The Station “Scientist”: Examining the Impact of Race, Sex, and Education of Broadcast Meteorologists on Credibility, Trust, and Information Retention

Adam M. Rainear
West Chester University of Pennsylvania, adam.rainear@uconn.edu

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The Station “Scientist”: Examining the Impact of Race, Sex, and Education of Broadcast Meteorologists on Credibility, Trust, and Information Retention

Adam Michael Rainear, Ph.D.
University of Connecticut, 2019

Abstract

Broadcast meteorologists hold a set of skills unique in a newsroom. Not only must a broadcast meteorologist utilize communication skills similar to that of a newscaster, they are also typically versed in some physical science. In addition, the field of meteorology has an unfortunate disparity when examining job statistics as they relate to race and biological sex. Generally speaking, men outnumber women in broadcast television positions three to one, and minorities are often outnumbered or excluded from coverage altogether. Drawing on Uses and Gratifications and Media System Dependency Theory, this dissertation project examines the effects of race, biological sex, and forecaster education on the audience perceptions of forecaster trust, credibility, and information retention. Two experiments are proposed, and analysis of variance and mediation testing will be used to examine the hypotheses and research questions. The first experiment tests the manipulations of forecaster race and sex in the form of a mock weather hit - using a student sample. The results generally suggest that there are mixed findings for the effects of forecaster race and sex on the dependent variables of trust, credibility, and information retention. The second experiment tests the same two manipulations from experiment one, with an additional manipulation of forecaster education added. No significant findings emerged for whether the forecaster held a science or non-science degree. The results are discussed in terms of how individuals may perceive forecasters given their race, sex, or degree level, and the potential implications for processing information or forming attitudes and decisions based off this behavior.

Keywords: Broadcast Meteorology, Credibility, Trust, Biological Sex, Race, Broadcast Television
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Adam Michael Rainear

B.A., Rutgers University, 2010
B.S., Rutgers University, 2010
M.A., University of Connecticut, 2014

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2019
The Station “Scientist”: Examining the Impact of Race, Sex, and Education of Broadcast Meteorologists on Credibility, Trust, and Information Retention

Presented by
Adam Michael Rainear, M.A.

Major Advisor
_____________________________________________________
Kenneth A. Lachlan, Ph.D.

Associate Advisor
_____________________________________________________
John L. Christensen, Ph.D.

Associate Advisor
_____________________________________________________
Saraswathi Bellur, Ph.D.

University of Connecticut
2019
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CHAPTER I: INTRODUCTION

“Americans have long looked to the ‘weatherman’ to keep them informed on the atmosphere’s itinerary. In the first few years of television, a new medium gave people exactly what the word weatherman implies: a man, and usually a white one” (Henson, 2013, p. 109).

Often dubbed the ‘station scientist,’ broadcast meteorologists hold a unique set of skills relative to the remainder of a broadcast newsroom; most positions in the field of news and broadcasting focus on training individuals with skills necessary for public speaking, television scriptwriting, and journalistic ethics. Meteorologists situated in the field of broadcasting require the similar skillsets akin to a newscaster: relaxed, conversational, yet enthusiastic (Mirsky, 2000); yet these skills must be uniquely coupled with physical science knowledge, including upon atmospheric dynamics, physics, radar meteorology, and other related science fields (Henson, 2013).

Early work on the effectiveness and reach of weather broadcasts found that individuals turn to them for a wide-range of science information and education – ranging from the less obvious in geography (Earl & Pasternack, 1991) and public health issues (Johnson, 2009), to the less surprising in that of risk information about natural disasters such as hurricanes (Demuth, Morss, Morrow, & Lazo, 2012) or information on climate change (Zhao et al., 2014). Since weather events are one of the largest risks to society – both economically and as a health and safety risk – understanding if differences of forecaster appearance, more specifically sex and race, influence audience perceptions is important to both researchers and those who may be attempting to mitigate against some risk (Collins, 2018). More explicitly, understanding if trust, credibility, and retention of information are influenced among an audience dependent on whether the broadcast meteorologist is white or black, and male or female, can help researchers and practitioners better understand the biases and limitations which individuals have in processing
and considering weather forecasts and warning messages. Unfortunately, there is a substantial disparity between men and women, and different racial groups, when breaking down the job statistics of positions held in the field of meteorology (Gonzalez, 2010; Green Jr. et al., 2019; Maibach et al., 2011; Maibach et al., 2017; Malone, 2011).

Underrepresented Groups in Meteorology

Generally speaking, both racial minority groups and women are outnumbered in the field of atmospheric science. More specifically, females are outnumbered by males in terms of overall positions held, and this trend is especially present in broadcast positions. Polling has suggested that approximately 25% or fewer of local television weather positions are held by women (Cranford, 2018), and this rate has remained relatively constant over the last twenty years. During their surveys of broadcast meteorologists’ views on climate change, Maibach and colleagues have found females comprise 18-25% of positions (Maibach et al., 2011; Maibach et al., 2017), with others finding approximately 20% of local positions being held by women (Malone, 2011). Unsurprisingly, this figure is even lower for those in prominent positions, with 10-12% of local news stations having females holding the chief meteorologist position (Malone, 2011). This trend also spans into the field of meteorology more generally, as women typically comprise 15% of all professional roles in meteorology, which can include government, academia, private sector, and non-profits (among others; Gonzalez, 2010).

Racial demographics of broadcast meteorologists paint an even more bleak picture. Though not specifically meteorology (the fields of meteorology and climatology are closely related, falling under the umbrella of atmospheric science), a 2017 analysis of broadcast network Sunday morning shows by Media Matters found that only 13% of guests or contributors to climate-related segments were from minority racial groups. In 2016, only one member of a
racial minority group appeared on these same broadcast network shows to discuss climate, which is extremely concerning considering it was a United States presidential election year (Kalhoefer, 2018). In broadcast news more generally, a 2004 survey of local television stations found that only about 10% of the broadcast news workforce was black (and being less than 4% of news directors for the stations; Papper, 2005). For comparison, the entire United States population is made up of approximately 40% non-white individuals. In the same analysis, women constituted 29% of the guest appearances on the Sunday morning broadcast network shows, while the breakdown of men and women in the United States is much closer to a 50/50 split.

Moreover, broadcast meteorologists have diverse educational backgrounds, being able to gain employment having a traditional meteorology degree (usually a Bachelor of Science), earning a certification through some type of secondary or post-education certificate program, or be a journalism-related major and become informally trained in meteorology. A recent study by Green Jr. and colleagues (2019) found that approximately two-thirds of broadcasters surveyed had traditional Bachelor of Science degrees in meteorologist, while approximately 20% had training from a Mississippi State broadcast meteorology-specific program, 12% having some type of other training, and 2% coming from a minor or military-related background. Across different geographic locations, these rates remain relatively similar, except for the West Coast – where a larger portion of the population is Mississippi State broadcast trained, and less of the broadcast meteorologists have degrees. These numbers are consistent with other surveys in the field as well (Cranford, 2018; Maibach et al., 2017).

“Weather Girls”

While the underrepresentation of certain groups is problematic enough in itself, the hegemonic, male-dominated ideas which permeate broadcast meteorology and science at-large
can lead to inaccuracies or poor representations. For example, the “weather girl” stereotype, popularized in the 1950s (Henson, 2013; Malone, 2011) arose out of an increase in presentation gimmicks which were used in broadcast news and journalism during this early age of visual broadcasts. This stereotype, one of which views women as unable or less able to understand science (Flicker, 2003; National Academy of Sciences, 2006; Brann & Himes, 2010; Henson; 2013), is often reinforced in various media forms (Perryman & Theiss, 2014) and could lead to a disconnect between viewers perceptions of the forecast with respect to the broadcast meteorologist’s intelligence, credibility, and trust (Brann & Hines, 2010). Coupling this with a fact like women being expected to cover softer news stories (compared to harder news topics; Desmond & Danilewicz, 2009), serves only to further reinforce these inaccurate stereotypes. Furthermore, the connotation in using the word “girl” – when many times male counterparts are described as “men” – suggests a child-like or novice knowledgebase when describing women broadcast meteorologists. Since credibility and trust are important considerations when the public determines appropriate response to dangerous weather (Lachlan, Spence, Edwards et al., 2014; Sherman-Morris, 2005; Siegrist, Gutscher, & Earle, 2005; Spence, Lachlan, Omillon-Hodges, & Goddard, 2014; Trumbo & McComas, 2003), an attenuation of trust based solely on biological sex, appearance, or racial demographic is a dangerous slope to navigate. The desire for television weather forecasts, particularly those which focus on local coverage and impacts, will remain steadfast and useful, and understanding sex and race differences toward individuals in this community will also remain important.
CHAPTER II:
LITERATURE REVIEW

Knowing that individuals consume media to meet a variety of goals - such as information seeking, entertainment, or as a distraction – there exist numerous approaches which can guide research interested in the effects of consuming some media. Similarly, one must consider the context of media consumption as well, since media consumption does not exist in a vacuum with no societal context or considerations, especially when considering science and weather information specifically. Two such approaches, Uses and Gratifications (U&G), and Media System Dependency (MSD; alternatively called Media Dependency Theory) examine the relationships between audience desires and needs and the media which is consumed. Both frameworks are outlined and presented as guides for forming the research questions in this present study.

Uses and Gratifications Framework

Uses and gratifications theory (U&G) is used to understand how an audience selects and uses mass media to obtain specific social and psychosocial needs and goals, to understand media consumption motives, and to identify consequences or functions which result from media consumption or behavior (Katz, Blumer, & Gurevitch, 1973). In other words, the behavior of an individual within the audience is goal-orientated and contains some purpose, and which media individuals choose to select are used to fulfil these goals, needs, wants, or expectations (Rubin, 2009).

Some of the more common uses for mass media are centered around five types of human needs. First, humans have a need for cognition, which can be satisfied through knowledge-based activities and learning with media. Second, individuals may seek to gratify an affective need through emotional and enjoyable experiences with media. Further, individuals develop a
personal identity through media use, confidence building, social status, and impression management. This helps build the integrative need of media, in other words helping individuals build their social identity through modeling behavior. A similar need for social integration is also desired and performed through social connections in the real world (or on virtual platforms) which we can feel a connection with others around the same topic (i.e., Tweeting with others about the same television character, etc.). Finally, many users desire escapism as a need derived from media – such as removing oneself from the real-world because of an unpleasant experience or overwhelming feeling – or in the form of experiences that one cannot reasonably partake in (e.g., watching an astronaut walking on the moon; Rubin, 2009; Lin, 1999).

Williams, Phillips, and Lum (1985) noted that U&G was mainly applied to traditional mass media research, but new media and the current technological boom have afforded researchers further extensions to apply these suggested U&G frameworks. U&G research has expanded to investigate motives for the internet (Papacharissi & Rubin, 2000) and to constructs within the internet such as MP3 music (Ferguson, Greer, and Reardon, 2007; Zeng, 2011), YouTube (Haridakis & Hanson, 2009), social networks (Joinson, 2008), online newspapers (Yoo, 2011), and Twitter (Liu, Cheung, & Lee, 2010). Early research which applied U&G theoretical frameworks to internet usage (Kaye, 1998; Ko, 2000; Ko, Cho, & Roberts, 2005: LaRose & Eastin, 2004; LaRose, Mastro, & Eastin, 2001) generally finding low correlations between web usage and entertainment, social interaction, and escape gratifications ($r$ ranges from .17 to .30). Similar studies have found results where classic mass media motivations (surveillance; escape, companionship, identity, and entertainment) accounted for 47% of the overall variance of the likelihood to adopt online technology (Lin, 1999). College students specifically information seek using the web for a variety of reasons, but the students do not
always consider information they find as credible (Metzger, Flanagin, & Zwarun, 2003). Since the internet is such a large-scale platform which has a variety of uses, this natural variety of uses allows for an even more diverse set of gratifications for the individual user to achieve (Ruggiero, 2000).

Some scholars argue that internet and cell phones can be classified as neither a mass communication platform nor a specific-individual medium for all situations (Morris & Ogan, 1996). This could be partially attributed to the fact that the aforementioned media can be used both interpersonally and for large-scale mass communication (Wei, 2008). Rubin (2009) postulates that U&G is useful for understanding today’s more interactive media environment, through refinement of original U&G measures (scales) and more parsimonious investigations of gratifications which arise out of technological affordances. Early work on mobile phone U&G focused primarily on using cellular phones as solely talking devices, with much of the research focused on cell phone U&G being drawn from conventional telephone usage research. Some common motives found in traditional phone usage included functional and relational motives (Claisse & Rowe 1987), fun or entertainment (Williams, Dordick, and Jesuale, 1985), and reassurance or fulfilling a need for security (Dimmick, Sikand, and Patterson, 1994). More recent studies have attempted to capture the U&Gs for using mobile phone applications and social media, such as content sharing within mobile applications (Ames & Naaman, 2007; Goh, Ang, Chua, and Lee, 2009), playing online games (Wu, Wang, & Tsai, 2010), and social networking sites (Bumgarner, 2007; Joinson, 2008; Raacke & Bonds-Raacke, 2008). No formal study has directly investigated U&G of weather consumption, though Demuth and colleagues (2011) suggest it as an area of future investigation of motivations behind weather media consumption, and others have applied the concepts of U&G to other loosely similar topics such
as environmental coverage (Holbert, Kwak, & Shah, 2003). While understanding uses and
gratifications of individual media platforms is important, considering the context of consumption
with context to larger society may be more encompassing, especially when individuals are
considering science and risk-based messages.

**Media System Dependency Theory**

MSD Theory arose as a shift away from focusing mainly on effects related to individual
choice and use (see Ball-Rokeach, 1998), toward a counter-perspective of considering the inter-
related role with society. Since news broadcasts (weather included) are not consumed inside a
media vacuum and often include some consideration of what is going on societally or
environmentally, MSD Theory seems most appropriate for this present work. Rubin and
Windahl (1986) attempted to get at this combination of ideas, by including the dependency
model with gratifications as an interaction with media dependency, which served to enhance
media effects. Since humans can derive useful and functional goals from media consumption
and use, addressing similarities between U&G and media dependency can explain why
individuals may find these platforms useful and the subsequent effects arising from media usage.

Individuals tend to be more dependent on media during times of dangerous weather (Loges,
1994; Hirschburg, Dillman, & Ball-Rokeach, 1986), such that it may heighten the level of
dependency to which they normally have with media to fulfill goals (Ball-Rokeach, Rokeach, &
Grube, 1984) and subsequently enhance the desired outcome behavior.

The theory defines a media dependent relationship as one in “which the satisfaction of
needs or the attainment of goals by individuals is contingent upon the resources of the other
party” (Ball-Rokeach & DeFleur, 1976, p.6). The framework is grounded in the assumption that
as a society advances and technology becomes more complex in nature, media begin assuming
more unique information functions – which were originally put forth as gathering, processing, and delivering information. Similarly, the roles in which media partake have different levels of centrality (i.e., more socially essential) in their function. These media - which serve as more central - are usually seen as more important to the audience, or media which the audience rely upon more for social and individual well-being. A second assumption, though arguably less important for this present line of research, also suggests that when there is a higher degree of change and conflict in society, there is a subsequent heightened media dependency for orientation and stability in society. During these states of flux or challenges to institutional norms, individuals rely on media information more. One such example of this could be a major weather event. Weather events can cause physical and social change to a location and its environment, through evacuations, damage, and/or infrastructure problems, and may serve as a flux state of uncertainty or change for an individual.

