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Taking leaders at face value

Ethology and the analysis of televised leader displays

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ABSTRACT. Research investigating the influence and character of nonverbal leader displays has been carried out in a systematic fashion since the early 1980s, yielding growing insight into how viewers respond to the televised facial display behavior of politicians. This article reviews the major streams of research in this area by considering the key ethological frameworks for understanding dominance relationships between leaders and followers and the role nonverbal communication plays in politics and social organization. The analysis focuses on key categories of facial display behavior by examining an extended selection of published experimental studies considering the influence of nonverbal leader behavior on observers, the nature of stimuli shown to research participants, range of measures employed, and make-up of participant pools. We conclude with suggestions for future research.

Key words: Facial displays, leadership, emotion, political figures, nonverbal communication

The face has long been appreciated as a focal point of attention by those competing for positions of power and then for maintaining influence once power has been attained. In large part, this is caused by the ability leaders have in communicating their emotional state and behavioral intent nonverbally to followers, information that may be more salient and readily understood than intricate plans conveyed through words.¹ Although the role of non-

verbal communication as a vital source of leader influence has long held fascination for those concerned with political rhetoric,² a systematic research agenda testing the effects of nonverbal communication only came to fruition somewhat recently. Here, the telegenic presence of presidents John F. Kennedy and, later, Ronald Reagan underscored the role mass media plays as an intermediary between national leaders and followers by offering a simulation of face-to-face contact that hearkens back to the evolutionary roots of small group decision making.

doi: 10.2990/28_1_48

Experimental research concerning the potential of televised leader displays to affect political communication dates at least to a pair of studies by Friedman and colleagues analyzing the impact of newscaster facial expressions when referring to presidential candidates during campaign coverage.^{3, 4} Soon thereafter, the Committee for the Experimental Study of Social and Political Behavior at Dartmouth College (hereafter, the “Dartmouth group”) commenced a series of studies considering how viewers respond to the televised facial expressions of political leaders in a variety of electoral contexts.^{5, 6, 7} At about the same time, Ellyson and Dovidios’ edited book on *Power, Dominance, and Nonverbal Behavior* provided an early reference for studying nonverbal political communication, revealing how display behavior correlated with dominance and power across cultures, ages, and species.⁸

A major indicator of a politician’s status as a serious candidate is the attention, or “face time,” he or she attracts from the mass media.⁹ Visual dominance is well established as an indicator of status not only in human societies but also with any animal species where there is a hierarchical social structure.^{10, 11, 12, 13, 14, 15} To be selected as a leader, one must *look* like a leader by exhibiting facial characteristics that communicate personality traits of dominance and competence.^{16, 17, 18} A contender for power must then *behave* like a viable leader by performing nonverbal behavior appropriate to the position and social-political context. Specifically, leaders are expected to communicate their dominance by reassuring followers in noncompetitive contexts while threatening those who would jeopardize group stability. Therefore, visual dominance is a key quality for candidates to have because it allows them to nonverbally communicate leadership ability to the public. In terms of emotional response, nonverbal delivery plays an important role and is more likely to affect observers than the same information provided in audio-only or textual formats.^{19, 20, 21}

A critical source of information caused by its visibility and expressiveness, even in repose, the face provides a host of information through different communicative properties. These properties include the size, shape, and location of facial features, which provide information about the identity and attractiveness of an individual; the wrinkling, sagging and bagging of the skin, which provide information about age;²² and, attempts to artificially alter, enhance, or

disguise the previous properties to strengthen biological signals. Finally, changes in muscle tonus, blood flow, and skin temperature affect the facial displays that communicate emotional state and behavioral intent.^{23, 24}

This article focuses on the face as the key component of political communication, emphasizing facial displays that, although flexible and momentary, reliably signal behavioral intent. To elaborate this view, we take an ethological approach, considering the major theoretical frameworks for understanding dominance relationships between leaders and followers and the role nonverbal communication plays in establishing and maintaining social hierarchies. Particularly, we focus on key categories of facial display behavior that are seen as reflecting basic emotions and behavioral intentions. We next analyze an extended selection of published experimental studies considering the influence of leader displays on viewers in terms of the experimental stimuli shown to research participants, range of measures employed, and make-up of participant pools. We conclude with suggestions for future research.

