; Mileva et al., 2020; Tigue, Borak, O'Connor, Schandl, & Feinberg, 2012) and courtroom decisions (Chen, Halberstam, & Yu, 2016; Wilson & Rule, 2016) are predicated by both modalities. Lastly, low-pitched male voices revealed a greater effect on first impressions of males in forced-choice tasks but a similar effect was not observed with female participants under similar conditions (Tsantani,

Belin, Paterson, & McAleer, 2016). This led the authors to conclude that the context of the situation does not affect the preference for low-pitched male voices, but the preference for female voices depends on the situation (Tsantani et al., 2016).

Here I will further examine how face and voice cues affect trait judgments (i.e., trustworthiness and dominance) in a controlled naturalistic setting (i.e., video and audio of people honest or dishonest). In other words, do voice and face signals contribute significantly to the first impression judgments of dominance and trustworthiness, respectively. I predict that facial cues will significantly influence the video modality. Thus, trustworthy trait ratings will appear more trustworthy for the video modality. There are three reasons for this prediction: 1) trustworthiness links to honesty, 2) trustworthiness links to facial cues, and 3) trustworthiness links to emotionality.

First, participants will be asked to judge the trustworthiness of an individual while they express either an honest or dishonest opinion about their movie. As previously discussed, DDT posits that a perceiver's initial rating of trustworthiness will have long-lasting effects and will guide the perceiver's evaluations (Porter & ten Brinke, 2009; Porter et al., 2010). In addition, the DDT framework relies on facial appearance, and in the audio condition, there are no facial appearances to influence trait judgments (Baker et al., 2016). Thus, the facial cues from the video will significantly affect trustworthy ratings. Second, studies examining the influence of voice and face signals on social trait ratings suggest that trustworthiness judgments are influenced by facial cues (Mileva, et al., 2018; Tsankova et al., 2015). Third, the trait of trustworthiness is linked to emotionality. Oosterhof and Todorov (2008) reported that the perception of trustworthiness is associated with emotionally expressive (e.g., positive, or

negative) facial features (Oosterhof & Todorov, 2008). Perception of dominance is associated with physical strength (Oosterhof & Todorov, 2008). Furthermore, Tsankova et al. (2015) argues that facial trustworthiness is an emotional dimension. This supports previous research which showed that faces significantly affect inferences of emotion (Krumhuber & Manstead, 2009; Hess, Kappas, & Scherer; 1988). Therefore, facial cues from the video are predicted to significantly affect trustworthy trait judgments.

I also predict that voice cues will significantly influence the audio modality. Thus, dominant trait ratings are predicted to be rated as more dominant for audio modality. There are two reasons for this prediction: 1) dominance judgments link to voice cues, and 2) audio stimulus consists of all-male speakers. First, prior studies have suggested that dominance judgments are influenced by voices (Mileva et al., 2018; Rezlescu et al., 2015). Second, the stimuli for my project consist of all-male speakers. Research has consistently linked the effects of males' lower voice pitch on dominance (McAleer et al., 2014; Morton, 1977; Ohala, 1984; Puts et al., 2006; Puts et al., 2007; Tusing & Dillard, 2000). Therefore, the voice cues from the audio modality will significantly affect dominance trait ratings.

CHAPTER 3

AIMS AND HYPOTHESES

3.1 Aim 1

The first aim of this project is to investigate whether perceptions of trustworthiness and dominance will influence judgments of honesty in the video condition (with sound). I will examine whether initial first impressions of static images of individuals' faces predict honesty evaluations in the later video condition (Baker et al., 2016; Korva et al., 2013; Porter et al., 2010; Porter & ten Brinke, 2009; O'Sullivan, 2003). I predict that individuals whose faces are rated as being higher in trustworthiness initially will be evaluated as more honest in the later video presentation compared to individuals whose static face images are rated as less trustworthy. Regarding dominance, I predict that individuals whose faces are rated as more dominant initially will be evaluated as being less honest in the video presentation compared to individuals whose faces are rated as less dominant initially.

3.2 Aim 2

The second aim of this project is to investigate the effects of increasing the duration of thin slice behavior clips from 8 to 15 seconds on honesty evaluations, confidence ratings, trustworthiness trait ratings, and dominance trait ratings. My first hypothesis is that individuals will be rated as more honest as thin slice duration increases from (8 sec) to (15 sec) (based on Clare & Levine, 2019; Levine, 2014). Willis and Todorov (2006) found that when participants are given more time to judge traits, the ratings were more negative, but confidence ratings increased. Thus, my second hypothesis is that dominance trait ratings will be rated as more dominant as thin slices increase from shorter to longer durations. The third hypothesis is that

trustworthy trait ratings will be rated as less trustworthy as thin slices increase from shorter to longer durations. My fourth hypothesis is that participants will rate their confidence being higher as thin slice durations increase from shorter to longer durations.

3.3 Aim 3

The third aim of this project is to investigate whether ratings of trustworthiness and dominance are affected by changing the sensory modality of the stimuli (i.e., video and audio). Previous research suggests that dominance judgments are influenced more by the voice or audio, however, faces have been indicated to have a greater impact on trustworthiness ratings (Mileva et al., 2018; Rezlescu et al., 2015; Tsankova et al., 2015). Therefore, my first hypothesis is that trustworthy trait ratings will be higher for the video condition compared to the audio condition. My second hypothesis is that the dominance trait ratings will increase for the audio modality relative to the video modality.

CHAPTER 4

METHODS

4.1 Participants

In total, 404 participants were recruited from Prolific (www.prolific.co), an online recruitment platform. This participant recruitment number was based on a power analysis. I used partial omega squared to calculate the effect sizes, because it is less biased than eta squared, or partial eta squared (Lakens, 2013). Medium partial omega squared effect sizes (i.e., 0.06 $\hat{\omega}\frac{2}{p}$) were used for the main factor of stimulus modality and small effect size (i.e., 0.01 $\hat{\omega}\frac{2}{p}$) for the main factor of time. I used the "effectsize" (Ben-Shachar, Lüdecke, & Makowski, 2020) and "pwr2" (Lu, Liu, & Koestler, 2017) packages from R to produce a power analysis (R Core Team, 2022). With a set power of 0.80, significance level at 0.05, Cohen's f at 0.08, and Cohen's f at 0.20 for the main factors, the power analysis produced 404 participants in total.

Twelve participants were excluded from the analysis. Nine participants did not finish the entire study and three participants failed more than one attention check. Thus, 392 participants (M_{age} = 26.15, SD_{age} = 4.79, n = 211 females, n = 181 males) data were used for the analysis. Study procedures were approved by the UT Dallas Institutional Review Board. Participants were paid $8.00 for their participation. See Table 4.1 for a demographic analysis of gender, ethnicity, and level of education. The inclusion criteria specified that participants must be native English speakers between the ages of 18 to 35 and have normal or corrected vision. In addition, participants with self-reported hearing problems were excluded because this study includes an audio condition. Older adults were excluded because prior research indicates that older adults

(e.g., ages on average 65 to 90) and younger adults (e.g., ages on average 18 to 35) perceive the trustworthiness of faces differently. Older adults may be more susceptible to the trust bias (i.e., predisposition to trust more) (Bailey et al., 2016; Cassidy, Boucher, Lanie, & Krendl, 2019), own-age bias (i.e., predisposition to favor one's own age group) (Holm & Nystedt, 2005; Slessor, Phillips, Ruffman, Bailey, & Insch, 2014), and positivity bias (i.e., predisposition to respond more positively). For example, older adults tend to be more inclined to respond positively to negatively valenced faces with emotional expressions, while young adults have better recall and respond negatively to the same stimuli (Grady, Hongwanishkul, Keightley, Lee, & Hasher, 2007; Grühn, Scheibe, & Bates 2007; Isaacowitz, Wadlinger, Goren, & Wilson, 2006). Therefore, these biases can affect how older adults perceive the trustworthiness of faces.

Table 4.1. Gender, Ethnicity, and Education Level Demographics

Demographics	*n*	%
Ethnicity		
African American	49	12.50%
Afro Caribbean	1	0.26%
Asian	42	10.71%
Caucasian	242	61.73%
Latino or Hispanic	29	7.40%
Native American	2	0.51%
Native Hawaiian or Pacific Islander	2	0.51%
Two or More	21	1.02%
Prefer not to say	4	5.36%
Education		
Some High School	3	0.77%
High School/GED	57	14.54%
Trade School	3	0.77%
Some College	112	28.57%
Associate Degree	27	6.89%
Bachelor's Degree	131	33.42%
Master's Degree	52	13.27%
MD/PhD or higher	4	1.02%
Prefer not to say	3	0.77%
Total	**392**	**100%**

4.2 Stimuli

The stimuli for this project consisted of 24 videos that were collected for a previous study (Young, 2016). In the videos, individuals describe a movie that they liked or disliked that is consistent and inconsistent with their true opinion. The individuals in the videos were Caucasian males between the ages of 18 to 35. Twelve of the videos featured people providing their authentic opinion (i.e., honest) and 12 included people providing a fabricated opinion (i.e., dishonest). The individuals in the videos were tasked with describing their true opinion of the movie and then describing the situation opposite to their true opinion. For example, if they picked a movie that they disliked, they described why they disliked the movie (i.e., true opinion), and then in a separate video, they described why they liked the movie (i.e., opposite of their true opinion). If they were successful in deceiving an observing research assistant regarding their true opinion, they received an additional monetary incentive in that prior study. Lastly, each of the 24 videos are from different individuals.

The original videos are approximately 85 seconds long and were edited to 8 and 15 second clips in iMovie (iMovie, 2022). They were edited to 1080p resolution, volume was adjusted (e.g., increase volume), and any shirt design art was cropped. As the clips end, they faded to black at 300 ms to aid in a smooth and awkward free transition. The video clips were converted to an audio version for the audio condition. Screenshots of neutral facial expressions were captured from the videos for the Face Trait Rating task. Clips were edited to ensure that individuals are not cut off mid-word. Consequently, some of the clips are 1 to 2 seconds shorter or longer depending on editing. At the beginning of the videos many of the individuals start their sentences with long pauses and verbal filler statements (e.g., “um”, “okay”, “all right” or “well”).

These long pauses were removed to save time. In each clip, individuals began by stating the name of the movie and then discussing why they liked or disliked the movie. The duration of the description of why they liked or disliked a movie depended on the length of the clips (i.e., 8 or 15 seconds). Table 4.2 provides the timing of the edited videos, the ethnicity of the individual in the videos, if honest or dishonest, and the movie they are giving their opinion on. Individuals appear only once; each video is of a different person.