There exist three different levels of dependent-relationships MSD presents as influencing effects: micro-level, macro-level, and meso-level. The micro (individual) level applies MSD Theory toward a specific individual’s relationship with media (also known as individual level MSD or IMD) with a focus on motivation for using media. Ball-Rokeach and DeFelur (1976) present goals as the main dimension of motivation and suggest that goals present a more problem-solving specific focus on motivation than needs since needs suggest rational and irrational motives (Ball-Rokeach, 1985). Individual-level MSD Theory presents three motivational goals which individuals have when choosing media: understanding, orientation, and entertainment or play. Understanding refers to an individuals desire for understanding themselves and the context or environment around them. Orientation refers to the need for individuals to orient themselves in society through interactions and communication. Finally,
entertainment refers to the recreations activities one uses to engage with roles, norms, and/or values typically through artistic or creative engagements (Ball-Rokeach, 1985).

Macro-level MSD considers the interdependence of all the social systems within a society as relying on each other for needs, and thus, the media choices, uses, and dissemination of media rely on three specific relationships between media and society. First, media and the economic system rely on each other for reinforcement of economic values and beliefs, profits, communication between companies, goods, and consumers, and information about labor relations and trade. Second, the media and political system rely on each other for reinforcement of values, norms, and beliefs, bearing in mind law and order, revenue related to political news, and organizing social and political groups. Specifically, in the United States media act as the fourth estate – such that they keep a watchdog role over government actions and provide information and alerts in times of crises by providing news and information. Finally, the third category encompasses the broadest set of systems, covering the relationship between media and systems such as family, religion, education, and military.

Finally, one would be remiss to not address the similarities and differences of both U&G and MSD Theory when considering the usage for design of research. U&G, as originally posited, was designed to examine the audience member viewpoint or perceptions for choosing some media to fulfill a gratification or need. This approach focuses on the audience member specifically, but often-without considering the interrelationship between user and larger society. It seems plausible that if an individual chooses to acquire information, they do so while considering other things going on in society. Since individuals use media to meet a variety of needs, there exists the possibility for users to derive a reliance on specific sources which can meet these needs in a consistent manner.
Parasocial Interaction and Similarity

How dependent an individual is with media may be a result of the ambiguity of a situation or environmental context (Ball-Rokeach, 1985), which related to uncertainty reduction and humans’ natural drive to reduce uncertainty. Dependency has also been shown predict the prevalence of media effects (Grant, Guthrie, & Ball-Rokeach, 1991), and specific to television news, the personality characteristic which the newscaster exhibits are often identified as elements of an interaction between newscaster and audience member (Levy, 1979; Palmgreen, Wenner, & Rayburn, 1980; Rubin, Perse, & Powell, 1985). Deriving a need or dependency on media based on information acquisition leads to enhanced parasocial interaction and news realism (Rubin, Perse, & Powell, 1985). Finally, parasocial interactions typically serve as an intermediary in the relationship between dependency and effects of media, which has been shown in examples such as television shopping purchases after having a parasocial interaction with the hosts of the shopping show (Skumanich & Kintsfather, 1998; Grant Guthrie, & Ball-Rokeach, 1991). The earliest work around parasocial interaction (Horton & Wohl, 1956) described the process as a relationship with a television media “persona” which touches upon feelings or intimacy and/or friendship. Additionally, media “personas” have the opportunity to influence and form interactions because of their conversational style and often-relaxed presentation, and the production techniques which television studios use (closeness of the cameras, style and appearance of the talent, conversational banter amongst anchors, etc.; Horton & Wohl, 1956; Meyrowitz, 1982; Nordlund, 1978; Rubin, Perse, & Powell, 1985).

Why individuals form parasocial relationships with characters or personalities they may never meet or interact with in real-life may have emerged out of the biological and social desire for interpersonal interaction. Cohen (1999) discussed four types of user-figure relationships,
noting that PSI (among the others: identification, wishful identification, and affinity) is the most appropriate for investigating media personalities which directly address viewers (e.g., a newscaster or comedian) compared to those who don’t (e.g., main character in a film). Potential differences between how a fictional character PSI (e.g., between an audience-member and a fictional sitcom character) and non-fiction character’s PSI (e.g., between an audience-member and a news broadcaster) are formed may also be an important consideration. Levy (1979) first proposed watching television news as a possible PSI because individuals find similarities compared to how individuals form primary social relationships. An affective component between audience-member and on-air personality which is actually a fictitious perception developed solely by the audience. This perception is reinforced through (the appearance of) genuine behavior, even though the audience member has no true understanding of the on-air personalities’ intent. Overall though, it serves to enhance the overall PSI.

PSI serves as a potential explanation for how individuals form a bond or relationship with the meteorologist or broadcaster which presents their television weather forecasts. Since users consume media to achieve a variety of needs, some of which include social and enjoyment needs, there exists a possibility to form some bond with a television news persona. Though understudied in an experimental fashion, several scholars discuss the possibility of parasocial interactions existing with weather personalities (Houlberg, 1984; Sherman-Morris, 2006; Sutter & Flores, 2009). The process is one which explains an illusionary experience where individuals perceive that they interact with media and the subsequent characters which are being consumed. This one-sided relationship with a media persona is a feeling of reciprocation between the individual and the mediated character or persona and can even go as far as individuals viewing the mediated persona as a true friend or a real bond. Further, if a user relies or feels dependent
on some media (or individual platform) to achieve a gratification of some sort, a parasocial interaction with an individual on that medium or platform may serve to explain some of the reasoning for why individuals chose or rely on said media. Thus, if an individual utilizes or depends on media, then parasocial interaction with a weather personality should increase the effect getting viewers to retain, listen, or act on information.

One additional way individuals can feel a connection or bond with a television broadcaster is through homophily. Homophily is the process through which people feel similar to others, and thus feel more connected with these individuals (McCroskey, Richmond, & Daly, 1975). Most simply, individuals are typically attracted to others who display similar characteristics and personality (Byrne & Nelson, 1965) and elicit more trust in these similar individuals as well (Brewer, 1979). Race is one route to which individuals find another similar or dissimilar and may influence how information is received by an audience. Ethnicity is comprised of the attitude’s and beliefs associated with one’s own ethnic group, knowledge, and cultural background (Phinney, 1990; Sodowsky, Kwan, & Pannu, 1995). There is a documented preference for individuals to seek out interaction with similar others on attributes such as sex, race, and education level (Rogers & Kincaid, 1981; Ibarra, 1992). In health communication and marketing literature, there is evidence for individuals seeking out or finding utility in messages which are targeted to be similar to the receiver’s characteristics (Arpan, 2002; Deshpande & Stayman, 1994). In risky situations and disasters, racial and ethnic groups may be less likely to believe or act on a warning message (or find it credible) without seeking out and finding confirmation through other social groups such as family and networks (Fothergill, Maestas, & Darlington, 1999; Lindell & Perry, 2004; Spence, Lachlan, & Griffin, 2007). Even when considering poverty, or geographic location in a crisis proximity, cultural factors still play an
important role in message reception during a risk (Lindell & Perry, 2004). Finally, in media – black individuals which identify strongly with their ethnic background prefer black targeted webpages when compared to those who identify in a weaker fashion (Appiah, 2004; Melican & Dixon, 2008).

Personality characteristics and the relatedness to them are another predictor for identifying with a mediated persona (Hoffner & Buchanan, 2005). It is not uncommon for individuals to situatethemselves in social networks through a preference for homophily. Personality characteristics also explain the formation of interpersonal attraction and the subsequent networks which individuals interact (Lazersfeld & Merton, 1954; McPherson & Smith-Lovin, 1987; Marsden, 1988; Ibarra, 1992). These drives toward similar interactions and networks can be explained through two perspectives, interpersonal attraction and structural perspective. Interpersonal attraction refers to our biological preferences for relationships with others, and structural perspective refers to how individuals structure their networks for interaction through availability. Thus, the following hypotheses and one research question are proposed:

**H1:** Forecaster sex and race will affect the relationship on forecaster trustworthiness, such that those viewing the white, male forecaster will report higher trustworthiness.

**H2a-e:** Forecaster sex and race will affect the relationship on the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e), such that viewing the white, male forecaster will report higher forecaster credibility values.

**H3:** Forecaster sex and race will affect the relationship on message credibility, such that those viewing the white, male forecaster will report higher message credibility.
RQ1: How will forecaster sex and race affect information retention?

H4a,b: Attitudinal (a) and Background (b) homophily will mediate the relationship between forecaster sex and race and forecaster trustworthiness.

H5a-e: Attitudinal homophily will mediate the relationship between forecaster sex and race and the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e).

H6a-e: Background homophily will mediate the relationship between forecaster sex and race and the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e).

RQ2: What effects will attitudinal and background homophily have on information retention when controlling for physical attractiveness?

The Role of Trust and Credibility in News, Weather, and Science

In the conversation of impending risks, trust and credibility have been examined extensively, and this is true in meteorology as well. Individuals generally report that mistrust is one of the major reasons for not taking action on impending risks (Slovic, 1999) indicating the importance of having high trust when serving in as an influencer of a network or audience. In their review of the concept of trust, Rousseau, Sitkin, Burt, and Camerer (1998) find that the definition crosses various domains and fields. One commonality often found in the defining factors of trust is the idea of being or willing to be vulnerable (Malhotra, 2004).

Local news stations offer an access point for those seeking information about risks, due to their high penetration and rate of use, especially since access and preference are important during risk events (Lindell & Perry, 2012). The importance of trust is no different for warning
forecasts either (Morss & Hayden, 2010), likely attributed to higher false rates and what can be seen as crying wolf when forecasts are considered false warnings or false alarms (Dow & Cutter, 1998; LeClerc & Joslyn, 2015). Unfortunately, what constitutes trust is dependent on what the user expects to occur – and this can be confounded by misinterpretation or poor delivery of a message (Sietgrist, Gutscher, & Earle, 2005). Finally, individuals may have more trust in one source over, likely emerging from confidence in that organization, which may influence their interpretation of risk (Lazo, Morss, & Demuth, 2009).

Organizational trust has been shown to be important toward perceptions of response agencies, officials in the government, or other organizations which disseminate information or resources during risks or crises (Spence, Lachlan, Westerman, & Spates, 2013). Source choice depends on the perceived trust and credibility a user has in the organization (Renn & Levine, 1991; Siegrist, Gutscher, & Earle, 2005; Slovic, 1993). Local news stations often tend to be most trusted due to their ability to deliver localized information in a relatively timely manner – much of which is delivered from the broadcast meteorologist (Sherman-Morris, 2005; Olmstead, Mitchell, & Rosenstiel, 2011). Research in this domain also generally lends support for the response to crises may not only influence the situation or scenario at present, but also may influence larger opinions and perceptions of an organization as a whole (Spence, Lachlan, Spates, & Lin, 2013).

Credibility – in the simplest terms – is an individual’s level of believability (McCroskey & Young, 1981). Credibility has been explicated across numerous fields, and slight variations in definition lead to the inclusion of various factors that researchers have considered when examining credibility. For example, factors such as expertness and trustworthiness (Hovland, Janis, & Kelley, 1953), safety, qualification, and dynamism (Berlo, Lemert, Mertz, 1969), and
competence, goodwill, and trustworthiness (Teven & McCroskey, 1997) have all been argued to be included in credibility judgements.

Additionally, an individual’s sex can also influence whether they are perceived as credible. Generally, research suggests males perceived as holding higher levels of credibility when compared with females, though this can vary in differing fields. For example, when working in small groups on tasks, men can be perceived to be more competent than women (Wood & Karten, 1986). Older men can be viewed as more intellectually competent than women (Canetto, Kaminski, & Felicio, 1995), and Conway and Vartanian (2000) displayed in their three studies that men are perceived to be more competent than women. Across company managers, men are perceived to show more concern or care for others than women (Heilman, Block, & Martell, 1995). Among college students though, Werner and LaRussa (1985) found that participants found women to have higher trustworthiness than men. Specific to news, research has found that older newscasters are perceived to be more credible, in particular older men (Weibel, Wissmath, & Groner, 2008); white newscasters have been rated in a more positive manner for extroversion, cheerfulness, and qualification (Balon, Philport, & Beadle, 1978); and Burgoon (1978) found that those with slower vocalizations were rated more competent and composed while being rated as less likely to influence judgements of character, sociability, and extroversion. Finally, individuals rated higher in physical attractiveness can be seen as being higher in liking toward that individual and having expertise and trustworthiness than a lower-rated attractiveness individual.

Because of their unique skillset with respect to the remainder of a newsroom, meteorologists often take on science reporting roles beyond just forecasting the weather (Wilson, 2002; 2008). Aside from a health reporter, meteorologists may be the only physical science-
degreed person working for a news organization, which often makes them the go-to for science information (Henson, 2013). Couple this with the fact that scientists as a community are one of the most trusted (Jameson & Hardy, 2014; Scheufele, 2013), there exists an idea that being a degreed meteorologist may also influence perceptions of one’s forecast. Weathercasts can often expand beyond the traditional bounds of providing the forecast or focusing solely on atmospheric science. When events – such as earthquakes, an eclipse, or even public health related events occur, meteorologists serve as a scientist which can lend some knowledge onto a situation in addition to appeasing viewer desires. Research suggests some level of informal education occurs, with science education being supported in geography topics (Earl & Pasternack, 1991), public health (Johnson, 2009), risk from large-scale disasters (Demuth et al., 2012), and more recently, in climate change education initiatives (Placky et al., 2016). Unfortunately, to this date no known research has examined how the appearance of holding a degree may influence perceptions of those serving in science capacities. Thus, the hypotheses and research questions for experiment two are proposed as follows:

**H7:** Forecaster sex, race, and education will affect the relationship on forecaster trustworthiness, such that those viewing the white, male forecaster will report higher trustworthiness.

**H8a-e:** Forecaster sex, race, and education will affect the relationship on the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e), such that viewing the white, male forecaster will report higher forecaster credibility values.
**H9:** Forecaster sex, race, and education will affect the relationship on message credibility, such that those viewing the white, male forecaster will report higher message credibility.

**H10a, b:** Attitudinal (a) and Background (b) homophily will mediate the relationship between Forecaster sex, race, and education and forecaster trustworthiness.

**H11a-e:** Attitudinal homophily will mediate the relationship between Forecaster sex, race, and education and the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e).

**H12a-e:** Background homophily will mediate the relationship between Forecaster sex, race, and education and the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e).

**RQ3:** How will the forecaster sex, race, and education affect information retention?
SUMMARY OF HYPOTHESES

Experiment One

H1: Forecaster sex and race will affect the relationship on forecaster trustworthiness, such that those viewing the white, male forecaster will report higher trustworthiness.