Evolutionary questions and methods

A common thread in studies of nonverbal leader behavior is an appreciation for the importance of evolutionary theory to understanding commonalities in political behavior. Research in this area also embraces an interdisciplinary outlook that draws extensively upon the natural sciences. Nonhuman mammalian, especially primate, species provide insight and inspire models of behavior for human political activities. This biobehavioral perspective relies heavily on classical ethology and differs from traditional perspectives that focus solely on proximal influences on political behavior by posing higher level questions that consider both individual and population level behavior.²⁵

The key foundational questions about behavior were originally posited by Tinbergen in his seminal 1963 paper, “On Aims and Methods in Ethology,” and concern proximate causation, ontogenetic development, phylogenetic roots, and ultimate causation.^{26, 27, 28} The first two concerns address proximal causes of individual behavior. Proximate causation considers factors that motivate an individual to behave in a particular manner at a specific moment in time, exploring mechanisms that produce different types of behavior. Ontogenetic development looks at the roots

and progression of behavior over an individual's lifetime, in other words, whether there are innate tendencies that trigger particular behaviors over one's lifespan. Both environmental and internal factors are considered in ontogenetic development, although they are intertwined and difficult to separate, especially as changes in an individual's physiology and concomitant behavior unfold over the lifespan (albeit with greater development occurring earlier in life).

The last two questions address ultimate causal factors.²⁹ The third question considers how behavior develops in a species over its history and analyzes its phylogenetic roots by considering differences in behavior among several closely related species. Ultimate causation considers the functional cause of a behavior in terms of how it promotes the passing of an individual's contributions (genetic and cultural) to future generations through enhanced reproductive fitness.^{30, 31, 32}

The ability to answer each of these four research questions is limited by the theories, methods, and measures employed in research. Of course, a necessary first step in understanding human behavior is observing and measuring it. Nevertheless, as Tinbergen observed, "contempt for simple observation is a lethal trait in any science."³³ Beyond observation, a key to showing at least proximate causation is experimentation to test whether changes in parameters can influence the occurrence of particular types of behavior. Both of these approaches are constrained by the research designs they employ. These limitations include the effect of observation on behavior, whether in the field or laboratory, with individuals reacting differently when they know they are under observation compared to when they are not; knowing what to measure and employing the proper metric to uncover meaningful relationships; choosing a sample with adequate numbers to meet standards of statistical power; and, observing behavior over a sufficient amount of time and settings to address recurring events and environmental developments that might influence outcomes and inhibit or advance the ability to generalize research findings.³⁴

The major criticism of experimental studies pertains to their external validity,^{35, 36} in other words, whether the findings can be generalized to the broader population with confidence. Specific questions concern whether the demand characteristics of the experimental setting produce systematically biased or artificial responses, whether the documented behavior is com-

mon enough for inferences to be drawn from a homogeneous sample, and whether the pool of participants is diverse enough to reflect differences. These factors can play havoc with the external validity of findings.

Further difficulties lie in ethical limitations when experimenting on humans. Because a major goal of research is to ascertain "human nature" in such a way that allows inferences to be drawn for all humans, "true" experiments that alter or fundamentally challenge human behavior are rare. Instead, the great majority of controlled experimental studies attempt to alter contextual or environmental information. Therefore, most experimental research considers proximal causation to understand why people form the impressions, make the decisions, and take the actions they do. However, both observational studies and experimental research considering developmental changes across an individual's lifespan (at the ontogenetic level) and cross-species comparisons (at the phylogenetic level), especially with nonhuman primates that are genetically related to humans, are highly useful in understanding behavior. In the former case, there is an understanding of how individuals interact with their environment and change over time with age and learning.³⁷ In the latter case, social primates such as Bonobos (*Pan paniscus*) and Chimpanzees (*Pan troglodytes*) are seen as closely related species that offer perspective into behavior that may have been inherited from a common ancestor.^{38, 39, 40, 41, 42, 43, 44} These insights are especially relevant when considering a population's choice of leaders and interactions between leaders and followers.