Table 4.2. Video Stimuli Summary

Video #	8 sec	15 sec	Ethnicity	Honest or Dishonest	Movie (Year)
1	10	16	C	Dishonest	When Harry Met Sally (1989)
2	7	16	C	Dishonest	Life of Pi (2012)
3	9	17	C	Dishonest	Guardians of the Galaxy (2014)
4	8	15	C	Dishonest	Wolf of Wall Street (2013)
5	9	17	C	Dishonest	The Hangover II (2011)
6	6	15	C	Dishonest	Skyfall (2012)
7	8	15	C	Dishonest	Fury (2014)
8	8	19	C	Dishonest	Zero Dark Thirty (2012)
9	8	16	C	Dishonest	Twilight (2008)
10	9	15	C	Dishonest	The Hangover (2009)
11	8	16	C	Dishonest	Gravity (2013)
12	7	17	C	Dishonest	Into the Woods (2014)
13	8	15	C	Honest	Kingsman: The Secret Service (2014)
14	8	16	C	Honest	Wreck-It Ralph (2012)
15	7	15	C	Honest	Lone Survivor (2013)
16	8	15	C	Honest	Gravity (2013)
17	8	15	C	Honest	Super Troopers (2001)
18	9	15	C	Honest	Matrix (1999)
19	7	18	C	Honest	Iron Man 3 (2013)
20	8	15	C	Honest	Django Unchained (2012)
21	9	17	C	Honest	Pitch Perfect (2012)
22	8	15	C	Honest	Guardians of the Galaxy (2014)
23	8	16	C	Honest	Twilight (2008)
24	8	16	C	Honest	Les Misérables (2012)
Average	**8**	**15.91**			

4.3 Preliminary Ratings

As previously noted, screenshots of individuals displaying neutral facial expressions were captured from the videos. These screenshots were rated in a preliminary study by 50 participants (M_{age} = 25.35, SD_{age} = 4.12, n = 32 females, n = 18 males). Participants were recruited from Prolific (www.prolific.co), an online recruitment platform. Neutral facial expressions can fluctuate and resemble emotional expressions that can affect the perception of trustworthiness and dominance (Todorov, 2008; Oosterhof & Todorov, 2009; Said et al., 2009; Zebrowitz & Montepare, 2008). Thus, the purpose of the preliminary ratings was for the facial images to be pre-rated on the neutrality of the facial expressions before these images were used for my dissertation project.

A naive group of research assistants rated the best 3 static screenshots (i.e., facing forward, mouth closed, neutral facial expression) from each video. In total, 72 screenshots were rated for the preliminary ratings (for an example of a screenshot see Figure 4.1). Participants rated the emotional expressions of the screenshots. Participants viewed a face and were asked to "Rate the emotion of this face". Since Todorov (2008) found that on the dimension of facial trustworthiness ratings, angry expressions are viewed as untrustworthy and happy expressions are viewed as trustworthy, the responses ranged from 1 (very happy), 4 (neutral), and 7 (very angry) on a Likert scale (see Figure 4.1). The faces that were on average rated as neutral (i.e., between a 3 and 5) on the Likert scale were used in the Face Trait Rating task where participants rated perceptions of trustworthiness and dominance. The average response for the chosen screenshots was 4.05. Lastly, 24 screenshots were selected (i.e., one screenshot from each video).

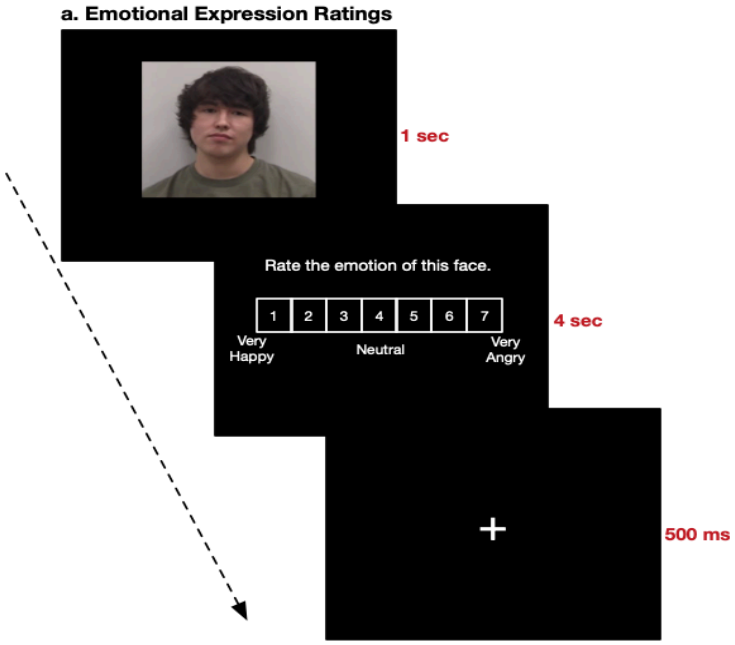

Figure 4.1. An example of the procedures for the emotional expression ratings (a). All images were randomized.

4.4 Procedure

The study was hosted by Gorilla Experiment Builder (www.gorilla.sc), an online experiment platform (Anwyl-Irvine, Massonnié, Flitton, Kirkham, & Evershed, 2019). First, participants clicked on a link to begin the study on their own computer (i.e., desktop or laptop). After completing the informed consent and demographics questionnaire, all participants started the Face Trait Rating task. In this task, participants rated faces on trustworthiness and dominance on a seven-point scale. Thus, participants viewed a face for 150 ms followed by the question "How trustworthy is this person?" and in a separate block they rated "How dominant is this person?" (see Figure 4.2). The participants rated these faces on a 7-point Likert scale with responses between 1 (not at all) and 7 (extremely). They viewed the face once in each block because I am interested in the participant's first impressions. Participants were instructed to

respond quickly with their "gut feeling". As previously noted, the facial images (i.e., neutral facial expressions) that participants are rating in the Face Trait Rating task are of the same individuals they will watch and listen to in the video or audio conditions. Whether participants watched the video or listened to the audio was determined by randomized group assignment. Furthermore, these faces were pre-rated in the Preliminary Ratings to ensure that they had neutral expressions (see Preliminary Ratings section above).

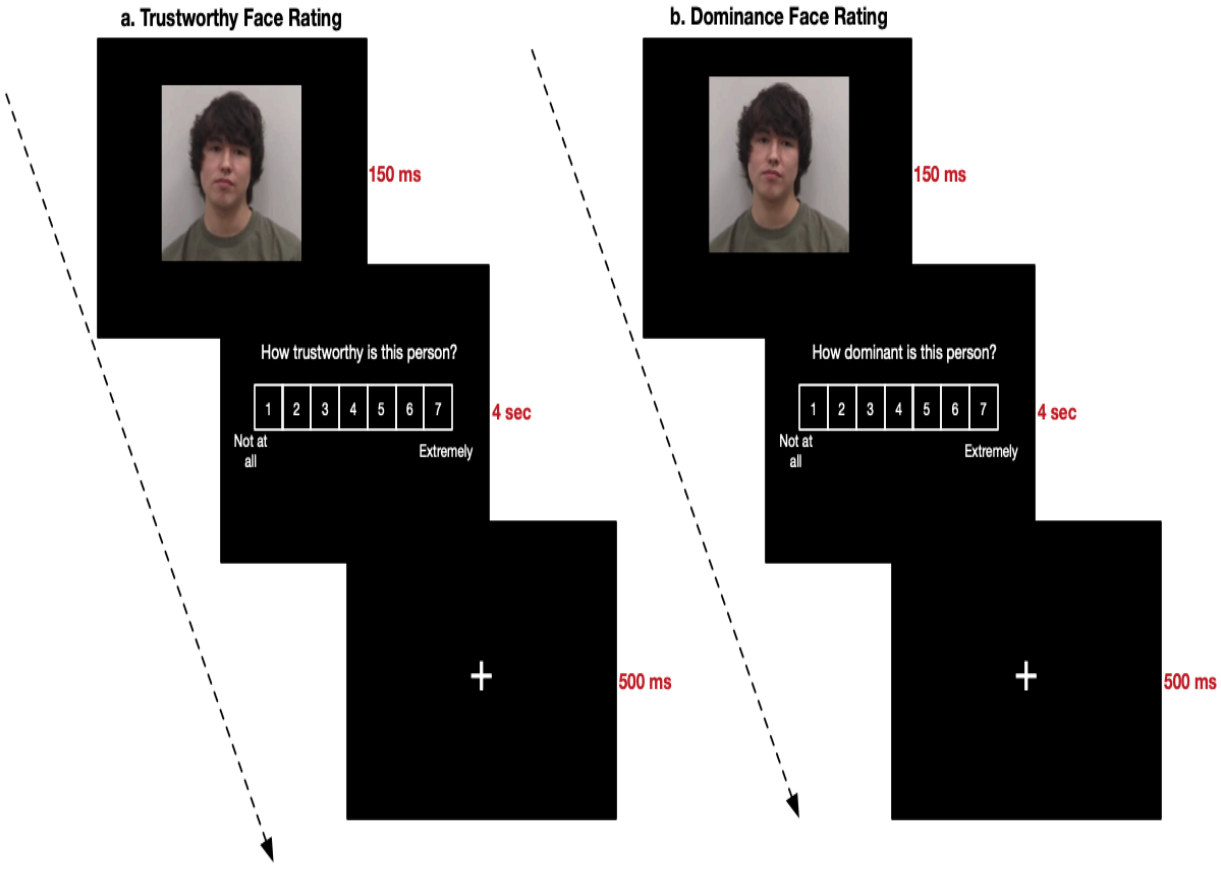

Figure 4.2. Example of the Face Trait Rating Task. All participants rated how trustworthy (a) and how dominant (b) a person is from a still image. The still image is a neutral facial expression of the individual from the video stimuli.

After this task, participants were assigned randomly to one of the four conditions: *video–8 seconds*, *video–15 seconds*, *audio–8 seconds*, and *audio–15 seconds*. For example, if participants were assigned to the video–8 seconds condition, for all the upcoming tasks they watched the videos of the individuals describing their opinion of the movie for 8 seconds. A minimum of eight seconds was chosen to give participants enough time for top-down processing and in return, they had enough information to be able to evaluate honesty. A maximum of fifteen seconds was chosen to give participants extra time to process stimuli but not too much time so that there is less risk of attention loss.

Once the participants were randomly assigned to their conditions, they were instructed to watch the short video clips or listen to audio of individuals giving their opinion on the movies that they have seen. For example, if a participant was assigned to the video stimulus, they were instructed as follows: "In the upcoming task you will watch short video clips of people giving their opinion on movies that they have seen. They will describe why they liked or disliked a movie. Then your job is to quickly and with your gut feeling rate each person on how honest they are about their opinion of the movie." (see Figure 4.3). Previous research suggests that there are no significant differences between dichotomous and continuous scale ratings of honesty evaluations (Levine, Shaw, & Shulman, 2010). Thus, participants decided on a scale of 1-very dishonest and to 7-very honest "How honest is this person about their opinion of the movie?". After each honesty evaluation, participants were asked to judge their confidence (i.e., "How confident are you in your judgment?") on a 7-point Likert scale with responses between 1 (not at all) and 7 (extremely).