H2a-e: Forecaster sex and race will affect the relationship on the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e), such that viewing the white, male forecaster will report higher forecaster credibility values.

H3: Forecaster sex and race will affect the relationship on message credibility, such that those viewing the white, male forecaster will report higher message credibility.

RQ1: How will forecaster sex and race affect information retention?

H4a,b: Attitudinal (a) and Background (b) homophily will mediate the relationship between forecaster sex and race and forecaster trustworthiness.

H5a-e: Attitudinal homophily will mediate the relationship between forecaster sex and race and the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e).

H6a-e: Background homophily will mediate the relationship between forecaster sex and race and the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e).

RQ2: What effects will attitudinal and background homophily have on information retention when controlling for physical attractiveness?

Experiment Two

H7: Forecaster sex, race, and education will affect the relationship on forecaster trustworthiness, such that those viewing the white, male forecaster will report higher trustworthiness.
H8a-e: Forecaster sex, race, and education will affect the relationship on the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e), such that viewing the white, male forecaster will report higher forecaster credibility values.

H9: Forecaster sex, race, and education will affect the relationship on message credibility, such that those viewing the white, male forecaster will report higher message credibility.

H10a, b: Attitudinal (a) and Background (b) homophily will mediate the relationship between Forecaster sex, race, and education and forecaster trustworthiness.

H11a-e: Attitudinal homophily will mediate the relationship between Forecaster sex, race, and education and the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e).

H12a-e: Background homophily will mediate the relationship between Forecaster sex, race, and education and the five factors of forecaster credibility: competence (a), character (b), sociability (c), composure (d), and extroversion (e).

RQ3: How will the forecaster sex, race, and education affect information retention?
CHAPTER III:
RESEARCH DESIGN: EXPERIMENT ONE

Experiment 1: Race and Sex

For this dissertation, two separate experiments were conducted to examine the proposed hypotheses. Though the experiments were conducted independently of each other (results from the first experiment did not inform the second experiment/collection), the hopes are that the ordering of the experimental procedures can build knowledge upon the previous experiment’s findings through expanding the generalizability of the sample and method and replication from experiment one. Means, standard deviations, reliability estimates for measures are presented in Chapters 3 and 4 with the respective variables, in addition to factor analytic and dimension reduction results, while descriptive information and model testing is done in Chapters 5 and 6. Subscripts 1 and 2 denote the experiment for which the references variable

**Design.** The design of experiment one is a 2x2 factorial design. Two manipulations are made across the four videos: manipulation one is in the race of the forecaster (black/white) and manipulation two is the biological sex of forecaster (Male vs. Female). The purpose of experiment one is to examine potential sex and race effects among a convenience sample of students, using the four stimuli developed for this dissertation. A graphic of the full design is proposed in Appendix B.

**Sample and procedure.** Given a minimal anticipated effect size of approximately .15 at a probability level of .05 and with power of .8, it can be anticipated that 85 students will be needed per condition. Approximately 500 students were drawn from an undergraduate participant pool during Spring 2019, at a large northeastern public university – following standard protocol procedures for utilizing the participant pool. The final usable sample for
experiment one was \( N = 481 \), after removing participants who failed the manipulation check of recalling the broadcaster’s race and sex.

Students were invited to participate in the online experiment, through an IRB-approved information sheet and were credited with a pre-determined portion of course credit for their participation. Once eligibility was screened (18 years or older), students were asked to confirm their intent to participate and were directed to the online survey portion of the experiment. Any student who was ineligible to participate was given an alternative assignment of equal length. Pre-test measures were asked immediately prior to the stimuli delivery, to not prime participants on the purpose of reporting these variables. Participants were then be randomly assigned to one of the four experimental conditions in the form of a YouTube video resembling a broadcast weather forecast (described in detail below). After watching the approximately one-minute video, participants returned to the survey portion of the process, and answered post-test and demographic questions. Upon completion, participants were thanked for their time, and re-directed to another external Qualtrics survey for inputting information to receive course credit.

**Stimuli and manipulation.** The stimuli were presented in the form of YouTube videos, which would be reasonably presented on a newscast. Weather events serve useful for investigation because nearly all humans are impacted by the weather, and diverse groups may have especially strong opinions about the weather due to past distrust with warning and recovery agencies and being affected by disasters disproportionately (Melillo, Richmond, & Yohe, 2014).

The mock weather hit lasted from 1:05-1:20 in duration dependent on the forecaster (this does deviate somewhat from a standard broadcast weather hit of 3 minutes but runs akin to what an individual may encounter on the web or social media, or in a shorter context weather hit). The weather hit only referenced populated or well-known geographic locations, in hopes of
representing the entire United States helping to give the mock forecast a feeling of relevance for the participants. Participants were randomized equally across the groups through automatic randomization within Qualtrics. After data cleaning, the breakdown for all four conditions were black female \(n = 117\), white male \(n = 117\), black male \(n = 121\), and white female \(n = 123\) – thus, allowing for comparisons between the different conditions.

**Measures**

**Independent variables.** The two independent variables of interest for experiment 1 are the manipulations made in the stimuli videos. Since one of the main goals of this dissertation is to probe the effects of two or more independent variables simultaneously, effect coding ranging from -1 to 1 (contrast coding) is utilized. Effect coding allows for the comparison of two or more groups, with some reference group to examine differences.

**Meteorologist biological sex.** Biological sex was measured as an independent variable based on which manipulation a participant was exposed. Participants viewed a mock weather hit which had a forecaster with the appearance of either a male or female, and these were subsequently coded as follows: female = -1, male = 1.

**Meteorologist race.** Race was also measured as an independent variable based on which manipulation a participant was exposed. Participants viewed a mock weather hit which had a forecaster who appears either black or white, and the coding scheme was black = -1, white = 1.

**Participant demographics.** In addition to the independent variables based off the stimuli, individual participant demographics were also collected and treated as control variables. Participant biological sex, race, age, education level, and present geographic residence were all collected. Additionally, because weather and climate are often bundled together under the umbrella of atmospheric science, political affiliation was also collected. All descriptive
information about the sample across these variables is presented in Chapter 4. Since the sample in experiment one was a student sample housed at the same University, the geographic location variable will go unused in the analysis.

**Intervening and control variables.** Multiple variables were captured for use as possible covariates or mediators in the model. Many of these variables required Confirmatory Factor Analysis (CFA), which was performed using SPSS AMOS, maximum likelihood solution. While many of these variables have been shown to be extremely reliable and valid, Levine (2005) suggest performing and reporting a CFA on previously validated scales which may be used in different contexts or have subtle changes in wording from study to study.

**Parasocial interaction (PSI).** PSI was measured through the abbreviated (10-item) PSI scale (10iPSI), since it was intended for use with news personas. To complete the 10iPSI, individuals reported their level of agreement (ranging from 1=strongly disagree to 5=strongly agree) on 10 Likert-type items. An example item would be “I would like to meet this broadcaster in person.” Upon performing a CFA to analyze the unifactorial structure, six items from the scale were dropped due to factor loadings being below the acceptable cutoff of .6. \[ \chi^2 (2) = 12.99; p = .002, \text{CFI} = .98, \text{RMSEA} = .11 \]. The final scale in experiment one was four items which were averaged into a computed PSI variable (\( M = 2.41, SD = .70, \alpha = .79 \)). Because the same variable in experiment two performed poorly as well, this variable was excluded from any analysis.

**Homophily.** Perceived homophily was measured using the perceived homophily scale (McCroskey, Richmond, & Daly, 1975; McCroskey & Richmond, 1979). Participants were asked to indicate their feelings on eight different items about the broadcaster they just viewed using a 7-point Likert type scale. An example attitudinal and background item are (respectively)
“This broadcaster in the video is like me,” and “The broadcaster in the video has status like mine”. The factor structure is typically two factors, and a CFA was performed to analyze this \[x^2(7) = 20.34; p = .05, \text{CFI} = .99, \text{RMSEA} = .06\]. Two factors emerged, upon deleting two poorly loading factors in the background homophily factor. The items were summed into respective variables for attitude homophily \((M = 3.54, SD = 1.03, \alpha = .82)\) and background homophily. \((M = 3.53, SD = 1.17, \alpha = .65)\). These two factors were moderately correlated at \(r = .42\).

**Physical attractiveness.** One dimension of McCroskey and McCain’s (1974) Interpersonal Attraction Scale will be utilized to measure physical attraction. Participants were asked to respond to 5-point Likert type questions which asked them to indicate the level to which they agree to different statements about the meteorologist presented. An example item would be “I think he/she is somewhat ugly.” A CFA was performed \[x^2(2) = 7.08; p = .03, \text{CFI} = .99, \text{RMSEA} = .07\] leading to two items being removed from the variable due to poor factor loading. The items were averaged into a computed physical attractiveness variable. \((M = 3.22, SD = .42, \alpha = .85)\).

**Media usage.** Media use was measured by asking participants to report hourly estimates of media usage on a standard weekday and weekend day basis. Specifically, participants will be asked to “please indicate how many hours you use each of the four media forms listed below on an average [weekday/weekend day].” The four media forms are print, television/movies, internet/social media/mobile apps, and video games. The totals were averaged into a daily media use variable, by weighting the weekday items by a factor of five and weighting the weekend day items by a factor of two. \((M = 7.31, SD = 3.43)\). Unrealistic or impossible reports of media use were ignored for analysis (18 hours of media use or less was the cutoff). No factor analysis was
performed on this variable because the variable is an index and not a latent construct. Because this variable performed poorly in experiment two as well, a decision was made to not use media usage as a covariate in any analysis.

**Involvement.** Involvement was measured through the Personal Involvement Inventory (PII; Zaichkowsky, 1985). This bipolar adjective scale measures individual perceptions of involvement with information, an issue, or a product. Participants responded to the prompt “When I think of the information I received about the weather forecast, I think of it as:” on twenty separate bipolar-adjective items. The items were scored with values ranging from 1 to 7, with example adjectives being “important/unimportant,” and “valuable/worthless.” The items were subject to CFA [$\chi^2 (77) = 439.79; p < .01, CFI = .90, RMSEA = .10$], which led to dropping 6 items due to inadequate factor loadings. The remaining 14 items were averaged into a final composite involvement variable. ($M = 4.79, SD = .94, \alpha = .93$).

**Dependent variables**

**Forecaster credibility.** Two separate concepts of credibility were measured (forecaster credibility and content credibility) which each target a different perspective of credibility (individual vs. message). Credibility of the forecaster was measured utilizing the newscaster credibility scale (McCroskey & Jenson, 1975). The scale is a five-dimension, 25-item scale of 7-point semantic differential phrases, which examine individuals’ perceptions of competence, character, sociability, composure, and extroversion of a newscaster. Upon completing a CFA, the five factors did emerge as expected [$\chi^2 (220) = 918.46; p < .001, CFI = .92, RMSEA = .08$]. Two items in the extroversion factor were dropped due to poor loadings, leaving a 23-item scale to measure the five factors. The five factors were each averaged into respective individual variables and renamed as follows: (forecaster) *competence* ($M = 5.37, SD = .90, \alpha = .93$);
character \((M = 5.13, SD = .98, \alpha = .88)\); sociability \((M = 5.62, SD = 1.02, \alpha = .93)\); composure \((M = 5.41, SD = 1.06, \alpha = .83)\); and extroversion \((M = 5.32, SD = 1.06, \alpha = .88)\).

**Content credibility.** The second credibility dimension accounts for the credibility of the message content (i.e. the forecast). Message credibility is measured to assess the credibility of the actual message rather than the credibility associated with the message source. Message credibility was measured using a slightly adapted version of Appelman and Sundar’s (2016) message credibility scale. This scale is a 3-item Likert-type scale which asks participants “How well do the following adjectives describe the content you just read?” with responses ranging from 1 (describes very poorly) to 7 (describes very well) on the adjectives accurate, authentic, and believable. The question was slightly adjusted to read “How well do the following adjectives describe the content you just watched” since participants will be viewing the forecast as a video rather than reading it. The items were averaged into a message credibility variable \((M = 5.41, SD = .97, \alpha = .90)\) with no items dropped.

**Forecaster trustworthiness.** To measure trustworthiness of the forecaster, one dimension of McCroskey and Teven’s (1999) source credibility scale was utilized. Source credibility is typically a three-factor construct, consisting of trustworthiness, competence, and goodwill of a source. Each construct is measured with 6 semantic differential type items, which have two antonyms on 7-point scales, and typically subject to a CFA to ensure a three-factor solution. The 6 semantic differential antonyms were prompted by the question “please indicate your feelings about the meteorologist you just viewed.” With respect to participant fatigue and because individuals are rating credibility through other measures, only the trustworthiness factor was measured. Forecaster trustworthiness was subject to a CFA, \(\chi^2 (6) = 24.3; p < .001\), CFI =
.99, RMSEA = .08, and no items were deleted when averaging into a singular variable ($M = 5.24$, $SD = .87$, $\alpha = .89$).

**Information retention.** Five true or false items were asked based off factual information presented in the stimuli. Timing of the retention questions was considered, such that attempts were made for the answers to the retention questions to occur approximately every 10 seconds in the video. All 5-items were summed into a composite retention variable and treated as an outcome ($M = 3.36$, $SD = 1.24$, no alpha). 21% of the sample were able to score 5 correct answers for the retention variable, and 26% of the sample scored 4 questions correct.
CHAPTER IV:
RESEARCH DESIGN: EXPERIMENT TWO

Experiment 2: Race, Sex, and Education

**Design.** Experiment two is a three-way factorial design, 2x2x2, which contains an added manipulation compared to the 2x2 design in experiment one. The two manipulations from experiment one are made within the original stimulus video (race of the forecaster: black/white, biological sex of forecaster: male vs. female), and the third manipulation for this experiment was made in the form of the forecaster’s presented education level (meteorology degree vs. non-science degree) prior to viewing the video. Participants were primed to believe that the on-screen forecaster had either a Bachelor of Science degree in Meteorology or no science-based degree (B.A. in Journalism) from the University of Oklahoma through reading a bio about the forecaster’s education level.

**Sample and procedure.** Sampling for experiment two utilized Amazon’s Mechanical Turk (MTurk; www.mturk.com) participant program during April 2019. Following a similar Power Analysis as Experiment 1, with one additional predictor variable, approximately 600 participants were necessary to be drawn. The final usable sample for this experiment was N = 595 after removing participants who failed the manipulation check of recalling the broadcaster’s race and sex. The breakdown of the experimental conditions were as follows for the B.A. conditions: black female n = 75, white male n = 70, black male n = 70, and white female n = 72 - and as follows for the B.S. conditions black female n = 72, white male n = 77, black male n = 84, and white female n = 75. Upon completion of the survey, participants were credited with $0.50 which was based on time requirements to complete the experiment.
Stimuli and manipulation. This stimuli for experiment two are the same four videos used in experiment one, with the additional manipulation built in prior to participants viewing the video. Before being exposed to the same set of videos in experiment one, participants were informed (akin to a priming task) that the person on-camera has a meteorology degree (B.S) or a journalism degree (B.A.). This manipulation was utilized because most on-camera weather broadcasters have a degree in one of the two fields or have received training in one of the fields which were utilized as conditions. A graphic of the proposed design is in Appendix B.