Ethology and facial displays of emotion

Humans are a socially labile species in which individuals exhibit a strong desire to attain social dominance yet will give up this opportunity for the sake of preventing others from dominating them. Therefore, although strong hierarchies exist in which leaders exert coercive power to produce submission from followers,^{45, 46} there is also seen to be a countervailing impetus toward an "antihierarchy" in which egalitarianism reigns.⁴⁷ Specifically, there is a general wariness of leaders who would overstep their boundaries of control. Group sanctions may also be imposed in response to leaders who would attempt to exert their authority beyond established norms.^{48, 49} Those who wish to lead must communicate a complex combination

of traits, including the “absence of arrogance, overbearingness, boastfulness, and personal aloofness”⁵⁰ and at the same time “espouse a combination of unaggressiveness, generosity, and friendly emotions.”⁵¹

Therefore, potential leaders must exhibit not only the ability to dominate others, whether in response to internal threats to the group’s peace or external threats to its well-being, but also master the ability to affiliate with group members. Therefore, facial display behavior of recognized leaders, and those who hope to wear the mantle of leadership, must be able to communicate both agonistic (aggressive) and hedonic (welcoming) intent. The broader social or environmental context as well as other pressing circumstances determine which type of display behavior is appropriate and should predominate in any given situation.^{52, 53, 54, 55}

Ethological research regarding political figures initially carried out by the Dartmouth group^{56, 57, 58} and elaborated upon by Salter⁵⁹ and others,^{60, 61} suggests a typology of emotional displays based on the rank held by the displayer and whether the social circumstance is competitive or noncompetitive. By ensuring social order and preventing outright aggression (which might occur if the display behavior is not successfully encoded or interpreted), signals of threat and subordination are functionally beneficial to both leaders and followers. In those noncompetitive situations in which individuals affiliate in the group, dominant members are expected to display higher rates of happiness/reassurance, whereas lower status group members avoid potential conflict and even social interaction by displaying higher rates of fear/evasion or sadness/appeasement behavior, both against a background of neutral affect.⁶² Elections and other organized competitions are also occasions where leaders are expected to exhibit affiliative gestures and expressions, as documented by the so-called “happy warrior” phenomenon in presidential campaigns.^{63, 64} Such display behavior benefits group members by strengthening coalitions through shared displays of bonding and personal affinity. However, to the extent that leaders or competitors for leadership positions exhibit submissiveness, evasion, or appeasement, there will be a concomitant weakening of attributions of status.^{65, 66, 67}

An attractive feature of ethological and other evolutionary approaches is their emphasis on behavioral universals. This improves the prospects for discovering principles of communication that pertain cross-culturally. Salter⁶⁸ makes this point when defining

observational categories of nonverbal behavior in his study of command hierarchies. For instance, social dominance has often been associated with smooth, relaxed movements.⁶⁹ But there are exceptions, and the association of dominance with both abrupt and fluid, and aggressive and affiliative, displays suggests that leadership might require skill in combining or blending different gestural cues in a functional manner. In particular, leaders appear socially skilled at selecting appropriate nonverbal behaviors in agonistic and affiliative encounters.^{70, 71, 72}

Along these lines, Palagi and colleagues have carried out extensive observational research with bonobos,⁷³ lemurs,⁷⁴ chimps,⁷⁵ and gorillas,⁷⁶ highlighting the importance of postconflict reconciliation and consolation for group cohesion and harmony. Agonistic behavior is typically followed by affiliative encounters to maintain group order. Although this research is focused on broadly defined behavior, facial displays by primates have been recognized as being “highly conserved,” that is, constant across species, albeit with differences in social function, since at least Darwin’s (1872/1998) *The Expression of the Emotions in Man and Animals*.^{77, 78, 79, 80, 81} Cross-species comparisons have been further enhanced by the development of ChimpFACS, a standardized observational tool allowing direct structural comparison of human and chimpanzee facial display behavior based on facial musculature.^{82, 83, 84, 85}

The face, then, is a premier communication site that has universal features. Across human populations, there appears to be a consensus concerning the social meaning attributed to particular facial expressions,⁸⁶ with the muscle movements underlying these emotionally meaningful configurations present in most individuals.⁸⁷ Although there are cultural differences in display rules, when a prototypical facial configuration is displayed, it has a similar meaning across cultures.⁸⁸ Scherer and Grandjean⁸⁹ have recently suggested that this effect could be a result of the circumstance that emotion words (as well as emotion components) are more readily available to make categorical judgments about faces than other kinds of categories like social motives and action tendencies. Of the six basic emotions identified by Ekman and colleagues⁹⁰ as occurring in prototypical facial displays—surprise, anger, fear, disgust, happiness, and sadness—four are closely tied to dominance relationships, whether

Table 1. Emotional displays in the context of rank.