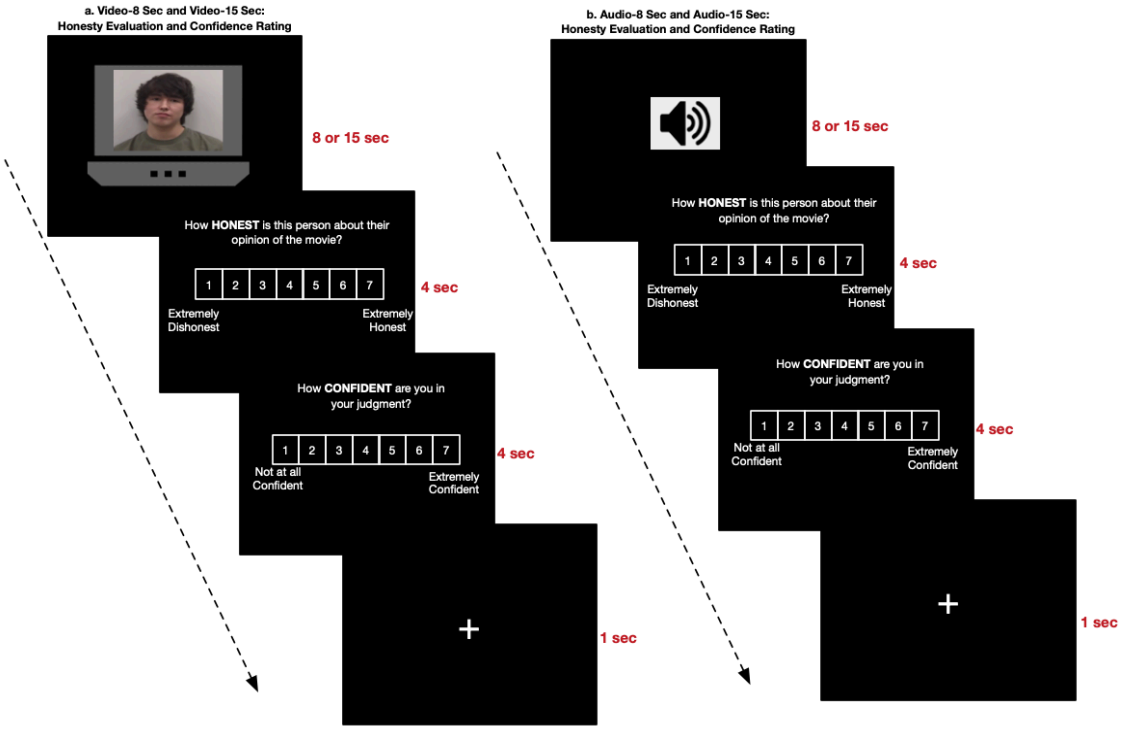

Figure 4.3. The design, procedures, and timing of honesty evaluations and confidence ratings for video-8 secs (a), video-15 secs (a), audio-8 secs (b), and audio-15 secs (b) conditions.

Next, participants completed the Trait Rating task. In this task, participants reported their perception of dominance and trustworthiness on a ratings scale. For instance, if they are assigned to the audio–8 seconds condition, they also rated this condition on the perception of dominance and trustworthiness on a 7-point Likert Scale between 1 (not at all) and 7 (extremely). The participants viewed their assigned condition followed by a question of "How trustworthy is this person?" and in a separate block "How dominant is this person?" (see Figure 4.4).

Lastly, all the participants completed a General Trust Scale (Yamagishi & Yamagishi, 1994) to examine the trustworthiness of others (see Appendix, Figure A.1), and questions regarding possible technical difficulties (see Appendix, Figures A.2 and A.3). I also asked participants whether they recognized anyone in the pictures and videos. The study took approximately 25 to

40 minutes to complete. Each participant was presented with randomized stimuli in each block. There were 5 blocks with 24 trials (i.e., video or audio stimuli) in each block, and trait judgment ratings were randomized into separate blocks to prevent carryover effects (Rhodes, 2006). Each participant viewed the same 24 videos throughout the study. Finally, it should be noted that participants did not know who was dishonest or honest during the study. Figure 4.5 presents the procedures of the study from start to finish.

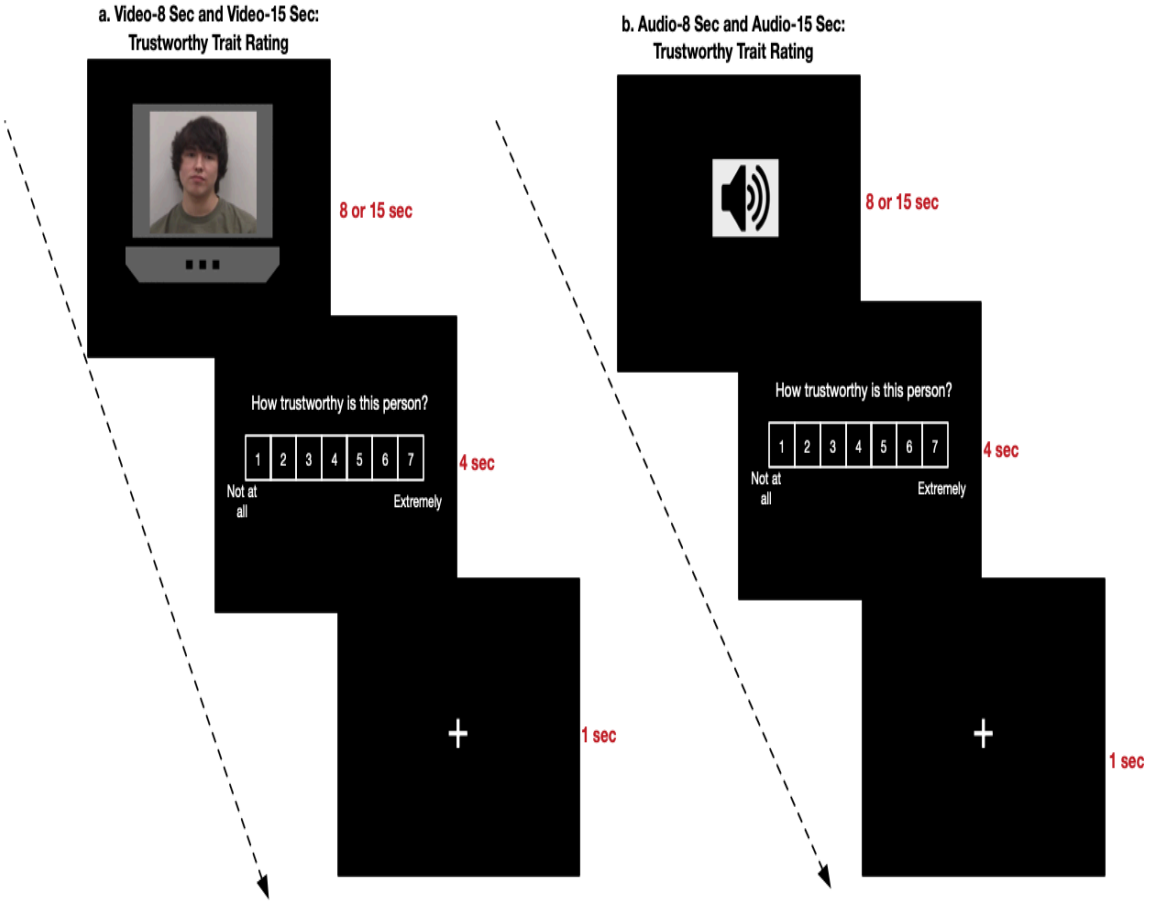

Figure 4.4. Procedures for the trustworthy trait ratings for video-8 secs (a), video-15 secs (a), audio-8 secs (b), and audio-15 secs (b) conditions. Dominance trait ratings for video-8 secs (a), video-15 secs (a), audio-8 secs (b), and audio-15 secs (b) conditions followed the same paradigm, except with a dominance prompt.

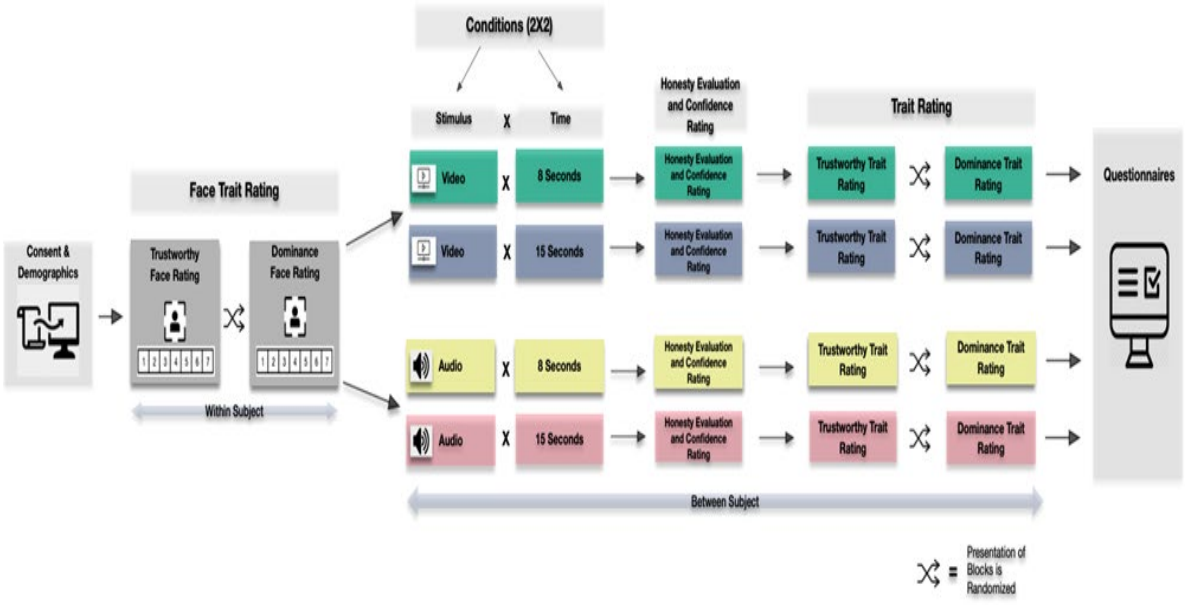

Figure 4.5. Illustration providing details of the study procedures from start to finish.

4.5 Data Quality Procedures

The data for this project was collected via Gorilla Experiment Builder (www.gorilla.sc), which is an online experiment platform (Anwyl-Irvine et al., 2019). In controlled lab environments, participants may be less susceptible to distractions and misunderstanding of instructions. Therefore, before participants began the study, they were asked to check whether their browser was updated, that they had exited out of extra tabs, and had turned on their volume. Participants were only able to complete this study via a computer (i.e., desktop or laptop).

To ensure that participants understood the directions and to help familiarize them with the tasks, participants completed short practice runs before each new task. The practice runs ensured that the participants could play the video and audio before beginning the tasks. This also gave participants a chance to adjust their volume to an appropriate level. To prevent participant distractions specific time limits were set for all the instructions and tasks. Consequently, the

study had to be completed in one sitting. Five catch trials or attention checks were implemented throughout the study to measure if participants are paying attention (Lavan, Mileva, Burton, Young, & McGettigan, 2021). For example, at random points in the study participants were asked to select a specific number from a scale (Lavan et al., 2021). They had to answer correctly 80% of the time for their data to be included in the analysis (Lavan et al., 2021).