The overall procedure followed akin to Experiment 1. Participants were invited to participate in the online experiment, through an IRB-approved information sheet which was hosted on the online-survey platform Qualtrics. Once eligibility was screened (18 years or older, never previously taken the survey, U.S. resident), participants were asked to confirm their consent and be directed to the online survey portion of the experiment.

Measures

Independent variables. The three independent variables of interest for this study are the manipulations made in the stimuli videos. Since one of the main goals of this study is to probe the effects of two or more independent variables simultaneously, effect coding ranging from \(-1\) to 1 is utilized. Effect coding allows for the comparison of two or more groups, with some reference group to examine differences.

Meteorologist biological sex. Biological sex was measured as an independent variable based on which manipulation a participant was exposed. Participants viewed a mock weather hit which had a forecaster with the appearance of either a male or female, and these were subsequently coded as follows: female = -1, male = 1.
**Meteorologist race.** Race was also measured as an independent variable based on which manipulation a participant was exposed. Participants viewed a mock weather hit which had a forecaster who appears either black or white, and in both experiments, the coding scheme was black = -1, white = 1.

**Meteorologist education.** For the second experiment only, an additional independent variable was measured based off the third manipulation. Participants were primed to believe the forecaster in the mock weather hit has either a Journalism degree or a Meteorology degree, and the coding for this was Bachelor of Arts in Journalism = -1, Bachelor of Science in Meteorology = 1. Participants were given this information immediately prior to viewing the respective video condition through the form of on-screen text.

**Participant demographics.** In addition to the independent variables based off the stimuli, individual participant demographics were also collected and treated as independent (or in some cases control) variables. Participant biological sex, race, age, education level, and present geographic residence were all collected. Additionally, because weather and climate are often bundled together under the umbrella of atmospheric science, political affiliation was also collected. All descriptive information about the sample across these variables is presented in Chapter 6.

**Intervening and control variables**

**Parasocial interaction (PSI).** PSI was measured through the abbreviated (10-item) PSI scale, since it was intended for use with news personas. To complete the 10iPSI, individuals reported their level of agreement (ranging from 1=strongly disagree to 5=strongly agree) on 10 Likert-type items. A CFA was performed but the model suggested poor fit even after removing six insignificant and low factor loadings \( \chi^2 (10) = 1070.37; p = .000, \text{CFI} = .23, \text{RMSEA} = .42 \).
The final scale contained four items which were averaged into a computed PSI variable, but this variable was not utilized in any analysis because of its poor internal consistency and reliability in both experiments.

**Homophily (mediating variable).** Perceived homophily was measured using the perceived homophily scale (McCroskey, Richmond, & Daly, 1975; McCroskey & Richmond, 1979). Participants were asked to indicate their feelings on eight different items about the broadcaster they just viewed using a 7-point Likert type scale. After performing a CFA \( \chi^2 (2) = .202; p = .653, \text{CFI} = 1.0, \text{RMSEA} = .01 \) a two-factor solution emerged, which capture attitude homophily \( (M = 4.34, SD = 1.46, \alpha = .77) \) and background homophily. \( (M = 3.63, SD = 1.56, \alpha = .78) \).

**Physical attractiveness (covariate).** For purposes of a control variable, one dimension of McCroskey and McCain (1974) Interpersonal Attraction Scale was utilized. Participants were asked to respond to 5-point Likert type question which asks them to indicate the level to which they agree to six different statements about the meteorologist presented. The full scale can be found in Appendix A. After performing a CFA, a just-identified solution emerged as one factor, and the items were averaged into computed physical attractiveness variables and used as covariates \( (M = 3.49, SD = 1.18, \alpha = .91) \).

**Involvement (covariate).** Involvement will be used as a control variable through measurement of the Personal Involvement Inventory (PII; Zaichkowsky, 1985). Participants responded to the prompt “When I think of the information, I received about the weather forecast, I think of it as:” on twenty separate bipolar-adjective items. The items were scored with values ranging from 1 to 7 and were subject to CFA to ensure unifactorial solution. Good model fit was achieved after removing 10 of the adjectives for poor factor loadings from the CFA \( \chi^2 (34) = \).
The final 10 items were computed into an involvement variable. \((M = 4.95, SD = 1.36, \alpha = .95)\).

**Dependent variables**

*Forecaster and content credibility*. Two separate factions of credibility were measured (forecaster credibility and content credibility) which each target a different level of credibility (individual vs. content). Credibility of the forecaster was measured following the newscaster credibility scale (McCroskey & Jenson, 1975). The scale is a five-dimension, 25-item scale of 7-point semantic differential phrases, which examine individuals’ perceptions of competence, character, sociability, composure, and extroversion of a newscaster. The scale underwent a CFA, for which a five-factor solution emerged after dropping 6 total items \(\chi^2 (142) = 490.62; p = .000, CFI = .96, \text{RMSEA} = .06\). The entire scale is presented in Appendix A. The five factors (to be treated as individual respective variables) which emerged are *forecaster competence* (6 items; \(M = 5.29, SD = 1.34, \alpha = .93\)), *character* (4 items; \(M = 5.38, SD = 1.07, \alpha = .78\)), *sociability* (4 items, \(M = 5.42, SD = 1.44, \alpha = .94\)), *composure* (2 items; \(M = 5.31, SD = 1.43, \alpha = .78\)), and *extroversion* (3 items; \(M = 4.67, SD = 1.49, \alpha = .85\)).

The second credibility dimension accounts for the credibility of the message content (i.e. the forecast). Message credibility was measured to assess the credibility of the actual message rather than the credibility associated with the message source. Message credibility was measured using a slightly adapted version of Appelman and Sundar's (2016) message credibility scale. This scale is a 3-item Likert-type scale which asks participants “How well do the following adjectives describe the content you just read?” with responses ranging from 1 (describes very poorly) to 7 (describes very well) on the adjectives *accurate, authentic*, and *believable*. The question was slightly edited for specificity, to read “How well do the following adjectives
describe the content you just watched” since participants will be viewing the forecast as a video rather than reading it. The final content credibility variable was computed by averaging the three item responses ($M = 5.71$, $SD = .93$, $\alpha = .85$).

**Forecaster trustworthiness.** To measure trustworthiness of the forecaster, one dimension of McCroskey and Teven’s (1999) source credibility scale was measured. Source credibility is typically a three-factor construct, consisting of trustworthiness, competence, and goodwill of a source. Each construct is measured with 6 semantic differential type items, which have two antonyms on 7-point scales, and typically subject to a CFA to ensure a three-factor solution. With respect to participant fatigue and because individuals are rating source credibility through a separate measure, only trustworthiness was measured as a singular factor which is treated as composite individual forecaster trust variable. This variable was measured with six 7-point semantic differential antonyms prompted by the question “please indicate your feelings about the meteorologist you just viewed.” After removing three poor-loading items, the remaining CFA model was just-identified. All antonyms are listed in Appendix A. ($M = 5.23$, $SD = 1.48$, $\alpha = .89$).

**Information retention.** Five true or false items were asked based off factual information presented in the stimuli. The goal here was to space out the answers to the retention questions at approximately every 10 seconds in the video. All 5-items were summed into a composite retention score and treated as an outcome variable. ($M = 2.34$, $SD = 1.5$). 24% of the participants scored 4 or 5 correct answers, while approximately 57% retained 0, 1, or 2 correct answers.
CHAPTER V

EXPERIMENT ONE RESULTS

Data for the first experiment were collected in late-March and early-April 2019. Prior to coding and analyzing the data, various researcher judgements were made while data cleaning. First, all surveys designated as in-progress by Qualtrics were deleted (all reported finishing 50% or less of the survey) as to ensure a respondent completed the requirements of the survey. Second, any surveys which were completed in an unrealistic amount of time (under 300 seconds) were also deleted, and seven cases were removed from the sample for failing the manipulation check. This resulted in a final usable sample of $N = 481$.

Descriptive Statistics and Sample Characteristics

After data cleaning, breakdown for the descriptive variables were exampled. Regarding the sex of the sample, a majority (51.6%) of the sample was female. The mean age was 19.3 years old. Approximately 69% of the sample was white, 7% black, 6% Latino or Latin American, 12% Asian-American, and 5% of participants specifying another racial demographic. The sample had a slight liberal skew, with 45% reporting a liberal political belief, and more than a quarter (26.4%) reporting they consider themselves neither conservative nor liberal. 89% of the sample reported residing in New England primarily, and the average media use was approximately 7 hours per day ($SD = 3.43$), with a range from zero to eighteen hours daily.

Homogeneity Across Sample

All variables of interest were examined for their relationships with another (through correlations), normality, and any possible skew. No variables had more than a slight skew which could be explained through a ceiling effect. All variables followed patterns of normality as well. Finally, comparisons across experimental conditions are made in the following analysis, as equal
randomization was successful – and all groups have roughly equal cell sizes for comparing results. For experiment one, two separate types of analyses will be performed to address the hypotheses and research questions.

**Analyzing Mean Differences**

First, a 2x2 between subjects’ multivariate analysis of covariance (MANCOVA) addressed the hypotheses examining multiple dependent variables across the manipulated experimental conditions of race and sex. A MANCOVA examined whether the eight dependent variables of interest were associated with the independent variables (and their interactions) and covariates. Bivariate correlations between all of the dependent variables are shown in Table 1 (Appendix D) and indicate that the moderate and significant correlations suggest MANCOVA is a sufficient analytic procedure here.

Hypotheses one through three and research question one, all sought to examine the role of the two conditions - race and sex - on the perceptions of forecaster trustworthiness, the five factors of forecaster credibility (competence, character, sociability, composure, and extroversion), and message credibility. A global MANCOVA was performed to address these three hypotheses and single research question together, where conditions of race and sex were entered as independent variables, each of the eight aforementioned dependent variables were entered, and five covariates (participant sex, participant race, political affiliation, perceived physical attractiveness, and issue involvement) were also input into the analysis.

For this analysis, the only non-significant covariate within the model was participant sex \[F (8, 432) = 1.09, p = .372, \text{partial } \eta^2 = .02\)]. The remaining four covariates, participant race \[F (8, 432) = 5.17, p < .001, \text{partial } \eta^2 = .09\)], political affiliation \[F (8, 432) = 1.96, p = .049, \text{partial } \eta^2 = .02\].
partial eta² = .04)], perceived attractiveness [F (8, 432) = 4.5, p < .001, partial eta² = .08]), and issue involvement [F (8, 432) = 8.79, p < .001, partial eta² = .14]) were all significant.

Further, the two-way MANCOVA revealed a significant main effect for both the sex condition [F (8, 432) = 3.08, p = .002, partial eta² = .05, Wilk’s λ = .95]) and race condition [F (8, 432) = 2.19, p = .027, partial eta² = .04, Wilk’s λ = .96]). The interaction effect (sex * race) was also probed and found to be non-significant [F (8, 432) = 1.18, p = .312, partial eta² = .02, Wilk’s λ = .99]).

Given the significance of the overall test, the univariate main effects were examined to better understand the pattern of results and understand the relationships with each dependent variable individually. Specifically, H1 examined the influence of condition on trustworthiness. Significant univariate main effects were found for the sex condition on forecaster trust [F (1, 439) = 3.10, p = .025, partial eta² = .01], but not the race condition on forecaster trust [F (1, 439) = .85, p = .24, partial eta² = .003]. Again, no significant interaction effect emerged. Those who were in the black male forecaster condition reported the highest values of trustworthiness (M = 5.46, SD = .94) while those in the white male condition reported the lowest values of trustworthiness (M = 5.17, SD = .79). Additionally, those who were exposed to a black condition reported higher trust across both sexes, while the differences in means between males and females was roughly negligible. While the univariate main effects of sex were found to be statistically significant and race were not, this pattern of means is contrary to the prediction in H1, such that the hypothesis is not supported.

Hypothesis two probed a similar effect, just on the five-factor dependent variable of forecaster credibility as the dependent variable. For H2a, the effect of condition on perceived forecaster competence was analyzed. Again, the univariate tests were inspected and significant
main effects were found for both the sex condition \[ F (1, 439) = 5.12, p = .024, \text{partial } \eta^2 = .012 \] and race condition \[ F (1, 439) = 4.37, p = .037, \text{partial } \eta^2 = .01 \] on forecaster competence. The significant findings suggest support for H2a, but upon inspecting the means, the pattern deviates from the proposed hypothesis. Individuals who were exposed to the black condition reported higher perceptions of competence \((M = 5.49, SD = .92)\) compared to those who were exposed to the white condition \((M = 5.30, SD = .86)\). Males were seen as more competent \((M = 5.43, SD = .92)\) than females overall \((M = 5.37, SD = .87)\).

In H2b, the same pattern of effects was probed but on forecaster character as the dependent variable. Upon inspecting the univariate results, there was no main effect for the sex condition on forecaster character \[ F (1, 439) = 2.32, p = .63, \text{partial } \eta^2 = .001 \], but there was a main effect for the race condition on forecaster character \[ F (1, 439) = 4.43, p = .036, \text{partial } \eta^2 = .01 \]. Inspecting the means for this dependent variable further shows race as the driving predictor variable, with those exposed to the black condition reporting higher perceptions of forecaster character \((M = 5.28, SD = .97)\) than those exposed to a white forecaster condition \((M = 5.07, SD = .93)\). There were negligible differences between the means of the sex conditions. H2b was not supported. Race was a significant predictor, while sex was not, but the pattern of means suggests a finding opposite of the hypothesized direction.

H2c sought to investigate if the race or sex manipulations played any role on perceptions of forecaster sociability. In short, neither univariate test, race \[ F (1, 439) = .013, p = .911, \text{partial } \eta^2 = 0 \] nor sex \[ F (1, 439) = .638, p = .43, \text{partial } \eta^2 = .001 \], produced a significant finding on the sociability of the forecaster. H2c was not supported.

H2d investigated the role of forecaster composure and the role that race and sex may play. Findings support sex having a main effect on perceptions of forecaster composure, \[ F (1,
439) = 8.99, \( p = .003 \), partial \( \eta^2 = .02 \), while race does not have a main effect on perceptions of forecaster composure \([F (1, 439) = 2.61, p = .11, \text{ partial } \eta^2 = .01]\). Inspecting the means for sex suggests that females were seen as significantly less composed \((M = 5.36, SD = 1.09)\) than men \((M = 5.54, SD = .97)\), and the white male condition produced the highest means \((M = 5.54, SD = .91)\) with the black female condition being viewed as the least composed \((M = 5.27, SD = 1.13)\). H2d is partially supported, with significant findings for sex but not race, in the anticipated pattern.