Rank	<i>Behavioral style</i>	
	Agonistic (competitive)	Affiliative (noncompetitive)
Dominant	Anger/threat	Happiness/reassurance
Submissive	Fear/submission	Sadness/appeasement

affiliative (happiness/reassurance and sadness/appeasement) or agonistic (anger/threat and fear/evasion).

However, the precise meaning of a facial expression often depends on context. For example, a smile can express dominance as well as submission and function as a greeting, invitation to play, or an offer to interact socially. A smile can also be used instrumentally to communicate these meanings even though the sender is not feeling happiness. The meaning of a smile or other facial expressions depends on the interactants' relationship and social setting. A leader's smile can function to reassure a subordinate that punishment is not pending. From a subordinate, a smile is more likely to signal willingness to cooperate.^{91, 92} Subtle changes in smiles may also be linked to different meanings, such as affiliation with peers or yielding to those with greater dominance, depending on the context.^{93, 94} In the next section, we revisit the Dartmouth group's typology⁹⁵ of facial display behavior and Salter's elaboration of sadness/appeasement displays.⁹⁵ These and other groupings of facial expressiveness have been used as observational categories for field studies, media content analyses, and controlled experiments assessing the influence of leader displays. Table 1 shows the four display categories, arrayed by dominant or subordinate rank.

Affiliative facial expressions

Happiness/reassurance. In happiness/reassurance displays, nonthreatening gestures are combined with reassuring facial actions such as smiles and raised eyebrows.^{96, 97} These behaviors follow a general pattern with primates. A smiling face can induce a similar expression and corresponding mood in the observer and alleviate the impulse to flee. Hence, a smile may act to neutralize aggression and function as an effective greeting. Morris⁹⁸ observed that the human recognition response consists of a smile, eyebrow flash (lasting approximately one-sixth of a second), head tilt, hail, wave, and intentional embrace. The first three elements are almost always present and occur simulta-

neously, whereas the last three are more variable between situations and cultures. Eibl-Eibesfeldt⁹⁹ identified salient features of greeting displays as initial eye contact followed by the head toss and eyebrow flash, followed by one or more nods. A smile is usually, but not always, present. Grammer et al.¹⁰⁰ have described smiles as a "social-marking" tool used to emphasize the meaning of other facial, gestural, and verbal signals. The eyebrow flash communicates agreement in various contexts, including agreement to engage in social contact. The nature of greeting displays is consistent with Darwin's¹⁰¹ principle of antithesis, with the greeter exhibiting the opposite of agonistic, anger/threat behavior.

The mouth is an important indicator of affiliative intent through the happiness/reassurance display of the smile. However, there are many different types of smiles that can be distinguished by varying mouth movements,¹⁰² or by the coactivation of the orbicularis oculi, a ring of muscles surrounding the eyes responsible for cheek raising and producing crow's feet wrinkles when stimulated.^{103, 104} Another affiliative display that involves the mouth is the relaxed open mouth display, which is mainly observed in playful interactions and promotes friendly relationships.^{105, 106, 107} The co-occurrence of relaxed open-mouth (evident during laughter) and silent, bared-teeth displays is particularly salient in egalitarian relationships where these behaviors function to strengthen social bonds.