CHAPTER 5

RESULTS

5.1 Aim 1 Analysis

For Aim 1, Pearson's correlations were utilized to examine the relationships between trustworthy face ratings, dominance face ratings, and honesty evaluations. The trustworthy face ratings measured the trustworthiness of the faces (i.e., pre-rated screenshots of individuals from the videos) from 1 (not at all trustworthy) to 7 (extremely trustworthy). Dominance face ratings measured the dominance of the faces (i.e., pre-rated screenshots of individuals from the videos) from 1 (not at all dominant) to 7 (extremely dominant). Participants were rating the faces of the individuals they would later view in the video (i.e., either 8 or 15 sec) or listen to in audio (i.e., either 8 or 15 sec) formats when they evaluated honesty. Thus, honesty evaluations examined how honest or dishonest the individuals in the video–8 seconds, video–15 seconds, audio–8 seconds, and audio–15 seconds were about their opinion of the movie. For honesty evaluations a rating of 1 indicated they were "extremely dishonest" and 7 was "extremely honest". Trustworthy face ratings, dominance faces ratings, and honesty evaluation responses were averaged across participants.

5.1.1 Trustworthy Face Rating Results

Pearson's correlations examined the relationships between trustworthy face ratings and honesty evaluations. A Pearson's correlation revealed a significant positive relationship between trustworthy face ratings and honesty evaluations in the video 8–second experimental condition, $r(96) = .23$, $p = .019$. Thus, those individuals that had rated faces as more trustworthy and less trustworthy also rated them as more honest or dishonest, respectively (see Figure 5.1).

Furthermore, there was not a significant correlation between trustworthy face ratings and honesty evaluations in the video–15 second condition, $r(96) = -.02$, $p = .862$. There were also no significant correlations between trustworthy face ratings and honesty evaluations in the audio–8 second ($r(96) = -.003$, $p = .976$) and audio–15 second conditions ($r(96) = .19$, $p = .054$). Table 5.1 reports the Pearson correlation results.

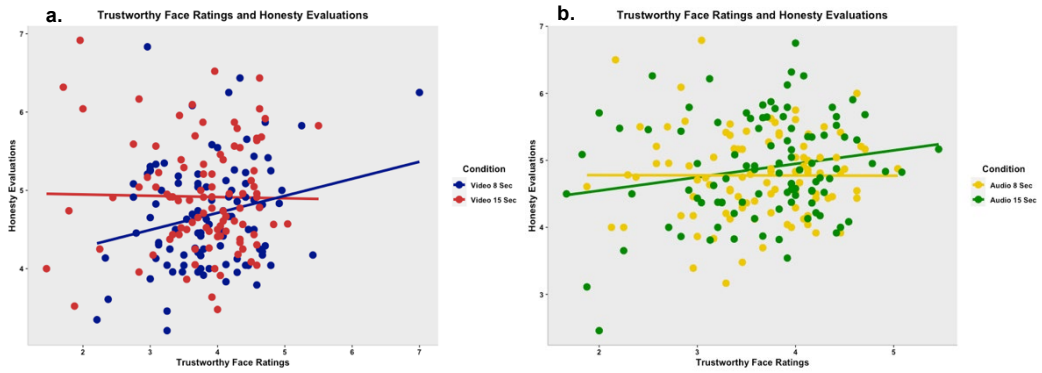

Figure 5.1. Scatterplot (a) showing the relationship between trustworthy face ratings and honesty evaluations in the video–8 seconds and video–15 seconds experimental conditions. The video-8 second condition is significant. Scatterplot (b) illustrates the relationship between trustworthy face ratings and honesty evaluations in the audio–8 seconds, and audio–15 seconds experimental conditions.

Table 5.1. Pearson's Correlation Results for Trustworthy Face Ratings and Honesty Evaluations

	Video 8 Sec		Video 15 Sec		Audio 8 Sec		Audio 15 Sec	
	Honesty Evaluations		Honesty Evaluations		Honesty Evaluations		Honesty Evaluations	
Face Rating	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Trustworthy	**.23**	**.019**	-.02	.862	-.003	.976	.19	.054

Follow up ANCOVA analyses examined the difference between time (8 sec vs. 15 sec) and stimulus modality (video vs. audio) on honesty evaluations while controlling for trustworthy face ratings. There was a significant effect of time on honesty evaluations, $F(1, 387) = 6.05$, $p = 0.02$, with participants in the 15 sec condition ($M = 4.90$, $SD = 0.73$) rating individuals as more

honest than participants in the 8 sec condition (M = 4.73, SD = 0.66*).* There was not a significant effect of stimulus modality on honesty evaluations, $F(1, 387) = 0.42$, $p = 0.52$. There was not a significant interaction between time and stimulus modality, $F(1, 387) = 0.97$, $p = 0.33$. Lastly, there was a significant relationship between trustworthy face ratings and honesty evaluations, $F(1, 387) = 4.49$, $p = 0.04$.

5.1.2 Dominance Face Rating Results

Pearson's correlations examined the relationships between dominance face ratings and honesty evaluations. Pearson's correlations indicate that there were no significant correlations between dominance face ratings and honesty evaluations in the video–8 second condition $r(96) = .104$, $p = .308$ and video–15 second condition, $r(96) = -.14$, $p = .173$. There were also no significant correlations between dominance face ratings and honesty evaluations in the audio–8 second ($r(96) = .005$, $p = .957$) and audio–15 second conditions ($r(96) = .085$, $p = .405$). Table 5.2 reports the Pearson correlation results, and Figure 5.2 displays the scatterplots of the non-significant relationships.

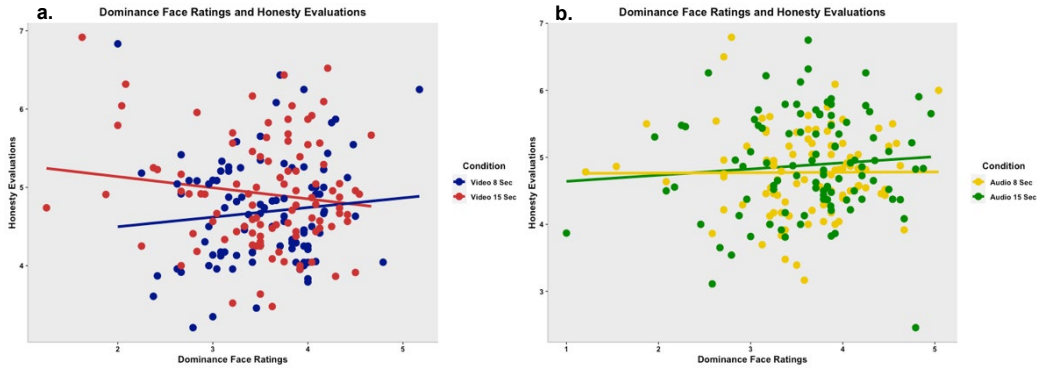

Figure 5.2. Scatterplot (a) showing the relationship between dominance face ratings and honesty evaluations the in video–8 seconds and video–15 seconds experimental conditions. Scatterplot (b) illustrates the relationship between dominance face ratings and honesty evaluations in the audio–8 seconds, and audio–15 seconds experimental conditions.

Table 5.2. Pearson's Correlation Results for Dominant Face Ratings and Honesty Evaluations

	Video 8 Sec		Video 15 Sec		Audio 8 Sec		Audio 15 Sec	
	Honesty Evaluations		Honesty Evaluations		Honesty Evaluations		Honesty Evaluations	
Face Rating	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Dominance	.104	.308	-.14	.173	.005	.957	.085	.405

5.2 Aim 2 Analysis

For Aim 2, I analyzed two between-subjects ANOVA to examine the effects of time (8 sec vs. 15 sec) and stimulus modality (video vs. audio) on honesty evaluations and confidence ratings. Honesty evaluations examined how honest or dishonest the individuals in the video–8 seconds, video–15 seconds, audio–8 seconds, and audio–15 seconds were about their opinion of the movie. For honesty evaluations a rating of 1 indicated they were "extremely dishonest" and 7 was "extremely honest". Confidence ratings immediately followed the honesty evaluations and examined how confident the participant was about their honesty evaluation. A rating of 1 indicated "not at all confident" and a 7 was "extremely confident".

5.2.1 Honesty Evaluation Results

A 2 (Stimulus Modality: Video vs. Audio) x 2 (Time: 8 sec vs. 15 sec) between-subjects ANOVA revealed a significant main effect of time, $F(1, 388) = 5.89$, $MSE = 2.86$, $p = 0.02$, $\hat{\omega}\frac{2}{p} = 0.01$ with participants in the 15 sec condition ($M = 4.90$, $SD = 0.73$) rating individuals as more honest (see Figure 5.3) than in the 8 sec condition ($M = 4.73$, $SD = 0.66$). There was no significant main effect of stimulus modality, $F(1, 388) = 0.15$, $MSE = 0.07$, $p = 0.70$, $\hat{\omega}\frac{2}{p} = .002$

on honesty evaluations. Lastly, there was no significant interaction effect between stimulus modality and time on honesty evaluations, $F(1, 388) = 0.76$, $MSE = 0.37$, $p = 0.38$, $\hat{\omega}\frac{2}{p} = .001$.

Table 5.3 reports the means and standard deviations of the main effects.

Table 5.3. Main Effect Means and Standard Deviations for Honesty Evaluations

	Stimulus Modality			Time	
	M	*SD*		*M*	*SD*
Video	4.80	0.70	8 Sec	4.73	0.66
Audio	4.83	0.70	15 Sec	4.90	0.73