Finally, H2e examined the effect of the two conditions on forecaster extroversion, finding that sex played a main effect role \([F (1, 439) = 3.71, p = .05, \text{ partial } \eta^2 = .01]\) while race did not have a significant main effect \([F (1, 439) = .174, p = .676, \text{ partial } \eta^2 = 0]\). Further inspection of the means across conditions suggested that those exposed to the black male condition reported the highest levels of extroversion \((M = 5.51, SD = .97)\), compared to the white female condition \((M = 5.39, SD = 1.0)\), and the black male \((M = 5.25, SD = .97)\) and white male \((M = 5.23, SD = .96)\) conditions. While sex did again play a main effect role in a significant manner, the pattern of means was opposite of hypothesized with the white male condition actually being perceived to have the lowest extroversion of the four conditions. Thus, H2e is not supported.

Hypothesis three sought to investigate the role of sex and race on the credibility of the actual message content (rather than on delivery or appearance). Univariate tests suggest that there was a main effect for sex \([F (1, 439) = 4.44, p = .036, \text{ partial } \eta^2 = .01]\) on message credibility and no significant main effect for race on message credibility \([F (1, 439) = .41, p = .53, \text{ partial } \eta^2 = .001]\). Examining the means across conditions finds that those exposed to the black male condition reported the highest levels of message credibility \((M = 5.51, SD = .94)\), whereas those exposed to the white female condition were seen to have the lowest levels of
message credibility ($M = 5.39, SD = 1.02$). Thus, there was no support for H3 because of the directionality of the findings.

The last analysis of variance in experiment one comes in RQ1, where the role of the two manipulations is tested on information retention. Neither sex nor race had a significant influence on whether participants retained information or not, with sex [$F (1, 439) = 1.44, p = .23$, partial $\eta^2 = .003$] and race [$F (1, 439) = .29, p = .66$, partial $\eta^2 = 0$] both having negligible findings and effect sizes. Means for the conditions ranged from 3.3 correct answers in the white male condition, to an average of 3.5 correct answers in the black female condition.

**Mediation Analyses**

To analyze the mediational hypotheses and research questions, a regression model was built and tested using PROCESS, a macro-developed for SPSS to test various mediation and moderation combinations (Hayes, 2013). PROCESS is useful for testing relationships and combinations of mediators, moderators, and combinations which may include both types of variables. The regression approach is an ordinary-least squares (OLS) path analytic approach which tests conditional direct and indirect effects. Indirect effects are formed using a bootstrapping procedure (5000 bootstraps in this study), with a confidence interval output, where the sample distribution is estimated using re-sampled replacement data from the original data (Hayes, 2013). In mediation testing, bootstrap methods are preferred over tests such as Sobel testing or other approaches (Hayes, 2013). Hayes also suggests the use of unstandardized coefficients, which are presented, and an indirect effect is interpreted as significant if the lower and upper 95% confidence intervals are either both above or below zero (i.e., do not cross 0). If a confidence interval contains zero, then there is no significant indirect effect.
This analysis addresses hypotheses four, five, six, and research question two. Hypothesis four sought to examine the relationship between the experimental conditions and the outcome of forecaster trust, being mediated through both attitudinal (H4a) and background (H4b) homophily. For H4a, the overall model was significant \(F (9, 468) = 9.12, p < .001\), while explaining 15% of the overall variance in forecaster trust \((R^2 = .149)\).

More specifically, H4a sought to test that both conditions relationship with perceptions of forecaster trust would be mediated by attitudinal homophily. The main effect of the sex condition on forecaster trust was significant \((B = .09, p = .03)\) and in the expected direction. The main effect of race was also significant \((B = -.08, p = .04)\), but in the opposite direction hypothesized. Even though not hypothesized, the interaction between sex and race was non-significant. Three of the five covariates entered in the model were significant, including participant race \((B = .12, p < .01)\), physical attraction \((B = .43, p < .01)\), and involvement \((B = .22, p < .01)\). Neither the conditional indirect effect of sex \((B = -.002, SE = .004; 95\% \text{ BCa CI} = -.012 \text{ to } .006)\) nor the conditional indirect effect of race \((B = .004, SE = .005; 95\% \text{ BCa CI} = -.015 \text{ to } .016)\) were significant. Thus, H4a was not supported. In a post-hoc fashion, it may be noteworthy to point out that those who were exposed to the black forecaster condition had a significant conditional direct effect \((B = .15, p < .01)\), in a pattern that suggests those who viewed a black forecaster perceived males as more trustworthy than the female forecasters.

Following a similar analysis process for H4b to investigate both conditions and their relationship with forecaster trust through the mediator of background homophily, again the overall model is significant \(F (9, 468) = 9.16, p < .001\), with 15% of the variance explained \((R^2 = .15)\). The main effects of both sex \((B = .09, p = .03)\) and race \((B = -.073, p = .05)\) are significant, and there were again three significant covariates in the model: participant race \((B = \ldots\).
.12, p < .01), physical attraction (B = .41, p < .001), and involvement (B = .22, p < .001). Again, the non-hypothesized interaction was also non-significant. Examining the conditional direct and indirect effects found similar patterns as H4a, where the conditional direct effect of condition on forecaster trust is significant among those who viewed the black condition (B = .15, p < .01) in a fashion that suggests these individuals found male forecasters more trustworthy than females.

For the indirect effects of sex (B = -.001, SE = .004; 95% BCa CI = -.01 to .007) and race (B = -.0004, SE = .005; 95% BCa CI = -.01 to .007) there was no evidence of mediation, and thus, H4b is not supported.

Hypothesis five examined the relationship of the two experimental conditions, with attitudinal homophily as a mediator, on the perceptions of competence (H5a), character (H5b), sociability (H5c), composure (H5d), and extroversion (H5e). For H5a, the overall model for the outcome of forecaster competence was significant [F (9, 468) = 15.34, p < .001], with 23% of the variance being explained (R^2 = .228). The main effect of sex condition was not significant (B = .08, p = .06), while the main effect of race condition was significant (B = -.10, p < .01). There were four significant covariates in the model, including participant race (B = .17, p < .001), political affiliation (B = .08, p < .01), physical attraction (B = .39, p < .001), and involvement (B = .33, p < .001). None of the interaction effect (sex*race) or conditional direct effects were significant. Examining the indirect effects for sex (B = -.002, SE = .005; 95% BCa CI = -.014 to .006) and race (B = .005, SE = .006; 95% BCa CI = -.005 to .018) suggests no mediation, such that H5a is not supported.

For the outcome variable perceptions of forecaster character, a relatively similar pattern of results emerges. The overall model is significant [F (9, 468) = 5.46, p < .001], with 10% of the variance explained (R^2 = .095). The main effect of the sex condition was not significant (B =
.01, \( p = .77 \), though the main effect of the race condition was significant (\( B = -.12, p < .01 \)). Two covariates emerged as significant, including physical attractiveness (\( B = .42, p = .001 \)), and involvement (\( B = .16, p = .01 \)). Again, none of the conditional direct effects were significant or of sizable meaning. Inspecting the indirect effects finds that neither sex (\( B = -.003, SE = .006; 95\% \text{ BCa CI} = -.016 \text{ to } .008 \)) nor race (\( B = .006, SE = .007; 95\% \text{ BCa CI} = -.005 \text{ to } .022 \)) are significant mediators. Thus, H5b was not supported.

For H5c, the outcome variable of interest was forecaster sociability. Overall the model was significant \([F (9, 467) = 12.14, p < .001]\) while accounting for 19\% of the variance (\( R^2 = .19 \)). Yet, neither condition main effect was significant, sex (\( B = -.02, p = .71 \)) nor race (\( B = -.06, p = .18 \)). Additionally – though not hypothesized, the interaction between race and sex was significant (\( B = -.09, p < .05 \)). There were also four significant covariates: participant race (\( B = .20, p < .01 \)), political affiliation (\( B = .10, p < .01 \)), physical attraction (\( B = .51, p < .001 \)), and involvement (\( B = .24, p < .001 \)). The conditional direct were not significant, and inspecting the indirect effects suggests neither sex (\( B = -.001, SE = .005; 95\% \text{ BCa CI} = -.010 \text{ to } .009 \)) nor race (\( B = .002, SE = .006; 95\% \text{ BCa CI} = -.011 \text{ to } .015 \)) were significant mediators. Because of these findings, H5c was not supported.

Hypothesis 5d sought to investigate the influence of condition on forecaster composure with attitudinal homophily as a mediator. The overall model was significant \([F (9, 468) = 9.05, p < .001]\), while accounting for 15\% of the variance (\( R^2 = .15 \)). The main effect for the sex condition was significant (\( B = .15, p < .01 \)), while the main effect for the race condition was not significant (\( B = .04, p = .35 \)). There were also four significant covariates: participant race (\( B = .19, p < .001 \)), political affiliation (\( B = .08, p < .05 \)), physical attraction (\( B = .46, p < .001 \)), and involvement (\( B = .27, p < .001 \)). The conditional direct effects were significant for both those
who were exposed to the black forecaster condition (B = .16, \( p < .05 \)) and the white forecaster condition (B = .14, \( p = .05 \)). None of the indirect effects were significant for either sex (B = -.005, \( SE = .008; 95\% \) BCa CI = -.022 to .01) or race (B = .011, \( SE = .008; 95\% \) BCa CI = -.003 to .03) – such that H5d was not supported.

Hypothesis 5e examined extroversion as the dependent variable. The overall model was significant \( [F (9, 468) = 8.22, \ p < .001] \), while being able to account for 14% of the variance (\( R^2 = .14 \)). Neither the main effect of the sex condition (B = .09, \( p = .06 \)) or the race condition (B = -.04, \( p = .37 \)) were significant. There were four significant covariates: participant race (B = .13, \( p < .01 \)), political affiliation (B = .07, \( p < .05 \)), physical attraction (B = .47, \( p < .001 \)), and involvement (B = .23, \( p < .001 \)). The conditional direct effect was significant for those who were exposed to the black forecaster conditions (B = .17, \( p < .01 \)). For the indirect effects, neither sex (B = -.006, \( SE = .01; 95\% \) BCa CI = -.03 to .012) nor race (B = .014, \( SE = .01; 95\% \) BCa CI = -.004 to .04) were significant mediators. H5e is not supported.

Hypotheses 6a through 6e sought to replicate the analysis in Hypothesis 5, with background homophily as the mediator rather than attitudinal homophily. For H6a, where competence is the outcome variable, the overall model was significant \( [F (9, 468) = 15.34, \ p < .001] \), and explained 23% of the variance (\( R^2 = .23 \)). The main effect for the sex condition was not significant (B = .08, \( p = .07 \)), while the main effect for the race condition was significant (B = -.10, \( p < .01 \)). The four significant covariates in this model were participant race (B = .17, \( p < .01 \)), political affiliation (B = .08, \( p < .01 \)), physical attraction (B = .37, \( p < .001 \)), and involvement (B = .33, \( p < .001 \)). The conditional direct effects were nonsignificant. Inspecting the indirect effects for both sex (B = -.001, \( SE = .004; 95\% \) BCa CI = -.010 to .007) and race (B
=.001, SE = .004; 95% BCa CI = -.009 to .007) also suggest there was no significant mediation, which does not support H6a.

In H6b, the dependent variable of interest is forecaster character. The overall model was significant \[F (9, 468) = 5.62, p < .001\], and the model accounted for 10% of the variance \([R^2 = .10]\). The main effect for sex was not significant (B = .01, \(p = .79\)), but the main effect for race was significant (B = -.11, \(p < .01\)). There were two significant covariates in the model as well: physical attraction (B = .39, \(p < .001\)) and involvement (B = .16, \(p < .001\)). The conditional direct effects were not significant or of useful magnitude. The indirect effects also suggest no mediation, with neither sex (B = -.002, SE = .007; 95% BCa CI = -.015 to .011) nor race (B = -.002, SE = .005; 95% BCa CI = -.011 to .012) being a significant mediator. H6b is not supported.

In H6c, the outcome variable included in the model is forecaster sociability. The overall model was significant \[F (9, 467) = 12.5, p < .001\], accounting for 19% of the variance \([R^2 = .19]\). Neither the main effect of sex (B = -.02, \(p = .72\)), nor race (B = -.06, \(p = .19\)) were significant, but the interaction effect between the two was significant (B = -.09, \(p < .05\)). There were four significant covariates: participant race (B = .21, \(p < .001\)), political affiliation (B = .09, \(p < .01\)), physical attraction (B = .51, \(p < .001\)), and involvement (B = .24, \(p < .001\)). None of the conditional direct effects were significant. Additionally, neither sex (B = -.002, SE = .006; 95% BCa CI = -.015 to .01) nor race (B = -.001, SE = .006; 95% BCa CI = -.013 to .011) was a significant mediator. Thus, H6c is not supported.

H6d sought to investigate the dependent variable of forecaster composure, for which the overall model was significant \[F (9, 468) = 8.73, p < .001\] and accounted for 14% of the variance \([R^2 = .14]\). The main effect of the sex condition was significant (B = .15, \(p < .01\), while the
main effect of the race condition was not significant (B = .05, p = .24). There were four significant covariates in the model: participant race (B = .19, p < .001), political affiliation (B = .08, p < .05), physical attraction (B = .41, p < .001), and involvement (B = .26, p < .001). The conditional direct effect was significant for those who were in the black forecaster condition (B = .16, p < .05). The conditional indirect effects were not significant for either sex (B = -.002, SE = .006; 95% BCa CI = -.014 to .011) or race (B = -.001, SE = .005; 95% BCa CI = -.013 to .01). Because of this, H6d is not supported.

H6e investigates forecaster extroversion as the outcome variable. The overall model is significant [$F(9, 468) = 8.31, p < .001$] and accounts for 14% of the variance, but the main effects for both sex (B = .08, p = .07) and race (B = -.25, p = .56) are non-significant. There is a conditional direct effect for those who viewed the black forecaster condition (B = .16, p < .01). Inspecting the indirect effects for mediational effects suggest there are none, as neither sex (B = -.003, SE = .01; 95% BCa CI = -.023 to .017) nor race (B = -.003, SE = .009; 95% BCa CI = -.021 to .016) are significant. There are four significant covariates: participant race (B = .17, p < .01), political affiliation (B = .07, p < .05), physical attraction (B = .41, p < .001), and involvement (B = .22, p < .001). Hypothesis 6e is not supported.

Finally, research question 2 investigates information retention as the outcome with both attitudinal and background homophily as mediators. For attitudinal homophily as the mediator, the overall model for information retention was significant [$F(9, 448) = 8.31, p < .001, R^2 = .06$], but neither the main effect for sex (B = -.07, p = .31) nor race (B = -.04, p = .46) were significant. Inspecting the indirect effects also suggests little in the way of significance, as neither sex (B = -.005, SE = .01; 95% BCa CI = -.028 to .01) nor race (B = .01, SE = .01; 95% BCa CI = -.004 to .037) mediate the relationship. A similar pattern was found for background
homophily, where the overall model is significant \[ F(9, 448) = 8.31, p < .001, R^2 = .06 \], but neither the main effect for sex (B = -.07, \( p = .28 \)) nor race (B = -.31, \( p = .59 \)) were significant. The indirect effects for both sex (B = 0, \( SE = .006 \); 95% BCa CI = -.013 to .011) and race (B = -.001, \( SE = .005 \); 95% BCa CI = -.014 to .009) are also not significant. Thus, there is no real evidence for influence on information retention as posed by RQ2 across either proposed mediator.