Recent research suggests that different types of smiles perform different functions in social interactions¹⁰⁸ in that emotion-based smiles can function to regulate cooperative relationships through the advertisement of altruistic intentions.^{109, 110, 111} This functional emancipation of the silent, bared-teeth display is thought to stem from selection pressures imposed by increasingly complex patterns of social organization.^{112, 113} Hierarchical relationships are based on the ability to signal one's social position in the hierarchy and, therefore, avoid potentially damaging conflicts. In this case, it is important to have explicit signals of power and submission that are distinct from affiliative and cooperative signals. In egalitarian relationships, the need for distinct signals for power, submission, and affiliation is diminished because payoffs depend heavily on collaborative effort, hence on the strength of social bonds. This explains why smiling and laughter are used interchange-

ably in egalitarian relationships whereas both displays are used distinctly in hierarchical contexts.^{114, 115}

Sadness/appeasement. The expression of sadness has been interpreted as a yielding behavior that functionally serves to appease an aggressor, thereby reducing the risk of further attack and allowing the defeated individual to remain in the group. The former function has been traced to separation distress in infants.^{116, 117} Price and Sloman's¹¹⁸ yielding hypothesis posits that the sad individual's behavior reassures adversaries that he is incapable of "making a comeback"¹¹⁹ and, therefore, is deserving of caring and concern. With rare exceptions, perhaps in the case of empathy, displays of sadness are incompatible with leadership. Senator Edmund Muskie, a front-runner for the 1972 Democratic party presidential nomination, found his campaign derailed by appearing to cry in response to a negative media profile of his wife. On the other hand, President George W. Bush's apparent sadness during his nationally televised speeches in the wake of the September 11 terrorist attacks was deemed appropriately empathetic.

Ethologically derived descriptions of sadness are in strong agreement. In addition to downturned mouth corners, a sad face is evident when the inner eyebrows are raised and pulled together, forming an inverted U-shaped wrinkle at the center of the forehead. Sad eyes are distinguished by eyelid position, particularly when the inner upper eyelid and lower eyelid appear raised.^{120, 121} Darwin considered the eyebrows and horizontal forehead furrows to be the major signalers of sadness or grief, calling the responsible muscles the "grief muscles,"¹²² and concluded from cross-cultural evidence that the latter display was universal. Although sadness is relatively well recognized across cultures, the precision afforded researchers by electromyographic detection of facial muscle activity allows a more rigorous analysis of emotional expressiveness than observation of visible expressions alone. Notably, in the case of sadness/appeasement, the corrugator muscle, positioned laterally above and on either side of the nose, is generally associated with expressions of sadness, grief, pain, and negativity generally.

Agonistic facial expressions

Anger/threat. In humans, anger/threat is a relatively unambiguous and readily decoded emotional display. Ekman's description of the lowered-brow anger expres-

sion appears to apply across human cultures.¹²³ Based on extensive cross-cultural observations, Eibl-Eibesfeldt¹²⁴ described the human threat display as a fixed stare unaccompanied by signs of reassurance, with brows lowered or raised. The psychological literature supports the view that stares become especially threatening when not accompanied by dynamics associated with affiliation or physical attractiveness.¹²⁵ Social psychologists have long documented how dominant individuals stare more than others in competitive situations.^{126, 127} The stare is most threatening, as measured by arousal levels, when the eyes are in a horizontal plane. Thus, a wide-eyed horizontal stare is characteristic of threat and usually projects anger.¹²⁸

In addition to (and likely because of) communicating threat, aggressive behaviors attract attention. Dominant individuals are more adept at and enjoy greater freedom to deploy aggressive gestures and tactics as a means of holding the floor. And dominance, once attained, is attention-getting in its own right. Visual attentiveness signals social power such that the greater the amount of visual attention given to an individual, the lower the observer's status relative to the focus of attention.¹²⁹ Likewise, experiments find that dominant individuals look more at their audience or conversational partner while speaking but less when listening to lower status individuals.^{130, 131}

Fear/evasion. From an evolutionary perspective, encounters between strangers are expected to elicit signals of fear/evasion (or fear/submission) because humans are adapted to function in small, intimate groups. This prediction is supported by physiological evidence that shows increased anxiety in participants approached by strangers.¹³² One observational study found that in over 90 percent of observed interactions between strangers, individuals exhibited varying combinations of gaze avoidance, lip compression, and lip-bite; tongue show and tongue-in-cheek; hand-to-face, hand-to-hand, and hand-to-body manipulations; and postures involving flexion and abduction of the upper limbs.¹³³ These self-directed "displacement activities" serve as behavioral measures of social stress in humans and nonhuman primates.¹³⁴

Ekman's description of the facial signals of fear positions the eyelids in a similar configuration to that of anger, leaving the combination of raised eyebrows and horizontally stretched mouth as the main distinguishing

Table 2. Criteria for classifying facial expressions.