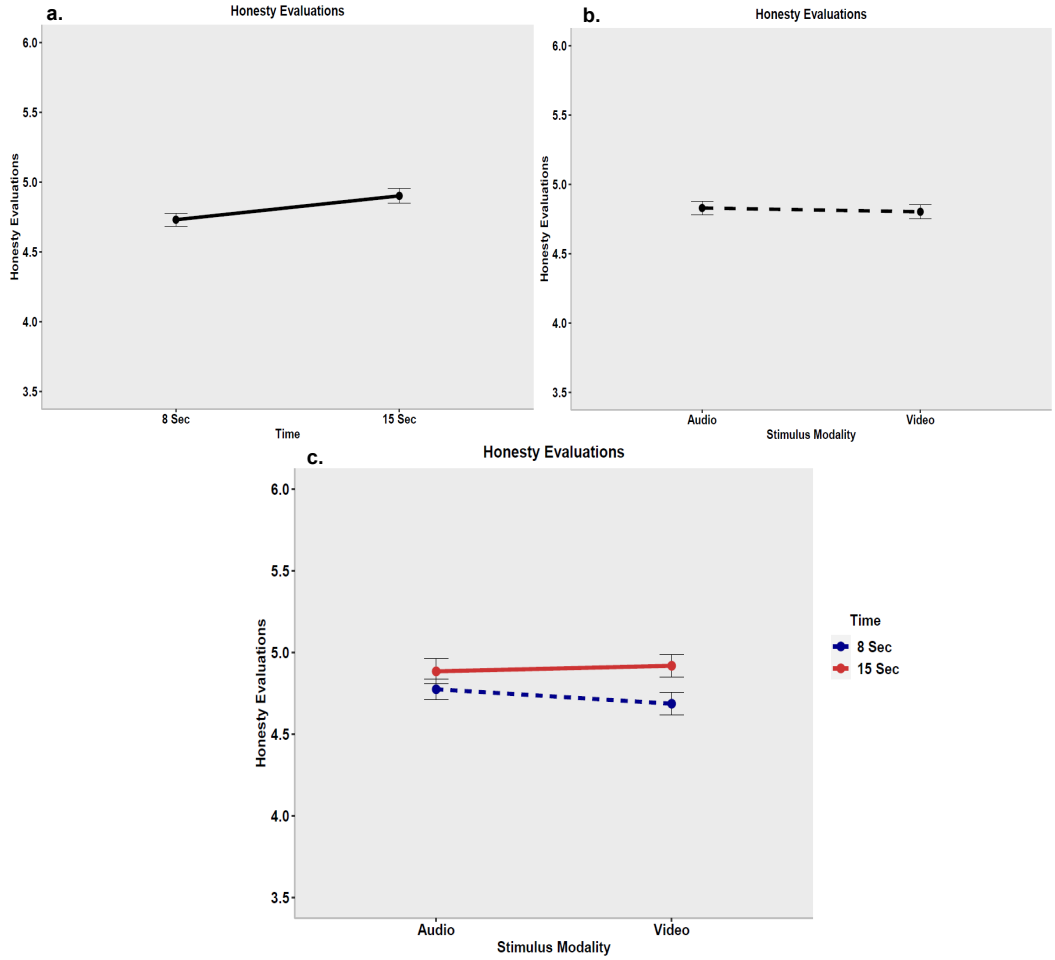

Figure 5.3. Line graphs illustrating the significant main effect relationship of time (a) and non-significant main effect of stimulus modality (b). Line graph (c) displays the non-significant interaction between time and stimulus modality.

5.2.2. Confidence Rating Results

A 2 (Stimulus Modality: Video vs. Audio) x 2 (Time: 8 sec vs. 15 sec) between-subjects ANOVA did not reveal significant main effects of stimulus modality, $F(1, 388) = 0.02$, $MSE = 0.01$, $p = 0.89$, $\hat{\omega}\frac{2}{p} = .002$ and time $F(1, 388) = 3.02$, $MSE = 2.01$, $p = 0.08$, $\hat{\omega}\frac{2}{p} = .005$ on confidence ratings. Additionally, there was no significant interaction effect between stimulus modality and time on confidence ratings, $F(1, 388) = 0.27$, $MSE = 0.17$, $p = 0.61$, $\hat{\omega}\frac{2}{p} = .002$. Table 5.4 reports the means and standard deviations of the main effects.

Table 5.4. Main Effect Means and Standard Deviations for Confidence Ratings

	Stimulus Modality			Time	
	M	*SD*		*M*	*SD*
Video	5.22	0.80	8 Sec	5.15	0.83
Audio	5.23	0.84	15 Sec	5.30	0.80

5.3 Aim 3 Analysis

For Aim 3, I analyzed two between-subjects ANOVAs to examine the effects of time (8 sec vs. 15 sec) and stimulus modality (video vs. audio) on trustworthy and dominance trait ratings. Trustworthy and dominance trait ratings examined how trustworthy or dominant the individuals in the video–8 seconds, video–15 seconds, audio–8 seconds, and audio–15 seconds were about their opinion of the movie. For trustworthy trait ratings a 1 was "not at all trustworthy" and 7 was "extremely trustworthy". For dominance trait ratings a 1 indicated "not at all dominant" and 7 was "extremely dominant".

5.3.1 Trustworthy Trait Rating Results

A 2 (Stimulus Modality: Video vs. Audio) x 2 (Time: 8 sec vs. 15 sec) between-subjects ANOVA revealed a significant main effect of time, $F(1, 388) = 5.68$, $MSE = 2.53$, $p = 0.02$, $\hat{\omega}\frac{2}{p}$

= 0.01, with participants in the 15 sec condition (M = 4.54, SD = 0.71) rating individuals as more trustworthy (see Figure 5.4) than participants in the 8 sec condition (M = 4.38, SD = 0.63). There was no significant main effect of stimulus modality, $F(1, 388) = 1.44$, $MSE = 0.64$, $p = 0.23$, $\hat{\omega}_p^2$ = .001 on trustworthy trait ratings. Lastly, there was no significant interaction effect between stimulus modality and time on trustworthy trait ratings, $F(1, 388) = 2.39$, $MSE = 1.07$, $p = 0.12$, $\hat{\omega}_p^2$ = .004. Table 5.5 reports the means and standard deviations of the main effects.

Table 5.5. Main Effect Means and Standard Deviations for Trustworthy Trait Ratings

	Stimulus Modality			Time	
	M	*SD*		*M*	*SD*
Video	4.42	0.67	8 Sec	4.38	0.63
Audio	4.50	0.67	15 Sec	4.54	0.71

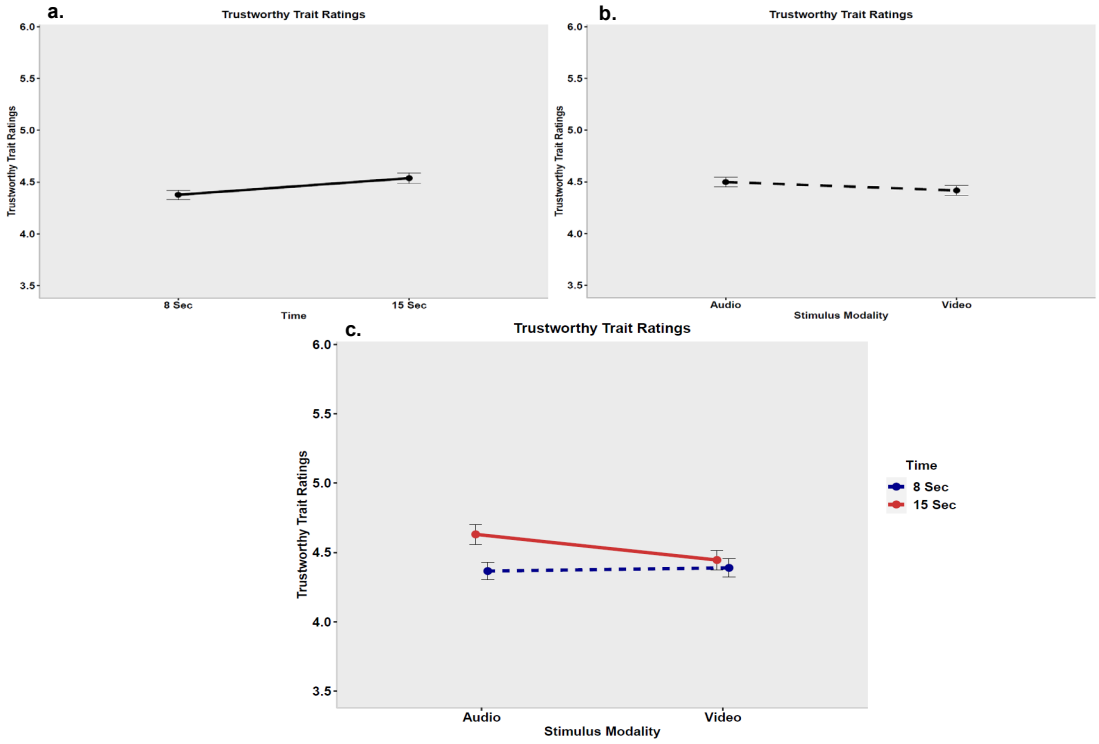

Figure 5.4. Line graphs showing the significant main effect of time (a) and a non-significant main effect of stimulus modality (b) on trustworthy trait ratings. Line graph (c) displays the non-significant interaction between time and stimulus modality on trustworthy trait ratings.

5.3.2 Dominance Trait Rating Results

A 2 (Stimulus Modality: Video vs. Audio) x 2 (Time: 8 sec vs. 15 sec) between-subjects ANOVA revealed a significant main effect of stimulus modality, $F(1, 388) = 19.022$, $MSE = 8.35$, $p < .001$, $\hat{\omega}_p^2 = 0.04$, with individuals rating the audio condition ($M = 3.86$, $SD = 0.62$) as more dominant (see Figure 5.5) than the video condition ($M = 3.56$, $SD = 0.71$). There was no significant main effect of time, $F(1, 388) = 2.82$, $MSE = 1.24$, $p = 0.09$, $\hat{\omega}_p^2 = .004$ on dominance trait ratings. Lastly, there was no significant interaction effect between stimulus modality and time on dominance trait ratings, $F(1, 388) = 2.31$, $MSE = 1.01$, $p = 0.13$, $\hat{\omega}_p^2 = .003$. Table 5.6 reports the means and standard deviations of the main effects.

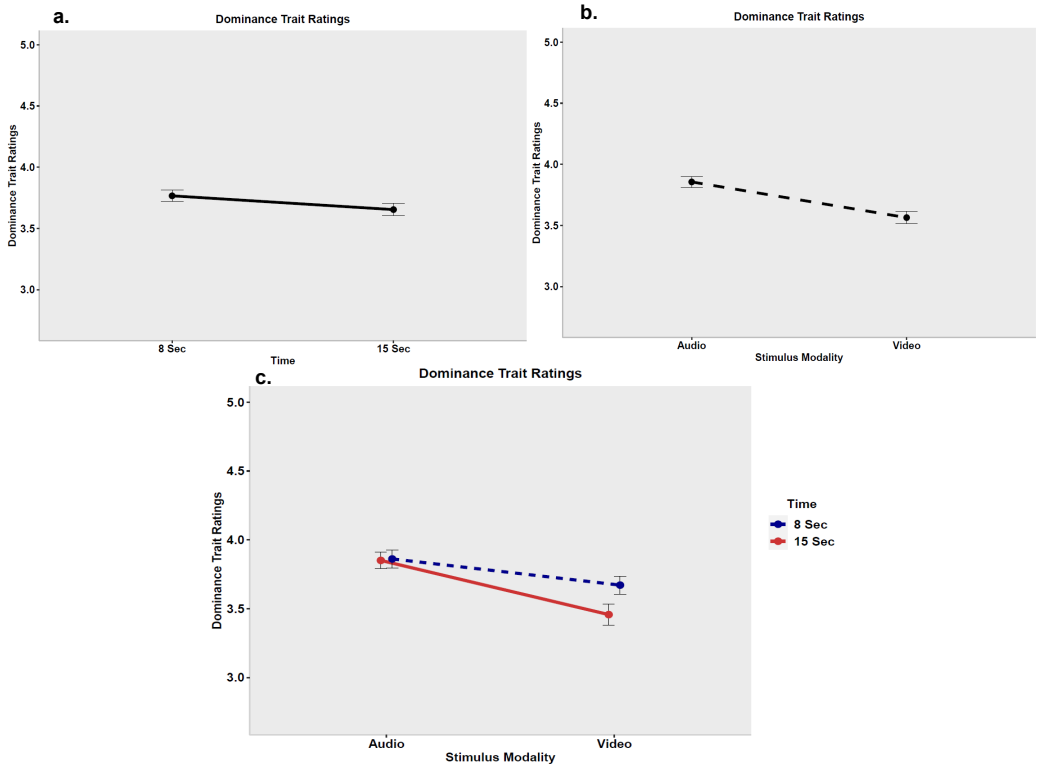

Figure 5.5. Line graphs illustrating the non-significant main effect relationship of time (a) and a significant main effect of stimulus modality (b) on dominance trait ratings. Line graph (c) displays the non-significant interaction between time and stimulus modality on dominance trait ratings.