In sum, the analysis of variance produced statistically significant covariates of participant race, political affiliation, perceived attractiveness, and issue involvement. For hypothesis one, where the dependent variable was forecaster trust, significant main effects emerged for sex but not race – and opposite of the expected direction. Results for hypothesis two found sex played a significant role in three of the five factors of credibility, while race influenced two of the five. Forecaster sociability was influenced by neither sex nor race. For hypothesis three, sex played an influencing role on message credibility (though opposite of the direction hypothesized), but race did not. Neither sex nor race had an influence on the number of retained questions participants scored correct.

To summarize the mediational findings, in general there was no mediation for either attitudinal or background homophily. It appears that the sex manipulation may have been more effective in influencing results, as most of the main effects for the sex condition were significant, in addition to often being in the hypothesized direction. The race manipulation generally produced fewer significant findings, and often would be opposite the hypothesized direction (such that those exposed to the black condition would rate outcomes higher). Experiment two seeks to replicate some of these findings, in addition to probing the effect of having a degree in meteorology or not.
CHAPTER VI

EXPERIMENT TWO RESULTS

Data for experiment 2 were collected over the course of a week in April 2019. A similar process was followed for experiment two as performed in experiment one, along with the addition of the degree manipulation prior to a participant viewing the video. After acquiring the dataset, data cleaning was performed. Surveys collected as in-progress by Qualtrics were captured and inspected. Surveys which completed 98% or higher were considered finished surveys and kept, because participants had to copy a participant code to input on MTurk to receive credit and may not have returned to “submit” the final page. Second, any surveys which were completed in an unreasonable amount of time (under 300 seconds, same criteria as experiment 1) were deleted. This resulted in a final sample of $N = 595$.

**Descriptive Statistics and Sample Characteristics**

After cleaning the data, descriptive variables were analyzed to understand demographic breakdowns. The sex of the sample was 54.5% male. The mean age was 36.4 years old (SD = 11.72), with a range from 18 to 78 years old. 60.5% of the sample reported their primary race as Caucasian non-Hispanic, 15.3% Asian-American, 8.1% African American, 6.6% Hispanic, approximately 5% Native American, and under 5% refusing to disclose their race. Generally speaking, the majority of the sample was well-educated, with 47.6% having a four-year degree, 18% having a professional degree, 14.3% having some college, 11.6% earned a 2-year degree, and 7% reporting being a high school graduate.

The sample was relatively evenly distributed across political affiliation, as 16% reported being neither conservative nor liberal, approximately 33% reporting a slight or moderate liberal belief, and more than a quarter (28.4%) reporting they consider themselves a moderate or slight
conservative. Geographic distribution came from all regions of the United States, though skewed slightly toward more populous regions, with 23% reporting living in the Southern Atlantic states (DE, FL, GA, MD, NC, SC, VA, DC, & WV), 19% reporting East North Central states (IL, IN, MI, OH, & WI), and 19% living in Mid-Atlantic states (NJ, NY, & PA).

**Homogeneity Across Sample**

All variables included in experiment 2 were inspected for their relationships with one another (correlations), normality, and any potential skew. No variables had a skew or non-normal distribution to the effect of an unacceptable or suspicious level. Additionally, comparisons across the cell sizes in each condition suggests that equal randomization was successful, as all groups have a roughly similar number of participants in each (no more than 84 or less than 70). In experiment two, two separate types of analyses will be performed to address the hypotheses and research questions.

**Analyzing Mean Differences**

A 2x2x2 (sex x race x education) between subjects MANCOVA will be used to address the hypotheses which examine mean comparisons across multiple dependent variables while considering experimental condition. This MANCOVA will be used to examine whether the eight dependent variables of interest are associated with the independent variables and covariates (in addition to probing interactions). Bivariate correlations for the dependent variables are displayed in Table 2 (Appendix D), which suggest that utilizing MANCOVA is sufficient because the variables are moderately and significantly related. H7, H8a-e, H9 and RQ3 can all be explained through this analysis.

The MANOVA was setup by entering the three conditions of race, sex, and degree as the independent variables of interest. Each of the eight dependent variables were entered
respectively, and seven covariates of interest were input into the model (participant sex, race, age, education level, political affiliation, physical attraction, and involvement).

For this analysis, five of the seven covariates were significant. The only non-significant covariates were participant sex \( [F(8, 556) = .29, p = .65, \text{partial } \eta^2 = .01] \) and participant education level \( [F(8, 556) = 1.58, p = .13, \text{partial } \eta^2 = .02] \). The five significant covariates were age \( [F(8, 556) = 4.95, p < .001, \text{partial } \eta^2 = .07] \), participant race \( [F(8, 556) = 1.98, p = .046, \text{partial } \eta^2 = .03] \), political affiliation \( [F(8, 556) = 3.15, p = .002, \text{partial } \eta^2 = .04] \), physical attraction \( [F(1, 439) = 13.87, p < .001, \text{partial } \eta^2 = .17] \), and issue involvement \( [F(8, 556) = 64.11, p < .001, \text{partial } \eta^2 = .48] \).

Additionally, the three-way MANCOVA revealed a significant main effect for sex \( [F(8, 556) = 2.14, p = .03, \text{partial } \eta^2 = .04, \text{Wilk’s } \lambda = .970] \). The main effects for race \( [F(8, 556) = 1.80, p = .075, \text{partial } \eta^2 = .03, \text{Wilk’s } \lambda = .975] \) and degree \( [F(8, 556) = 1.05, p = .40, \text{partial } \eta^2 = .02, \text{Wilk’s } \lambda = .985] \) were also examined, but not statistically significant. Finally, a possible interaction of interest may be sex*race \( [F(8, 556) = 1.96, p = .085, \text{partial } \eta^2 = .02, \text{Wilk’s } \lambda = .975] \), though the interaction was not statistically significant.

Given the presented main effects, the univariate main effects were examined to better understand the pattern of results and relationships with respect to the proposed hypotheses. Furthermore, H7 examined the influence of the three conditions on the dependent variable of forecaster trust, while controlling for various variables. No significant main effects were found for the sex condition \( [F(1, 563) = 2.72, p = .10, \text{partial } \eta^2 = .01] \), race condition \( [F(1, 563) = .197, p = .66, \text{partial } \eta^2 = 0] \), or the degree condition \( [F(1, 563) = .001, p = .98, \text{partial } \eta^2 = 0] \). Additionally, no significant interaction effect emerged, and if one were to inspect the pattern
of means (while neglecting non-significance), the pattern is opposite of the anticipated finding. Thus, H7 is not supported.

Hypothesis 8a-e investigated a similar effect, except the dependent variables were the five individual factors of forecast credibility. Upon inspecting the univariate tests, the only significant effects for forecaster competence were found for the sex condition \[ F(1, 563) = 6.53, \ p = .01, \ \text{partial eta}^2 = .01 \], while the results in the race \[ F(1, 563) = .23, \ p = .64, \ \text{partial eta}^2 = .01 \] and degree conditions \[ F(1, 563) = 2.65, \ p = .10, \ \text{partial eta}^2 = .01 \] were non-significant. This suggests that only forecaster sex has an influence on perceptions of forecaster competence, but the pattern of means again is opposite of the hypothesis – where those exposed to the white male condition actually reported the lowest levels of competence \( M = 5.18, SD = 1.29 \) relative to any other group. This, H8a is not supported. Though not hypothesized, one significant two-way interaction did emerge and is presented as a post-hoc analysis here. Race and degree (race*degree) significantly predicted perceptions of forecaster composure \[ F(1, 563) = 4.49, \ p = .035, \ \text{partial eta}^2 = .01 \].

Following the same univariate procedure for H8b, forecaster character is the dependent variable and the results suggest that race \[ F(1, 563) = 7.87, \ p = .005, \ \text{partial eta}^2 = .014 \] is the only significant influencer of perceptions of forecaster character, while the sex \[ F(1, 563) = 3.23, \ p = .07, \ \text{partial eta}^2 = .01 \] and degree conditions \[ F(1, 563) = .22, \ p = .883, \ \text{partial eta}^2 = 0 \] are not statistically significant. Those who were exposed to the white male condition reported the lowest levels of forecaster character \( M = 5.08, SD = 1.04 \), compared to the other three groups.

For the dependent variable of forecaster sociability (H8c), all three of the conditions produced non-significant results. Sex \[ F(1, 563) = .025, \ p = .88, \ \text{partial eta}^2 = 0 \], race \[ F(1, 563) = .22, \ p = .64, \ \text{partial eta}^2 = .01 \],
563) = .93, \( p = .34 \), partial \( \eta^2 = .002 \), and degree \( F(1, 563) = .63, p = .43, \) partial \( \eta^2 = .001 \) did not influence perceptions of forecaster sociability, and H8c is not supported.

Forecaster composure as a dependent variable follows a similar pattern as the findings in H8c, where all three conditions do not produce significant results. Sex \( F(1, 563) = .87, p = .35, \) partial \( \eta^2 = .002 \), race \( F(1, 563) = .50, p = .48, \) partial \( \eta^2 = .001 \), and degree \( F(1, 563) = 1.02, p = .31, \) partial \( \eta^2 = .002 \) all failed to influence perceptions of how much composure individuals felt about the forecaster displayed, and thus, H8d is not supported.

Finally, H8e sought to examine the relationship between the three conditions and perceptions forecaster extroversion. Again, all three conditions failed to influence the dependent variable, such that sex \( F(1, 563) = .09, p = .76, \) partial \( \eta^2 = 0 \), race \( F(1, 563) = .36, p = .55, \) partial \( \eta^2 = .001 \), and degree \( F(1, 563) = .165, p = .69, \) partial \( \eta^2 = .001 \) were all negligible in their influence. H8e was not supported.

The final two dependent variables of interest in this analysis are message credibility (H9) and information retention (RQ3). For H9, none of sex \( F(1, 563) = .82, p = .37, \) partial \( \eta^2 = .001 \), race \( F(1, 563) = 1.51, p = .22, \) partial \( \eta^2 = .003 \), or degree condition \( F(1, 563) = .84, p = .77, \) partial \( \eta^2 = 0 \) were able to significantly influence perceptions of message credibility. A sex by race (sex*race) interaction did emerge \( F(1, 563) = 3.55, p = .06, \) partial \( \eta^2 = .01 \) but is presented here as a non-hypothesized post-hoc finding, and the effect size is minimal. Overall, H9 was not supported. RQ3 also failed to produce any significant results across three conditions for the dependent variable of information retention. No significant differences were found across sex \( F(1, 563) = .48, p = .49, \) partial \( \eta^2 = .001 \), race \( F(1, 563) = .016, p = .9, \) partial \( \eta^2 = 0 \), or degree condition \( F(1, 563) = .042, p = .84, \) partial \( \eta^2 = 0 \), suggesting that the condition a
participant was exposed to did not influence the number of informational questions they were able to retain.

**Mediation Analysis**

A similar analytic procedure to the procedure in experiment one was conducted for analyzing the mediation results, with an extra experimental manipulation added to the model. A new regression model was built and tested using PROCESS, an SPSS macro utilized for testing mediation and moderation relationships. This macro uses an OLS regression path analytic approach which computes both conditional direct and conditional indirect effects. Indirect effects are created using a bootstrapping procedure as explained in full detail in experiment one, with 5000 bootstrap iterations (Hayes, 2013). This analysis will address hypotheses 10, 11, and 12. In all three hypotheses, seven covariates were entered in the model. These included participant sex, age, participant race, participant education level, political affiliation, physical attraction, and involvement.

Hypothesis 10 examined if the experimental conditions and the outcome of forecaster trust were mediated by both attitudinal homophily (H10a) and background homophily (H10b). For H10a, the overall model was significant \( F(13, 571) = 58.06, p < .001 \), while being able to account for 57% of the total variance \( R^2 = .57 \). Furthermore, the main effects for sex (\( B = .07, p = .10 \)), race (\( B = .02, p = .68 \)), and degree (\( B = .002, p = .96 \)) were all non-significant. There were three significant covariates: participant education (\( B = -.08, p < .05 \)), physical attraction (\( B = .34, p < .001 \)), and involvement (\( B = .51, p < .001 \)). Further investigating the mediation suggests that there are no significant indirect effects for sex (\( B = .001, SE = .02; 95\% \text{ BCa CI} = -.033 \text{ to } .036 \)), race (\( B = .003, SE = .02; 95\% \text{ BCa CI} = -.029 \text{ to } .04 \)), or the degree condition (\( B = -.01, SE = .02; 95\% \text{ BCa CI} = -.038 \text{ to } .029 \)). Thus, H10a was not supported.
For hypothesis 10b, a similar analysis was followed using background homophily as the mediator variable. A similar pattern of findings emerged. Overall, the model was significant \[ F (13, 571) = 54.43, p < .001 \], while accounting for 55% of the variance \( R^2 = .55 \). None of the three conditions produced significant main effects, with sex \( (B = .07, p = .11) \), race \( (B = .03, p = .54) \), and degree level \( (B = .001, p = .98) \) all being nonsignificant. The three significant covariates in the model were participant education \( (B = -.08, p < .05) \), physical attraction \( (B = .34, p < .001) \), and involvement \( (B = .57, p < .001) \). Background homophily did not perform as a significant mediator for any of sex \( (B = .001, SE = .01; 95\% BCa CI = -.002 to .022) \), race \( (B = -.01, SE = .01; 95\% BCa CI = -.026 to .016) \), or degree level \( (B = -.003, SE = .01; 95\% BCa CI = -.024 to .017) \) as evidenced by the indirect effects. H10b was also not supported.

Hypothesis 11 sought to investigate if attitudinal homophily would mediate the relationship between the three conditions on the five factors of forecaster credibility. For H11a, the outcome variable of interest is perceived forecaster competence. The overall model was significant \[ F (13, 570) = 68.49, p < .001 \], while being able to account for 61% of the variance \( R^2 = .61 \). Only the main effect for the sex condition was significant \( (B = .09, p < .01) \), while the main effects for the race condition \( (B = -.02, p = .65) \) and degree condition \( (B = .06, p = .08) \) were not significant. There were three significant covariates in the model, including participant age \( (B = .01, p = .01) \), physical attraction \( (B = .25, p < .001) \), and involvement \( (B = .56, p < .001) \). Upon inspecting the indirect effects, it is evident that no mediation occurs – as the indirect effects for sex \( (B = .001, SE = .01; 95\% BCa CI = -.021 to .021) \), race \( (B = .002, SE = .01; 95\% BCa CI = -.018 to .031) \), and degree level \( (B = -.003, SE = .010; 95\% BCa CI = -.025 to .016) \) are all nonsignificant. Thus, H11a is not supported.
H11b follows a similar analytic process except the outcome variable of interest is forecaster character. The overall model is significant \([F (13, 570) = 7.04, p < .001]\), and the main effects for the race condition (B = -.11, \(p < .01\)) are significant, while the main effects for the sex condition (B = -.07, \(p = .09\)) and degree condition (B = .001, \(p = .99\)) are not. The overall model explained 14% of the variance (\(R^2 = .14\)), and the three significant covariates were education level (B = -.08, \(p = .03\)), physical attraction (B = .19, \(p < .001\)), and involvement (B = .12, \(p < .01\)). There again appears to be no significant mediation across the sex (B = 0, SE = .004; 95% BCa CI = -.01 to .009), race (B = 0, SE = .004; 95% BCa CI = -.01 to .009), or degree conditions (B = 0, SE = .004; 95% BCa CI = -.008 to .009). H11b is also not supported.