	<i>Anger/threat</i>	<i>Fear/evasion</i>	<i>Happiness/reassurance</i>	<i>Sadness/appeasement</i>
Eyebrows	Lowered	Lowered and furrowed	Raised	Inner corners raised
Eyelids	Open wide	Upper raised/ lower tightened	Wide, normal, or slightly closed	Lower raised
Eye orientation	Staring	Averted	Focused, then cut off	Averted
Mouth corners	Forward or lowered	Retracted or normal	Retracted or raised	Lowered
Teeth showing	Lower or none	Variable	Upper or both	Variable or none
Head motion: lateral	None	Side-to-side	Side-to-side	Away from the source
Head motion: vertical	Upward	Up-down	Up-down	Down
Head orientation to body	Forward from trunk	Turned down from vertical	Titled from vertical	Turned down
Head orientation: angle to vertical	Down	Down	Up	Down

From Roger D. Masters, Dennis G. Sullivan, John T. Lanzetta, Gregory J. McHugo, and Basil G. Englis, "Facial Displays and political leadership," *Journal of Biological and Social Structures*, 1986, 9:330. Modified to include the sadness/appeasement category. Reprinted with permission from Elsevier. As updated by Roger D. Masters, *Machiavelli, Leonardo, and the Science of Power* (South Bend, IN: University of Notre Dame Press, 1996, p. 141).

feature of fearful facial expressions.¹³⁵ Several mouth configurations are consistent with Ekman's description of horizontally stretched lips. For instance, the compressed mouth display has been associated with anxiety in interactions with strangers and other unpleasant social exchanges.^{136, 137, 138, 139} And smiles, as mentioned, can express appeasement.^{140, 141, 142, 143, 144}

Because submissive or fearful expressions involve the lowered brow similar to anger displays, granted with a furrowed appearance, additional signals of head orientation and gaze add important contextual cues. In contrast to anger, the chin may be lowered and gaze averted, as can be seen cross-culturally with children.^{145, 146, 147} The aversion of gaze is used to reduce stress. Indeed, research has linked increased arousal with gaze from strangers in threatening situations.¹⁴⁸ Although continuous gaze is disliked, those who avert gaze during conversation are judged to be defensive, evasive, nervous, or lacking in confidence.¹⁴⁹ Thus, nonverbal communication entails a delicate interplay between appropriate displays that signal one's desired intent and behaviors that project affiliative, evasive, or threatening plans. Table 2 shows specific criteria for classifying facial expressions used in biopolitical research.

Viewer responses to nonverbal leader displays

Studies investigating the nonverbal display behavior of political leaders have applied these and other display categories in longitudinal content analyses of election campaigns as well as experimental research that continues to inform our understanding of politics and

leadership. Over time, the methods and measures of investigation have become increasingly sophisticated and have achieved greater ecological validity. Specifically, research carried out since the mid-1980s has become savvier in measuring viewer responses, more externally valid in terms of stimuli employed, and more cognizant of the need to test a range of participants. The following section reviews published studies carried out over the past quarter century that focus on viewer responses to nonverbal leader displays. Attention is given to how the stimulus of the face is presented in experimental research, how the dependent variables are measured, and make-up of the participant pools used in this research. Appendix 1 summarizes the research design, treatment conditions, major variables, and findings from the experimental studies reviewed in this analysis.

As observed by Masters et al.,¹⁵⁰ research concerning facial display behavior raises three central questions: (1) whether the actor actually *feels* the emotion displayed—in other words, whether the display is genuine; (2) whether observers ascribe intent to the actor in terms of how the displayer plans to act; and (3) whether displays reliably elicit emotional responses in observers. Although the first question may only be inferred, because politicians likely have mastered the ability to mask their internal state while presenting the socially appropriate display, the latter two may be empirically interrogated through experimental research. Therefore, the study of facial display behavior is not limited to just assessing the emotional state of the actor^{151, 152} but assesses the perceptions and consequences of commu-

nication that may occur with or without conscious awareness on the part of the observer.