Table 5.6. Main Effect Means and Standard Deviations for Dominance Trait Ratings

	Stimulus Modality			Time	
	M	*SD*		*M*	*SD*
Video	3.56	0.71	8 Sec	3.77	0.65
Audio	3.86	0.62	15 Sec	3.65	0.71

5.4 General Trust Scale

Participants completed a General Trust Scale (GTS) at the end of the study. The GTS measures individuals' general trustworthiness toward others (Yamagishi & Yamagishi, 1994). A response of 1 indicated "strongly disagree" and 5 indicated "strongly agree". Participant responses were averaged across each participant. A higher average response indicated that the participant had a greater generalized trust. Trustworthy trait ratings measured how trustworthy the individuals in the video–8 seconds, video–15 seconds, audio–8 seconds, and audio–15 seconds were about their opinion of the movie. For trustworthy trait ratings, a 1 was "not at all trustworthy" and a 7 was "extremely trustworthy". Thus, I examined if there was a positive relationship between GTS responses and trustworthy trait ratings.

5.4.1 General Trust Scale and Trustworthy Trait Rating Results

Pearson's correlations examined the relationships between GTS and trustworthy trait ratings. Pearson's correlations revealed significant positive correlations between GTS and trustworthy face ratings in the video 8–second experimental condition ($r(96) = .29$, $p = .004$) and video–15 second condition ($r(96) = .29$, $p = .004$). There were also positive significant correlations between GTS and trustworthy trait ratings in the audio–8 second ($r(96) = .21$, $p = .037$) and audio–15 second conditions ($r(96) = .28$, $p = .006$). Thus, participants that had a higher GTS mean also rated individuals in the experimental conditions as having been trustworthy. On the other hand, participants lower on the GTS rated individuals in the experimental conditions as

less trustworthy. Table 5.7 reports the Pearson correlation results and Figure 5.6 displays the significant relationships.

Table 5.7. Pearson's Correlation Results for General Trust Scale and Trustworthy Trait Ratings

	Video 8 Sec		Video 15 Sec		Audio 8 Sec		Audio 15 Sec	
	General Trust Scale		General Trust Scale		General Trust Scale		General Trust Scale	
Trait Rating	*r*	*p*	*r*	*p*	*r*	*p*	*r*	*p*
Trustworthy	**.29**	**.004**	**.29**	**.004**	**.21**	**.037**	**.28**	**.006**

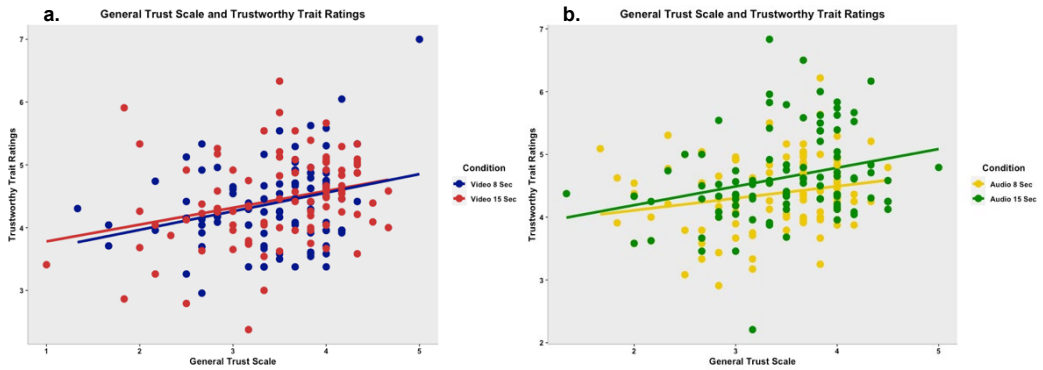

Figure 5.6. Scatterplot (a) shows the significant relationships between General Trust Scale and trustworthy trait ratings in the video–8 seconds and video–15 seconds experimental conditions. Scatterplot (b) illustrates the significant relationships between General Trust Scale and trustworthy trait ratings in the audio–8 seconds, and audio–15 seconds experimental conditions.

CHAPTER 6

DISCUSSION

6.1 General Discussion

The first aim of this dissertation investigated whether perceptions of trustworthiness and dominance influence judgments of honesty in the video condition (with sound). In other words, do first impression of the traits of trustworthiness and dominance predict how participants will evaluate the honesty of a subsequently presented movie opinion? I had predicted that individuals whose faces are rated as being higher in trustworthiness initially would later be evaluated as being more honest in the subsequent video presentations compared to individuals whose static face images were rated as being less trustworthy. For the dominance trait, I predicted that individuals whose faces are rated as more dominant initially will be evaluated as being less honest in the video presentations compared to individuals whose faces are rated as less dominant.

The main finding relevant to Aim 1 was in the video-8 second condition. The results showed that there was a significant positive relationship between the trait of trustworthiness (i.e., trustworthiness rating of the face) and honesty evaluations in the video-8 second condition. Thus, if participants rated faces as more trustworthy then they were more likely to evaluate those same individuals as more honest in the video-8 second condition. By contrast, if participants rated faces as less trustworthy then they were more likely to evaluate those same individuals as less honest in the video-8 second condition. This finding supports the DDT framework which suggests that the initial ratings of trustworthiness will have long-lasting effects and will guide the perceiver's evaluations (Porter & ten Brinke, 2009; Porter et al., 2010). However, this result was only observed in the video-8 second condition. The correlation between trustworthiness ratings

and honesty evaluations in the video-15 second condition was not significant. The honesty evaluation conducted in this project was a low-stakes honesty situation (e.g., evaluate the honesty of movie opinion) which is associated with minimal consequences, decreased emotional arousal or attachment, and cognitive load processing (Caso et al., 2005; Porter & ten Brinke, 2010; ten Brinke, & Porter, 2012). Previous research studies mostly examined high-stake honesty situations (e.g., evaluate the honesty of truthful and guilty family members pleading for the return of their loved ones) (Baker et al., 2016). The results from this study suggest that in low-stakes honesty situations the trait of trustworthiness only has lasting effects during shorter durations of honesty evaluations. If participants are presented with a longer time to evaluate honesty, they will not be impacted by their initial trustworthiness rating. Thus, the DDT framework has longer-lasting effects on high-stake honesty evaluations than on low-stakes honesty evaluations. Furthermore, the perception of dominance did not predict honesty evaluations. This was not surprising because the DDT model and lab-controlled experiments by Baker et al. (2016) and O'Sullivan (2003) also support the idea that trustworthiness is the emerging trait associated with honesty evaluations. Another explanation for the lack of an association between dominance and honesty outcomes is that dominance has a stronger association with social evaluations of threat. For instance, previous research has found that dominance is linked to bodily behaviors that express threat during competitions (Hwang & Matsumoto, 2014). This is consistent with Oosterhof and Todorov's (2008) results which suggest that the perception of dominance is associated with physical strength.

To my knowledge, this is the first study that has examined the effects of trustworthiness (i.e., DDT model) in a low-stakes honesty situation with multiple thin slice durations. The DDT

model should be examined further with non-verbal situations. For instance, it would be beneficial to examine if the DDT framework prevails with silent videos that use suspicious targets (e.g., stealing, hiding, committing a crime). Usually, participants evaluate honesty by listening to a target individual's story which gives the target the opportunity to defend their actions regardless of truthfulness. However, if future paradigms present targets looking deceptive without the ability to explain their actions, it would further aid in examining whether the DDT model impacts the ratings of honesty in non-verbal situations. Moreover, instead of using still images to examine the initial ratings of trustworthiness, future studies could use short 1-second clips to analyze if there is an association to honesty ratings. Examining face-trait judgments using dynamic stimuli provides participants with additional details regarding facial appearance. Plus, previous findings suggest that utilizing dynamic stimuli with manipulated eye gaze cueing or facial expressions impacts trustworthiness ratings (Bayliss, Griffiths, & Tipper, 2009; Bayliss, Paul, Cannon, & Tipper, 2006; Bayliss & Tipper, 2006).

The second aim of my dissertation investigated the effects of increasing the duration of thin slice behavior clips from 8 to 15 seconds on honesty ratings, trustworthy trait ratings, and dominance trait ratings. I predicted that honesty evaluations would be rated as being more honest as thin slices increase from shorter to longer durations. Second, I predicted that dominance trait ratings would be rated more dominant, and trustworthiness trait ratings would be rated less trustworthy as thin slices increased from shorter to longer durations. The main findings related to these predictions are that honesty evaluations were rated as more honest as thin slices increased from shorter (8 sec) to longer (15 sec) durations. Furthermore, trustworthy trait ratings were rated as more trustworthy as thin slices increased from shorter to longer durations. These results

suggest that individuals adjust their judgments of honesty positively when they receive more information (e.g., more honest in 15-second clip). Moreover, they also adjust their judgments of trustworthiness (e.g., more trustworthy in 15-second clip) as thin slices increase from shorter to longer durations. However, the dominance trait ratings did not become more dominant from shorter to longer durations.

The findings from Aim 2 support the truth-bias theory, which suggests that in general people default to a truth judgment during honesty evaluations even when prompted to suspect deceit (Levine, 2014). Furthermore, truth-bias is usually measured by the number of times that participants assumed honesty in a particular situation (Levine, 2014). However, for this study I was not interested in the percentage of times the participants rated a message as honest. Here I utilized thin slices to examine if honesty evaluations significantly increase from 8 to 15 seconds. Thus, this study showed that the assumption of honesty prevails (i.e., truth-bias) even as exposure times increase. Most importantly, the perception of honesty increases over time regardless of the sensory modality. These results are also consistent with previous findings which indicate that people are prone to believe others rather than assume they are lying (i.e., truth-bias theory). For instance, findings show that the percentage and veracity of honesty judgments are larger due to the truth-bias effect (Levine et al., 1999; Park & Levine, 2001). Furthermore, Levine (2014) suggests that the magnitude of honesty ratings would increase, if the participants were not aware of dishonesty in research studies (Levine, 2014). Since the participants in my study were aware that they were evaluating honesty, future studies should examine if rates of honesty will increase much more rapidly when participants are not prompted to suspect deception. Accordingly, this would examine TDT further because this theory implies that

humans will unconsciously or passively default to assume others are honest unless prompted to suspect dishonesty (Levine, 2014). In addition, since the results of this study demonstrated that truth-bias impacts honesty evaluations and trustworthiness ratings, it is likely that it also caused dominance ratings to remain unaffected. Finally, to my knowledge, this is the first study that has examined the truth-bias theory using thin slices of behavior.