For H11c, the outcome variable of interest is forecaster sociability. The overall model is significant \([F (13, 571) = 58.95, p < .001]\) and accounts for 57% of the variance (\(R^2 = .57\)). In this model, no significant main effects exist for sex (B = -.004, \(p = .92\)), race (B = -.04, \(p = .32\)), or degree conditions (B = -.03, \(p = .42\)). The two significant covariates in this model are physical attraction (B = .29, \(p < .001\)) and involvement (B = .51, \(p < .001\)). Very little evidence exists for mediation, as all of sex (B = .001, SE = .02; 95% BCa CI = -.035 to .036), race (B = .004, SE = .018; 95% BCa CI = -.032 to .038), and degree conditions (B = -.004, SE = .02; 95% BCa CI = -.040 to .029) are not mediated by homophily. H11c is not supported.

Examining the model for H11d, where forecaster composure is the outcome variable, finds an overall significant model \([F (13, 566) = 5.63, p < .001]\) which explains 11% of the variance (\(R^2 = .11\)). None of the three main effects, sex (B = -.05, \(p = .41\)), race (B = .04, \(p = .49\)), or degree (B = .06, \(p = .31\)), are significant. The three significant covariates are participant age (B = .01, \(p < .05\)), political affiliation (B = .07, \(p < .05\)), and physical attraction (B = .23, \(p < .001\)). Investigating the indirect effects shows no significant mediation of attitudinal homophily.
for the relationships between the conditions of sex (B = -.001, SE = .01; 95% BCa CI = -.02 to .018), race (B = -.001, SE = .01; 95% BCa CI = -.02 to .018), and degree level (B = .002, SE = .01; 95% BCa CI = -.016 to .022) with forecaster composure. Because of this, H11d is not supported.

Finally, the last model to investigate for hypothesis 11 includes the outcome variable of forecaster extroversion. The overall model was significant \[ F(13, 571) = 33.33, p < .001 \] and accounted for 43% of the variance (\( R^2 = .43 \)). None of the three main effects, sex (B = .02, \( p = .76 \)), race (B = -.03, \( p = .51 \)), or degree level (B = .02, \( p = .70 \)) were significant. In this model, there were six total significant covariates, including participant age (B = .02, \( p < .001 \)), participant race (B = .13, \( p < .05 \)), education level (B = -.09, \( p < .05 \)), political affiliation (B = .10, \( p < .001 \)), physical attraction (B = .38, \( p < .001 \)), and involvement (B = .38, \( p < .001 \)).

Inspecting the indirect effects suggests there was no significant mediation for sex (B = -.001, \( SE = .012 \); 95% BCa CI = -.024 to .025), race (B = -.002, \( SE = .012 \); 95% BCa CI = -.026 to .024), or degree (B = .003, \( SE = .012 \); 95% BCa CI = -.020 to .029). Thus, H11e is also not supported, and generally speaking there were no significant findings around the mediational hypotheses in this experiment.

The last hypothesis of interest in this study is hypothesis 12, which replicates hypothesis 11 but with background homophily as the proposed mediator rather than attitudinal homophily. H12a examined the outcome variable of forecaster competence in relation to the conditions and the proposed mediator. The overall model was significant \[ F(13, 570) = 65.98, p < .001 \] and accounted for 60% of the variance (\( R^2 = .60 \)). The main effect for sex was significant (B = .10, \( p < .01 \)), while the main effects for both race (B = -.014, \( p = .70 \)) and degree (B = .06, \( p < .10 \)) were not. There were three significant covariates in this model, including age (B = .01, \( p < .05 \),

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physical attraction (B = .25, \( p < .001 \)), and involvement (B = .61, \( p < .001 \)). Examining the conditional indirect effects suggests that none of sex (B = 0, \( SE = .004 \); 95% BCa CI = -.009 to .01), race (B = -.001, \( SE = .004 \); 95% BCa CI = -.01 to .008), or degree (B = 0, \( SE = .004 \); 95% BCa CI = -.01 to .008) were significant in the mediation relationship, suggesting that H12a is not supported.

Switching to forecaster character as the outcome variable (H12b) again finds the overall model significant \( [F (13, 570) = 7.35, p < .001] \), and accounting for 14% of the overall variance \( (R^2 = .144) \). The main effects for both the sex condition (B = -.07, \( p = .09 \)) and degree conditions (B = -.001, \( p = .98 \)) were not significant. The main effect for the race condition was significant (B = -.11, \( p < .01 \)). Two significant covariates emerged: physical attraction (B = .19, \( p < .001 \)) and involvement (B = .13, \( p < .001 \)). Further inspecting the conditional indirect effects again suggests a lack of mediation for H12b, where no significant indirect effects exist for sex (B = -.001, \( SE = .007 \); 95% BCa CI = -.015 to .014), race (B = .003, \( SE = .007 \); 95% BCa CI = -.011 to .019), or degree (B = .002, \( SE = .007 \); 95% BCa CI = -.013 to .017). Thus, H12b is not supported.

For forecaster sociability (H12c) – the overall model is again significant \( [F (13, 571) = 53.10, p < .001] \) and explains 55% of the total variance \( (R^2 = .547) \). The main effects for sex (B = -.004, \( p = .93 \)), race (B = -.034, \( p = .40 \)), and degree (B = -.04, \( p = .39 \)) are all not significant. There were two significant covariates in physical attraction (B = .29, \( p < .001 \)) and involvement (B = .60, \( p < .001 \)). Examining the indirect effects for each factor again suggests little evidence for mediation, as none of sex (B = 0, \( SE = .006 \); 95% BCa CI = -.012 to .012), race (B = -.002, \( SE = .005 \); 95% BCa CI = -.013 to .009), or degree (B = -.001, \( SE = .006 \); 95% BCa CI = -.014 to .010) produce meaningful results. Thus, H12c is unsupported.
The final two hypotheses examine the outcomes of forecaster composure (H12d) and extroversion (H12e). The overall mediational model for forecaster composure was significant \[ F(13, 566) = 5.99, p < .001 \], but none of the main effects for sex (B = -.05, \( p = .42 \)), race (B = .32, \( p = .58 \)), or degree (B = .06, \( p = .33 \)) were significant. The overall model accounted for 12% of the variance (\( R^2 = .121 \)). Age (B = .012, \( p = .001 \)), political affiliation (B = .07, \( p < .05 \)), and physical attraction (B = .22, \( p < .001 \)) were all significant covariates. Inspecting the indirect effects for each factor suggests no mediation exists for any of sex (B = -.001, SE = .013; 95% BCa CI = -.026 to .025), race (B = .003, SE = .012; 95% BCa CI = -.021 to .029), or degree level (B = .006, SE = .013; 95% BCa CI = -.016 to .035) through background homophily with forecaster composure.

When extroversion becomes the outcome variable (H12e), a similar pattern of results also exists. The overall model is significant \[ F(13, 571) = 34.52, p < .001 \] and accounts for 44% of the variance (\( R^2 = .44 \)). None of the three main effects are significant - sex (B = .02, \( p = .74 \)), race (B = -.04, \( p = .37 \)), nor degree level (B = .02, \( p = .74 \)). There were five significant covariates in age (B = .02, \( p = .001 \)), participant race (B = .15, \( p < .01 \)), political affiliation (B = .10, \( p < .001 \)), physical attraction (B = .37, \( p < .001 \)), and involvement (B = .37, \( p < .001 \)). Finally, across all three conditions, the indirect effects suggest no mediation occurred for any of sex (B = -.001, SE = .016; 95% BCa CI = -.032 to .031), race (B = .008, SE = .016; 95% BCa CI = -.022 to .041), or degree level (B = .005, SE = .016; 95% BCa CI = -.027 to .037) through background homophily with forecaster extroversion. Thus, both H12d and H12e are not supported.
CHAPTER VII: DISCUSSION

In sum, this dissertation project attempts to explore under-investigated areas in the fields of communication, media, meteorology, and science. First and foremost, understanding if any implied biases, stereotypes, cognitive judgements, heuristics, or the like - which may be tied to an individual’s appearance – influence outcome perceptions of that forecaster, scientist, anchor, or meteorologist is extremely important to knowing how messages are received. This study makes an initial attempt at understanding patterns of how individuals receive a forecast, and then make subsequent judgements on the forecaster delivering the message or the actual content of the message itself. The goal here is that these two experiments can help to promote and guide a line of research in this domain which allows practitioners, forecasters, and broadcast executives to understand the downstream effects related to an individual’s appearance on camera.

Second, this study combines two areas of communication and media - mass communication/media and science communication – to further this growing body of work which looks at how mass media can influence subsequent representations of science and technical information. In the field of broadcasting, and more specifically broadcast meteorology, there is a limited understanding of how television meteorologists or broadcasters serving as meteorologists are perceived based off their appearance, demographic factors, or if individuals even care that their local meteorologist has a physical science degree. It’s very easy for an individual to anecdotally point to a person’s attire or their appearance and suggest that attractiveness or appearance may dominate why an individual is believed or trusted. Yet, research in this domain that applies specifically to television broadcasters has limited knowledge of what important factors that could influence these outcomes of trust, believability, credibility, or even retaining
information, having mainly been focused on news anchors or vocal representations of delivery. It becomes more important to gain knowledge in this area, knowing full well that those factors of trust and credibility are some of the most influential to getting audience members and individuals to act upon weather information. Additionally, better understanding how these influences work in differing contexts, for example during a hurricane warning compared to a sunny day, may be important. First, the findings from both experiments are presented and discussed, before expanding upon future directions to pursue in this line of research.

**Findings Across Both Experiments**

In experiment one, there was a general attempt to establish baseline knowledge about how a forecasters sex or race may influence trust, credibility, or retaining information from the forecast. Using a convenience sample is a good starting point for understanding these patterns, to then further investigate and probe them in experiment two. Similarly, for using student sample, there is some relative diversity across the race and political affiliation – which is not always the case among a college-aged population. First, the significance and magnitude of physical attraction and issue involvement as covariates suggest they could be important drivers to consider when pursuing an understanding of these types of relationships. It is likely no surprise that physical attraction would influence an outcome such as credibility or trustworthiness, especially when considering that these are some of the larger effect sizes across the whole experiment.

Additionally, involvement with the weather information may be a byproduct of how interested someone is naturally in a science-based topic, or a byproduct of a person needing information to be able to conduct their day to day activities. These variables were utilized as controls primarily in this investigation, but in future work may be seen to moderate or further
influence an outcome variable. Physical attraction is subjective participant to participant, but pre-testing may allow for controlling some of the differences in physical attraction across conditions. Involvement is more unique and may be useful in explaining how media dependency might work in a more involved or “serious” weather situation. Either way, this is important for researchers to consider when performing these types of studies, as a lesser involved person may be subject to less downstream effects on the outcome of interest.

Though hypothesis one wasn’t supported, it is interesting to note that the effect sizes for the race and sex main effects are similar in magnitude to those found when studying mass media (under .10). Sex played a more significant role in influencing trustworthiness of the forecaster, whereas race did not play a significant role in influencing perceived trust. Interestingly enough, one may expect to find the white male forecaster rated higher in trust, yet it was actually the case that the condition of highest reported trust was the black male condition. The hypothesized condition of highest trust was the lowest reported trust, so the pattern of means was reverse of what was hypothesized.

Because there was no pre-testing done on the stimuli prior to investigating them, this finding could be a byproduct of subtle differences in how the forecaster may have presented themselves and the information in the video. In other words, there may be subtle differences in experience, delivery, tone, pace, so on and so forth, that were not controlled for during the design phase that could be influencing this result, though directions were given to forecasters (through manipulating the presentation of what to display on screen and how to talk about it) in hopes of keeping similarities across the conditions. Furthermore, all four individuals who served as the individuals in the stimuli are professional broadcast meteorologists for a relatively well-known
weather organization, such that there should not be a large variance between quality in delivery/performance.

Furthermore, an interesting future area of research would be to understand how in-group and out-group participants rated these individuals, to see if those who viewed another as part of their in-group rated the forecaster higher in trust than those who saw a forecaster as someone who was out-group. This could potentially be done through some type of race-match (or group-match) variable but doing so would also reduce the cell sizes for analysis because of the majority of participants being white (69%) and the roughly 50% chance someone could be assigned to either race condition.

In hypothesis two, again there was no support across any of the five outcome variables. Sex was the more important variable for competence, composure, and extroversion, while race was the influencing factor for competence and character. This may suggest that regardless of race and sex, individuals have a desire for a “competent” forecaster to deliver them the forecast. A factor such as sociability may not actually be necessary in delivering the forecast, though one may argue that this personality characteristic manifests itself in a variety of delivery methods, vocal patterns, and how a meteorologist chooses to interact with their audience. The inconsistency between this finding and the finding for H2e, where extroversion is the outcome – is also noteworthy, as one may expect these two variables to perform similarly since both refer to sociability and outgoingness of an individual, and sex related differences may be expected here. In hypothesis three, the importance of sex is again highlighted, as sex did significantly influence message credibility. Again though, the black male forecaster elicited the highest values of message credibility. This finding is somewhat noteworthy in that black forecasters only make up approximately 10% of the workforce in broadcasting. It seems plausible that individuals may
be biased in believing that these individuals appearing on-air is some type of expectancy violation because of the lower representation compared to white forecasters. Upon them delivering a forecast, it may elicit a violation such that people now perceive the black forecaster as more competent or trustworthy because of their ability to deliver the forecast. Additionally, there may be another variable which explains this relationship that has not been captured. For example, maybe black participants who were exposed to the black forecaster condition rated these individuals significantly higher because of the low representation in broadcast meteorology (this could reasonably extend to other minority groups as well). Subsequently, white individuals may be so used to being in the dominant majority, that they may rate white forecasters as average, or need something to significantly stand out about the forecasters appearance or delivery to sway their ratings on the outcome variables. A future exploration of this would be noteworthy, especially if one were to include Asian-Americans as a third race condition, and elicited responses from individuals who live in areas where Asian-Americans more frequently appear as broadcast meteorologists (e.g., Hawaii, Pacific Northwest) compared to how others in different geographic regions would respond.

Regarding research question one, there stands no reason to make much sense of two nonsignificant findings. There could be a lack of variance among the information retention variable due to a ceiling effect. The student sample in experiment one scored .75 higher (3/4 of a full question correct) than the MTurk sample in experiment two. Similarly, approximately double of the student sample got either four or five questions right, while the MTurk sample only had 24% of participants earn four or five correct. This could be seen as both a positive and negative, as the ceiling effect may limit the significance and variance in the results, but opposite to that – it may be seen as more important that individuals retain information from a forecast,
such as a large portion of the student sample did, and one would hope actually occurs when consuming weather information in a real-world setting. There is also some evidence which suggests retention questions (or as the authors termed it “questions with factual answers”) may not perform well within MTurk samples (Goodman, Cryder, & Cheema, 2012).

It would not make sense to overstate the lacking results in the mediational analyses and hypotheses, so a few important considerations and interesting findings will be discussed instead. First, across the mediational hypotheses in both experiments, physical attraction to the meteorologist and issue involvement were the primary driving covariates – in some cases with effect sizes of .5 or higher. Also speaking broadly, when attitudinal homophily was included as the proposed mediator rather than background, the regression models were able to account for more total variance. This pattern of findings held true across most of the regression models, and also occurred again in experiment two. It’s possible that without background information about an individual, an attitudinal set of beliefs may be more important to driving outcome perceptions, but future work in this area could further tease out the ideas behind different factors of homophily to understand what is most important for perceiving and using risk information.

In experiment two, adding the additional manipulation of whether a forecaster earned a Bachelor of Arts or Bachelor of Science degree appears to not influence the results in any manner. It’s possible that simply offering somebody a short one sentence blurb about the broadcaster’s educational background may not elicit enough thought for an individual to have noticeable differences in perceptions of trust or credibility. On the flipside, it is possible that those consuming the weather broadcasts simply just don’t care about the training or background a broadcaster has (in a non-life-threatening weather scenario at least) as long as they can deliver the information in a consumable or enjoyable fashion. Additional studies could attempt to
control for this manipulation better, or focus solely on the education, training, and certifications a broadcaster has earned to understand if the general public does care.

For hypothesis 8, which analyzed the means across the five factors of forecast credibility, there were similarities to what was found in experiment one. Competence was significant for sex but not race, which is similar to both being significant in experiment one. Degree level did not produce a significant result for any of the factors of credibility. Character was significant for race, akin to experiment one and at the same (albeit small) effect size. In experiment one, message credibility was significant for the sex condition, but not for race. In experiment two, none of the three conditions produced a significant result, though the post-hoc examination of the sex and race interaction produced marginal significance (at $p = .06$).

**Integration of Media Dependency**

One possible explanation in the inconsistency of findings across the two experiments could actually lend support for media dependency theory. Though media dependency was used as an explanatory framework for this study rather than a predictive model, the underlying tenants of media dependency appear to be extremely important to consider here. As presented in the literature, media dependency theory suggests that media and audience members must be studied in the larger context of society and the interaction with other systems. This seems particularly relevant here, as individuals participating in the study are bringing their own societal beliefs, views, and attitudes towards a particular race, sex, and to some degree even scientists at large to the table when considering the forecast to which they were exposed. It stands reasonable that there are additional variables which may explain some of these relationships that were not captured in this study (religious views, belief in science, prior experiences with media as a few examples). Since the manipulations made across both experiments (race and sex) were based on
demographic differences, it made sense to collect and utilize participant demographics as control variables and for an initial understanding. Yet moving forward, it may make sense to include more nuanced variables which get at attitudes and values and individual may hold and bring to the table when considering a broadcaster.

The field of meteorology and weather forecasts in general are a ripe area of investigation for understanding more about these relationships, because weather has the ability to influence so many of society’s larger systems (e.g., a snow day influencing the economy). Furthermore, there has been a shift to more diverse and fragmented choices for consuming weather – down to the point of not even needing a human to forecast or communicate the information to a user directly. Most mobile phones come with weather applications preinstalled, many individuals are cutting some of their cable packages which are traditional forms of weather consumption, and the legacy method of talking interpersonally to an individual still exists. Thus, this is a very fragmented domain where users now actively select from a variety of choices – and could reasonably have the ability to avoid messages (or people/channels/etc.) they choose to not view.

It’s also important to acknowledge the possible role of a variable such as PSI, since there is some evidence of this being studied with media dependency. Though measured here, the variable likely did not perform well since the experimental setup was a single-shot delivery of a one-minute video. It likely takes individuals many repeat exposures and “interactions” to develop feelings of PSI with an anchor or broadcaster. That withstanding, it seems that PSI is a ripe investigation for television meteorologists because of their unique requirement to be both personable and professional simultaneously. A meteorologist cannot just simply deliver the weather in a monotone, boring, and tedious style. They must leverage their scientific delivery with public speaking skills that relate to a viewer regarding their day to day or weekly activities.
Limitations and Future Investigations

As one would anticipate, no dissertation exists without limitations. Though attempts were made to limit the possible influences which could disrupt an experiment and muddy the results, there are a few limitations which may also explain some of the findings. First, the experimental conditions were not pre-tested due to time constraints and the difficulty of finding enough diverse individuals to reasonably pretest differences across videos. A future work may attempt to pre-test some of the experimental conditions, to ensure other confounds that are left unaddressed may not influence the results. For example, making attempts to equalize delivery patterns, rates of speed, or tone in speaking may help address differences that could arise due to a person’s vocalizations rather than appearances. Attempts were made to normalize the conditions to a reasonable degree by providing the broadcasters with rough scripts for which they could work off. Since meteorologists do not work off a script – different than a news anchor – it does not make sense to force them into a rigid pattern of speech through a scripted package, rather than give the broadcaster some flexibility in ad-libbing the content while ensuring that certain markers are consistent across the forecasts. Similarly, this consistency across the conditions allows for measuring the retention variable.

Additionally, there is the experimental give and take with bringing participants into a laboratory for additional experimental control versus allowing them to watch a video in a normal setting – as one would expect to consume a weather forecast on a daily basis. Thus, there is the possibility that participants were doing other things in lieu of watching the video, though attempts were made to keep them relatively brief in hopes that participants would pay due attention. Furthermore, neither sample comes without limitations. The goal of utilizing a student convenience sample was to develop a general understanding of how some of these
relationships may play out amongst an easily accessible population. Then, one can take this and apply it to a more representative sample in something like MTurk (though this comes with caveats as well). A future investigation might seek to sample from different geographic regions across the United States, since there are differences in both weather patterns and differences amongst the demographics of meteorologists which appear on air varying by region.

One possible area of inquiry – which would take some diverse sampling – might be to examine the role of in-group and out-group dynamics when an audience member is exposed to somebody who they view similar (or vice versa). In these two specific studies, this was not a possible analytic strategy since white individuals made up approximately 70% of both samples. Upon taking the remaining 30% of individuals who fall into a minority category and if they see a black forecaster as their in-group is a very broad and poor assumption. This may be able to be performed through incorporating PSI as well, as individuals likely identify with those they feel they interact with parasocially (or the relationship may be reversed). In this study, this was not possible since the focus was on meteorologists for which individuals have not formed a relationship or affinity towards prior to taking part in the study. The goal of this study was to utilize forecasters which individuals had no or limited prior knowledge about, in hopes of controlling the effects down to race, sex, and degree level. Since individuals don’t consume media in a vacuum – and have that plethora of choices across channel and platform today – it seems reasonable to better understand if individuals are making choices about who they choose to watch with some of the themes from this study in mind. Forecasts could be used from a television market which does have enough diversity to reasonably compare, while controlling for the source (channel/news agency) and being able to measure prior conceptions about an individual before being exposed to a video. Similarly, this may be further important because of
the ideas behind parasocial interactions. Though not directly studied here because there was no repeat exposure, it seems reasonable to propose that individuals form parasocial relationships (or something similar) with their broadcasters on the news (including the meteorologist). A single exposure video would not allow you to test or measure parasocial findings because an individual does not have time to form that parasocial relationship. Yet, if they came into an experiment with preconceived notions about a forecaster, or if they had a parasocial relationship with a forecast, there may be more ability to detect nuanced effects while measuring that relationship simultaneously.

Conclusion

To conclude, this dissertation project attempts to compare perceived differences on a variety of vital factors important to individuals making decisions based on weather. Differences based on sex and race differences of the broadcast meteorologists were the main focal points of analysis, and the results generally suggest that sex has somewhat of a larger influence than race and degree level, though there are some inconsistencies in the results. The work here attempts to extend upon the very limited research in this domain (particularly Bran & Himes, 2010; Weibel et al., 2008), and future work in this domain would strengthen the fields of broadcast meteorology, broadcast news, and risk communication well – in the hopes that individuals don’t engage in biased processing when intaking important information about the weather forecast.
References


Appendix A – Full Questionnaire

**Homophily (Mediator, Adapted from McCroskey, Richmond, & Daly, 1975)**

On the scales below, indicate your feelings about Tom Brokaw. Numbers 1 and 7 indicate a very strong feeling. Numbers 2 and 6 indicate a strong feeling. Numbers 3 and 5 indicate a fairly weak feeling. Number 4 indicates that you are unsure or undecided. There are no right or wrong answers.

**Attitude Homophily**

**Is like me**

<table>
<thead>
<tr>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
</table>

Is unlike me

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Is similar to me

**Think like me**

| 7 | 6 | 5 | 4 | 3 | 2 | 1 |

Does not think like me

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Behaves like me

**Background Homophily**

**Has status like mine**

| 7 | 6 | 5 | 4 | 3 | 2 | 1 |

Has status different from mine

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Is from the same social class

**Has an economic situation like mine**

| 7 | 6 | 5 | 4 | 3 | 2 | 1 |

Does not have an economic situation like mine

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Is culturally similar

**Physical Attraction (Covariate, Adapted from McCroskey & McCain, 1974)**

The scales below are designed to indicate how attractive you find another person to be. Please indicate your perceptions of the attractiveness of "**Meteorologist NAME HERE**" Please indicate the degree to which each statement applies to you by marking whether:

I think he (she) is quite handsome (pretty).

**He/she is somewhat ugly.**

He (she) is very sexy looking

I find him (her) very attractive physically.

**I don't like the way he (she) looks.**

**He/she is not very good looking.**

- Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5

**Parasocial Interaction Scale (Intervening, Adapted from Rubin, Perse, and Powell, 1985)**

Here are several statements about television news and broadcasters. For each statement, please indicate your level of agreement or disagreement about the broadcaster in the video.

I feel sorry for the newscaster when he/she makes a mistake.

The broadcaster makes me feel comfortable, as if I am with friends.

I see the broadcaster as a natural, down-to-Earth person.

I would look forward to watching this broadcaster on tonight's news.

If this broadcaster appeared on another TV program, I would watch that program.

When the broadcaster reports a story, he/she seems to understand the kinds of things I want to know.

If there were a story about this broadcaster in a newspaper or magazine, I would read it.

I would miss seeing this broadcaster if he/she were on vacation.

I would like to meet this broadcaster in person.
I find this broadcaster to be attractive.

- Strongly Disagree = 1; Somewhat Disagree = 2; Neither agree nor disagree = 3; Somewhat Agree = 4; Strongly Agree = 5

**Personal Involvement Inventory (Control, Zaichkowsky, 1985)**

When I think of the information, I received about the weather forecast, I think of it as:

- Important/Unimportant
- Of no concern/Of concern to me
- Irrelevant/Relevant
- Means a lot to me/Means nothing to me
- Useless/Useful
- Valuable/Worthless
- Trivial/Fundamental
- Beneficial/Not beneficial
- Matters to me/Doesn't matter
- Uninterested/Interested
- Significant/Insignificant
- Vital/Superfluous
- Boring/Interesting
- Unexciting/Exciting
- Appealing/Unappealing
- Mundane/Fascinating
- Essential/Nonessential
- Undesirable/Desirable
- Wanted/Unwanted
- Not needed/Needed

**Forecaster Credibility (DV, McCroskey & Jensen, 1975)**

**Competence**

- qualified-unqualified
- expert-inexpert
- reliable-unreliable
- believable-unbelievable
- incompetent-competent**
- intellectual-narrow
- valuable-worthless
- uninformed-informed**

**Character**

- cruel-kind**
- unsympathetic-sympathetic**
- selfish-unselfish**
- sinful-virtuous**

**Sociability**

- friendly-unfriendly**
- cheerful-gloomy**
- good natured-irritable**
sociable-unsociable**

*Composure*
composed-excitable**
calm-anxious**
tense-relaxed
nerveous-poised

*Extroversion*
meek-aggressive
timid-bold
talkative-silent**
extroverted-introverted**
verbal-quiet**

**Message Credibility (DV, Adapted from Appelman & Sundar, 2016)**
How well do the following adjectives describe the content you just watched?

Accurate
Authentic
Believable

• (1 = describes very poorly to 7 = describes very well)

**Trustworthiness (DV, Factor adapted from McCroskey & Teven, 1999 - Source Credibility)**
On the scales below, indicate your feelings about the meteorologist you just viewed:

Honest 1 2 3 4 5 6 7 Dishonest*
Untrustworthy 1 2 3 4 5 6 7 Trustworthy
Honorable 1 2 3 4 5 6 7 Dishonorable*
Moral 1 2 3 4 5 6 7 Immoral*
Unethical 1 2 3 4 5 6 7 Ethical
Phony 1 2 3 4 5 6 7 Genuine

• Numbers 1 and 7 indicate a very strong feeling. Numbers 2 and 6 indicate a strong feeling.
• Numbers 3 and 5 indicate a fairly weak feeling. Number 4 indicates you are undecided.

**Information Retention (DV, created variable based off stimulus videos)**
Thinking back to the video you watched, which of these accurately describes the weather in the northeast US? A: Cool and dry

Thinking back to the video you watched, which of these most closely depicts the current temperature in Caribou Maine? A: 18 degrees

Thinking back to the video you watched, which of these most accurately describes the current temperatures in central California? A: Mid-50s

Thinking back to the video you watched, the broadcasters referred to most of the "action" or precipitation taking place in which region of the country? A: South Central

Thinking back to the video you watched, what was the current temperature in Miami? A: 75 Degrees
Participant Sex
Are you a...?
Male/Female/Other (Specify)

Participant Age
What is your current age? ____

Race
With which race do you primarily identify?
Caucasian, non-Hispanic
African-American, non-Hispanic
Hispanic
Asian American or Pacific Islander
Native American
Other

Participant Political Affiliation
Do you consider yourself a....?
Strong conservative
Moderate conservative
Slightly conservative
Moderate
Slightly liberal
Moderately liberal
Strong Liberal
Appendix B – Proposed Relationships for Experiment 1
Appendix C – Proposed Relationships for Experiment 2
### Appendix D – Tables

**Table 1. Experiment One Covariate Correlations**

<table>
<thead>
<tr>
<th></th>
<th>Sex condition</th>
<th>Race condition</th>
<th>Sex</th>
<th>Race</th>
<th>Political Affil</th>
<th>Physical Attraction</th>
<th>Issue Involv.</th>
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<td>0.063</td>
<td>-0.428**</td>
<td>0.026</td>
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<td>0.930</td>
<td>0.171</td>
<td>0.000</td>
<td>0.000</td>
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Table 2. Experiment One Outcome Variable Correlations

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**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).