The third aim of my dissertation investigated whether ratings of trustworthiness and dominance are affected by changing the sensory modality of the stimuli (i.e., video and audio). Previous research suggested that dominance judgments are influenced more by the voice or audio, however, faces have been indicated to have a greater impact on trustworthiness ratings (Mileva et al., 2018; Rezlescu et al., 2015; Tsankova et al., 2015). I predicted that trustworthy trait ratings will become more trustworthy in the video condition relative to the audio condition. Second, I predicted that the dominance trait ratings will be rated as more dominant for the audio stimulus and rated as less dominant for the video stimulus. The main finding is that dominance trait ratings were rated as more dominant in the audio stimulus. However, the trustworthy trait ratings were not rated as more trustworthy for the video stimulus. This finding is not unexpected as there is a greater consensus within the literature linking the trait of dominance to vocal pitch (Ohala, 1984; Morton, 1997). Furthermore, since my stimuli contained all male voices, this could be the driving factor responsible for increasing the perception of dominance for the audio stimulus. McAleer et al. (2014) found lower pitch and dominance had a stronger link in male voices than in female voices. Also, low-pitched male voices revealed a greater effect on first impressions of males in forced-choice tasks but not in females (Tsantani et al., 2016). This led the authors to conclude that the context of the situation does not affect the preference for low-

pitched male voices, but the preference for female voices depends on the situation (Tsantani et al., 2016). Other studies found that female voices with lower pitch are rated as more dominant (Borkowska & Pawlowski, 2011). Thus, it might be the case that the homogenous stimuli produced the desired results with perceptions of dominance increasing for voices, which implies that the gender of the stimulus was an important factor in driving the increase of dominance ratings.

Furthermore, the findings in Aim 3 are largely inconsistent with previous research results. Mileva et al. (2018) and Tsankova et al. (2015) found that trustworthiness judgments are impacted by faces. On the other hand, the results of this study are partially consistent with Rezlescu et al. (2015). Rezlescu et al. (2015) demonstrated that trustworthiness ratings were equally impacted by voice and face channels but that dominance ratings were influenced by voice cues. The inconsistencies between these results may be due to the type of stimulus presented. The aforementioned studies used highly controlled stimuli either sentences or vowels, but the current project investigated the differences between the effects of voice and face channels with a more ecologically valid stimulus. One of the few studies that also used an ecologically valid stimulus and examined the impact of both face and voice signals on voting behaviors found that trustworthiness is the trait associated with voting outcomes for both modalities (Mileva et al., 2020). The authors concluded that this suggests an integrated person perception evaluation, instead of audio and video signals independently contributing to dominance and trustworthiness ratings, respectively. However, the results from this study suggest that the type of social evaluation (e.g., honesty evaluations, voting outcomes) and stimulus utilized matters. For this study, the trait of trustworthiness is also linked to honesty outcomes. Yet, the results from this

study suggest an asymmetrical relationship between dominance and trustworthiness dimensions with voice signals significantly impacting dominance ratings for male speakers. Consequently, future first impression studies should take into consideration the features of the stimulus (e.g., age, gender) and the type of social evaluation they plan on investigating.

Additionally, by utilizing the General Trust Scale survey this study examined participants' attitudes or beliefs regarding their general trust in others. The results demonstrate a link between participants' beliefs about trust and their ratings of trustworthiness (i.e., trustworthy trait ratings). For example, participants that held positive beliefs about trusting others rated targets in the audio and video conditions as more trustworthy. On the other hand, participants that held negative beliefs about trusting others judged targets in the audio and video conditions as less trustworthy. Therefore, this indicates that an association exists between our views regarding trust and how we rate others on trustworthiness. To my knowledge, this is the first study on first impressions research that has investigated the link between participants' general trust in others and corresponding trustworthiness judgments. Moreover, this highlights the importance of employing surveys like the General Trust Scale to examine these relationships further.

6.2 Limitations and Additional Recommendations

There are some limitations to this study. As an online study, it permitted less control than lab experiments conducted in-person. The honesty evaluation, trustworthy, and dominance trait ratings were evaluated in separate blocks. Thus, participants were exposed to the same stimuli (i.e., 24 video or audio) more than once which could have possibly familiarized them with the individual's movie opinion. As a result, participants had a higher chance of losing interest or

getting distracted. The second limitation is that this investigation was limited to two central traits. Expanding the traits to include other factors that are likely relevant should be a goal of future research. For example, attractiveness might be beneficial to include because Sutherland et al. (2013) found that traits can also be collapsed on a 3-dimensional model, instead of two.

Lastly, all the videos included stimuli that presented Caucasian males. Previous studies suggest that the ethnicity and gender of the stimuli affect first impression judgments. For example, first impressions studies indicate that suspects with stereotypical Black features are more likely to receive death penalties (Eberhardt, et al., 2006) and that individuals get more severe sentences with Afrocentric facial features (Blair et al., 2004). Moreover, photos with individuals smiling were rated as less threatening for multiple ethnicities (e.g., Hispanic, African American, Asian, European) (Sullivan, Scott, & Nocks, 2011). Additionally, men rate overweight women as increasingly more guilty than lean female defendants (Schvey, Puhl, Levandoski, & Brownell, 2013), and the level of masculine physical appearance across gender influences perceptions of guilt (Ward et al., 2012). Consequently, including ethnicities other than Caucasians and males only will aid in understanding the broader relationship between face-trait judgments and honesty outcomes. Plus, including only one ethnicity and gender reduces generalizability to other populations. Nevertheless, a recent study suggests that there are benefits to analyzing multiple study designs. Trent and Ferguson (2021) found that having a within-subject design (e.g., only using stimuli from one ethnicity) reduced overcorrection, and a between-subject design (e.g., using stimuli with multiple ethnicities) influenced participants to overcorrect their first impression judgments. Finally, most first impression results are based on Western cultures and values. Forthcoming research will benefit from including non-Western

cultures in first impression research because variabilities between face-trait ratings might be discovered (for review, see Over, Eggleston, & Cook, 2020).

In addition, future research should further explore paradigms with thin slices of behavior that include more exposure times that gradually increase (e.g., 8 seconds, 15 seconds, 30 seconds, and 60 seconds). The results of this study suggest that gradually increasing thin slices can aid in understanding how first impressions affect the rating of traits over time. Moreover, there are no studies that have examined if warning participants beforehand about the effects of first impressions will affect social evaluations or trait ratings. There could be a high probability that the consequences of first impressions will weaken if participants are warned of general biases. There is also a lack of eye tracking studies in first impression research, thus, expanding studies to examine the pattern of eye movements during trait ratings will contribute to the understanding of how traits are evaluated (Calvo, Krumhuber, & Fernandez-Martin, 2019; Hermens, Golubickis, & Macrae 2018).

6.3 Conclusion

Aim 1 of this study investigated if first impressions influence honesty outcomes during our daily social interactions. Results suggest that perception of trustworthiness is associated with honesty outcomes. Specifically, we showed that the DDT model impacts high-stake honesty outcomes longer than low-stakes honesty evaluations. Thus, the aftereffects of trustworthiness will weaken as more details are gained about an individual. Since in our daily lives we encounter mundane honesty judgments, the emotional impact of high-stake honesty evaluations is less potent. Moreover, our results were consistent with previous studies that found dominance is not

associated with honesty outcomes. Accordingly, individuals will not be influenced by dominance when judging honesty.

Aim 2 extended the understanding of truth-bias research further by incorporating thin-slice lengths to examine if truth-bias prevailed for honesty evaluations. This approach differs from previous studies that examined truth-bias because we used thin-slices of behavior. The main finding implies that truth-bias gradually (i.e., 8 sec to 15 sec) and positively influenced honesty evaluations and trustworthiness. Most significantly, we showed that truth-bias prevailed irrespective of the stimulus modality (i.e., video, audio). On the other hand, perceptions of dominance remained unchanged from longer to shorter durations.

Aim 3 explored if the perceptions of trustworthiness and dominance are affected by changing the sensory modality of the stimuli (i.e., video and audio). Results suggest an asymmetrical relationship between trustworthiness and dominance dimensions for male voices. We found that voice signals significantly impact dominance ratings for male speakers, which is also consistent with prior findings that imply male voices are linked to dominance.

Together, these findings contribute to the limited literature that has examined the integration of face and voice cues in a naturalistic setting. Furthermore, examining the differences between sensory modalities and thin slice lengths allowed for additional testing of first impression effects. In conclusion, initial ratings of trustworthiness predict judgments of honesty in instances where everyday opinions are shared. How you view a person's trustworthiness initially impacts how you judge the honesty of their opinion. However, the aftereffect of trustworthiness only lasts briefly, and gradually judgments of honesty increase.

APPENDIX

SUPPLEMENTAL FIGURES FOR CHAPTER 4

A.1 General Trust Scale

Scale:

Using the following scale, please indicate how much you agree or disagree with the following statements:

1	2	3	4	5
Strongly Disagree	*Disagree*	*Neutral*	*Agree*	*Strongly Agree*

1.) Most people are basically honest.
2.) Most people are trustworthy.
3.) Most people are basically good and kind.
4.) Most people are trustful of others.
5.) I am trustful.
6.) Most people will respond in kind when they are trusted by others.

Scoring:

The score for each item is averaged together to form a continuous measure of generalized trust.

Figure A.1. General Trust Scale questions and scoring guide.

A.2 Technical Difficulties Quiz for Video Conditions

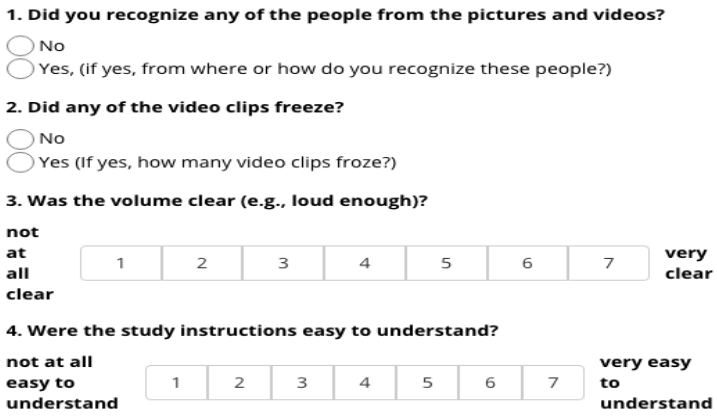

Figure A.2. Questions from the Technical Difficulties Quiz that participants in the video conditions answered at the end of the study.

A.3 Technical Difficulties Quiz for Audio Conditions

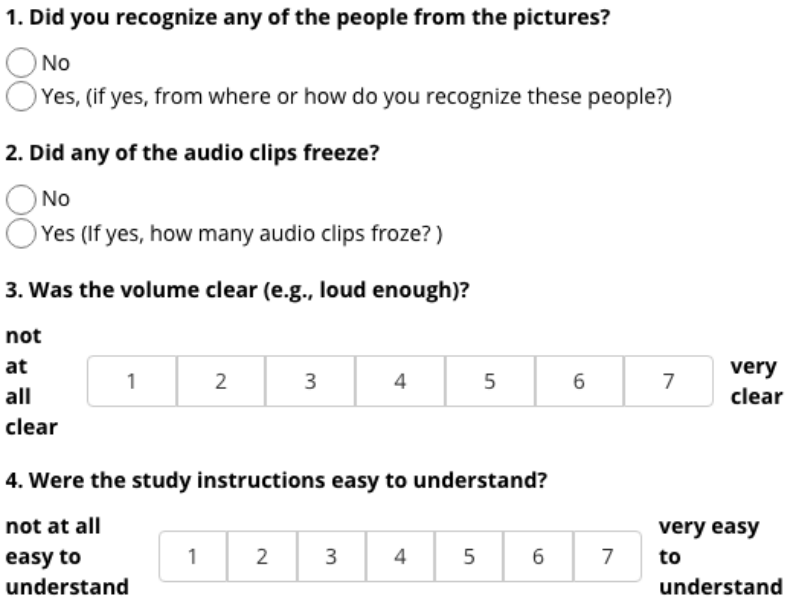

Figure A.3. Questions from the Technical Difficulties Quiz that participants in the audio conditions answered at the end of the study.

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BIOGRAPHICAL SKETCH

Jelena Rakic is a cognition and neuroscience PhD student at The University of Texas at Dallas under the supervision of Dr. Daniel Krawczyk. Jelena received her Bachelor of Arts in political science and psychology from The University of Texas at Arlington. Afterwards, she began working as a research assistant in Dr. Krawczyk's Reasoning Lab and obtained her Master of Science in Applied Cognition and Neuroscience from UTD. As a PhD student, Jelena has researched various topics like traumatic brain injury (TBI), deception, face perception, first impressions, reasoning, and neurohypophysial hormones.

CURRRICULUM VITAE

JELENA RAKIC

EDUCATION

PhD Candidate **2017 – present**
University of Texas at Dallas
- Major: Cognition and Neuroscience
- Dissertation Title: The Effects of First Impressions on Predicting Honesty Outcomes using Audiovisual Integration
- Advisor: Dr. Daniel C. Krawczyk
- Anticipated graduation: September 2022

Master of Science **2014 – 2017**
University of Texas at Dallas
- Major: Applied Cognition and Neuroscience

Bachelor of Arts **2008 – 2012**
University of Texas at Arlington
- Major(s): Psychology and Political Science

PROFESSIONAL EXPERIENCE

Graduate Teaching and Research Assistant **2017 – present**
University of Texas at Dallas
- Developed research study criteria and methodology
- Pre-processed behavioral and fMRI data
- Conducted statistical analyses of behavioral and neural data
- Presented research findings to scientific and non-scientific audiences
- Utilized various techniques to collect data like neuropsychological testing, fMRI scanning, eye tracking, and online platforms
- Conducted data collection and managed databases for multiple research studies
- Facilitated in teaching, creating lectures, and grading papers/exams for Experimental Projects, Research Design and Analysis, Neuroanatomy, Health Psychology, and Intro to Psychology
- Created reports for grant and fundings agencies
- Created and managed Institutional Review Board (IRB) applications, continuing reviews, and modifications

Research Assistant II **2013 – 2017**

Center for BrainHealth at University of Texas at Dallas

- Conducted neuropsychological testing and fMRI scanning
- Managed databases
- Recruited and scheduled participants
- Statistical analysis of behavioral and neural data

PUBLISHED RESEARCH PAPERS

1. Krawczyk, D.C., Han, K., Martinez, D., **Rakic, J.,** Kmiecik, M., Chang, Z., Nguyen, L., Lundie, M., Cole, R., Nagele, M., & Didehbani, N. (2019). Executive function training in chronic traumatic brain injury patients: Study protocol. Trials, 20, 1-14. https://doi.org/10.21203/rs.2.273/v1

2. Teed, A., **Rakic, J.,** Mark, D.B., & Krawczyk, D.C. (2019). Relative activation patterns associated with self-transcendent and self-enhancement core values: An fMRI study of basic human values theory concepts in males. Social Neuroscience, 15(1), 1-14. https://doi.org/10.1080/17470919.2019.1598893

3. Teed, A., Han, K., **Rakic, J.,** Mark, D.B., & Krawczyk, D.C. (2019). The influence of oxytocin and vasopressin on men's judgment of social dominance and trustworthiness: An fMRI study of Neutral Faces. Psychoneuroendocrinology, 106, 252-258. https://doi.org/10.1016/j.psyneuen.2019.04.014

4. Vas, A. K., Chapman, S. B., Aslan, S., Spence, J., Keebler, M., Rodriguez-Larrain, G., Rodgers, B. N., Jantz-Fox, T., Martinez, D., **Rakic, J.,** & Krawczyk, D.C. (2015). Reasoning training in veteran and civilian traumatic brain injury with persistent mild impairment. Neuropsychological Rehabilitation, 26(4), 502-531. https://doi.org/10.1080/09602011.2015.1044013

CONFERENCE PAPERS AND ABSTRACTS

1. Krawczyk, D. C., Chang, Z., **Rakic, J.,** Lundie, M., Clover, M., & Rule, G. (2022). Evaluating a game-based executive function intervention in individuals with chronic traumatic brain injury. Poster presented at the Military Health System Research Symposium, Orlando, FL, September.

2. Belavadi, V., Yan, Z., Bakdash, J.Z., Kantarcioglu, M., Krawczyk, D.C., Nguyen, L., **Rakic, J.,** Thuriasingham, B. (2020). MultiModal Deception Detection: Accuracy, Applicability and Generalizability*. 2020 Second IEEE International Conference on Trust, Privacy and Security in Intelligent Systems and Applications (TPS-ISA), Atlanta, GA, 99-106. https://doi.org/10.1109/TPS-ISA50397.2020.00023

3. **Rakic, J.,** Teed, A., Mark, D., & Krawczyk, D.C. (2019). Oxytocin and Vasopressin Effects on Dominant and Trustworthy Neutral Facial Ratings. The Society for Personality and Social Psychology. Portland, OR. February.

4. Nguyen, L., Young, L., **Rakic, J.,** & Krawczyk, D.C. (2019). Neural Implicit Mechanisms of Deception Detection. The Society for Personality and Social Psychology. Portland, OR. February.

5. Teed, A., Han, K., **Rakic, J.,** & Krawczyk, D.C. (2018). The effects of oxytocin and vasopressin nasal sprays on behavior and functional connectivity related to facial judgments: A placebo controlled fMRI study. Center for BrainHealth Symposium. Dallas, TX. May.

6. Nguyen, L., Young, L., **Rakic, J.,** & Krawczyk, D.C. (2017). Neural implicit mechanism of deception detection. Social Affective Neuroscience Society. Los Angeles, CA. March.

7. Teed, A. R., Mark, D., **Rakic, J.,** & Krawczyk, D. C. (2016). The neural correlates of social values: An application of the basic human values theory in social neuroscience. Social Neuroscience Meeting. San Diego, November.

8. Teed, A. R., Mark, D., **Rakic, J.,** & Krawczyk, D. C. (2016). The neural correlates of social values: An application of the basic human values theory in social neuroscience. 38th International Symposium of the Groupe de recherche sur le système nerveux central (GRSNC), "The neuroscience of decision-making". Montreal, Canada. June.

9. Mark, D., Teed, A., **Rakic, J.,** & Krawczyk, D.C. (2016). Searching for Neural Correlates of Basic Human Values. University of Texas at Dallas Masters Poster Presentation, Dallas, TX. May.

10. **Rakic, J.,** Jantz, T., Davis, R., Chapman, S.B., & Krawczyk, D.C. (2014). Pre and Post Daily Functioning Comparison in Mild and Moderate TBI. International Neuropsychological Society, Denver, CO. February.

11. **Rakic, J.,** Jantz, T., Davis, R., Liao, K., Vas, A., Chapman, S.B., & Krawczyk, D.C. (2014). Cognitive correlates of abstract reasoning in chronic mild TBI. American Congress of Rehabilitative Medicine Conference, Toronto, Canada. October.

12. Jantz, T., Liao, K., Vas, A., Davis, R., **Rakic, J.,** Chapman, S.B., & Krawczyk, D.C. (2013). Cognitive correlates of abstract reasoning in chronic mild TBI. International Neuropsychological Society, Seattle, WA. February.

INVITED TALKS AND PRESENTATIONS

1. **Rakic, J.** "Oxytocin and Vasopressin Effects on Dominant and Trustworthy Neutral Facial Ratings." Talk presented at Center for BrainHealth at the University of Texas at Dallas. February 2020.

2. **Rakic, J.** "Oxytocin and Vasopressin Effects on Dominant and Trustworthy Neutral Facial Ratings." Talk presented in Adult Development and Aging Class, Brain and Behavior Department, University of Texas at Dallas. October 2018.

RESEARCH PROJECTS

1. **Investigating Effects of First Impression using Audiovisual Integration**
   Funding: Dianne Cash Graduate Fellowship; Private Donation
   Principal Investigator(s): Jelena Rakic, Daniel Krawczyk

2. **Improving Cognitive and Functional Deficits after TBI Using Virtual Technology**
   Funding: Department of Defense (DOD); Joint Warfighter Medical Research Program
   Principal Investigator(s): Daniel Krawczyk

3. **BIOmarkers of dynamic sociocultural capacities: Integrating Neurotechnologies and Novel Math (BIOSINM)**
   Funding: Department of Defense; Defense Advanced Research Projects Agency (DARPA)
   Principal Investigator (s): Daniel Krawczyk, Leanne Young

4. **Investigating Human Values through Hormones and Neuroimaging**
   Funding: Prothro Clark Fund; Dallas Foundation
   Principal Investigator (s): Daniel Krawczyk, Adam Teed

5. **Brain Training to Enhance Frontal Lobe Reasoning in Soldiers with TBI**
   Funding: Department of Defense (DOD); Congressionally Directed Medical Research Programs (PH/TBI)
   Principal Investigator (s): Daniel Krawczyk, Sandra Chapman

6. **A Collaborative Cognitive Training Approach to Assist Texas Veterans and their Families**
   Funding: Health and Human Services Commission Grant
   Principal Investigator(s): Leanne Young

7. **Investigation Decision Making and Risk in Military Veterans**
   Principal Investigator(s): Daniel Krawczyk

AWARDS AND FELLOWSHIPS

Dianne Cash Graduate Fellowship ($2500) **2021**
University of Texas at Dallas

Dianne Cash Graduate Fellowship ($2500) **2018**
University of Texas at Dallas

Graduate Student Travel Support Award ($1000) **2018**
University of Texas at Dallas

Outstanding Research Paper Award **2011**
"President William Howard Taft After the Midterm Election"
University of Texas at Arlington, Department of Political Science