The face as experimental stimulus. Analysis of the influence of nonverbal leader displays on viewers can be grouped into two categories. The first grouping considers the influence of presidential candidate nonverbal behavior during televised debates. Exline's¹⁵³ analysis of nonverbal stress cues by President Gerald Ford and Governor Jimmy Carter during their first televised debate and Patterson et al.'s¹⁵⁴ investigation of the second Reagan-Mondale debate found that movements reflecting tension or stress affect how favorably the candidates are evaluated. These nonverbal indicators of stress include eye blinks, gaze shift and direction, lip moistening, awkward speech, head nods, body sway, and hand gestures. Along with affective gestures such as brow movements and smiles, these nonverbal cues were shown to have an influence on viewer perceptions, with stress indicators diminishing how favorably candidates were perceived while head movements and smiles positively affected candidate evaluations.

The second approach, employed by the Dartmouth group and subsequent researchers, takes the more theoretically grounded framework discussed above using cross-cultural, developmental, and cross-species studies to derive three prototypic facial displays: happiness/reassurance, anger/threat, and fear/evasion, as well as a neutral display as a reference point. Although early studies focused on the influence of the prototypic displays,^{155, 156, 157} later studies considered the intensity and valence of display behavior^{158, 159, 160, 161} and moved from focusing solely on leader expressions to studying facial displays in relation to specific news story contexts, particularly national crisis news, giving the experimental research greater external validity.^{162, 163, 164, 165, 166}

The selection of treatment stimuli from evening newscasts and other publicly accessible sources can also be seen as contributing to the external validity of these studies. Nationally known leaders represent highly salient stimuli owing to their public visibility and political influence. When it comes to the interpretation and persuasive impact of leader displays, context matters.¹⁶⁷ Politicians presented in a competitive situation, such as a debate, are viewed differently than when presented alone or among fervent supporters. Likewise, politicians who are not presently holding political office will have less salience for the viewer than

those currently serving and exerting influence.^{168, 169} With the exception of Exline's 9- and 10-minute presidential debate excerpts,¹⁷⁰ the duration of experimental treatments featuring dynamic facial displays is relative short, lasting between 30 and 75 seconds. Mapping the prevalence and influence of nonverbal cues present in news also takes into consideration an explicit understanding of the structure of television news stories and how they are presented.¹⁷¹

In addition to candidate displays, the influence of newscaster expressions has been investigated. Studies by Friedman and colleagues examined the perceived "bias" of network newscaster facial expressions toward presidential candidates in news coverage of the 1976 election. Of five network news anchorpersons analyzed, one (John Chancellor) showed greater judged facial positivity toward Gerald Ford, and three (Walter Cronkite, David Brinkley, and Harry Reasoner) showed greater facial positivity toward Jimmy Carter. The fifth anchor (Barbara Walters) did not exhibit significant differences. With just one anchorperson exhibiting greater positivity (toward Ford) when the verbal content of the news stories was considered, media "bias" may be perceived more accurately in the facial expressiveness of newscasters than in the semantic content of their story narratives.^{172, 173} Subsequent work by Mullen and colleagues found that newscaster expressions may have played a role in shaping voting behavior in the 1984 presidential election, with Peter Jennings of ABC News exhibiting strong nonverbal bias (facial display behavior) in favor of Ronald Reagan over Walter Mondale when reporting the news. In a subsequent telephone survey of four media markets, the researchers found a significant difference in voting patterns: viewers of ABC News reported they were more likely to vote for Reagan than Mondale.¹⁷⁴

An interesting finding from this research is that the effect of leader displays can be modified via a priming effect by visuals that immediately precede the target stimulus. Such viewer sensitivity to subtle, if not subliminal, emotionally relevant cues of 33 ms before viewing multiple political figures was documented in experimental research by Way and Masters^{175, 176} who found that these brief stimuli only affected participants when viewing Democratic President Bill Clinton compared to less salient Democrats (Earnest Hollings, Reubin Askew, and Walter Mondale), suggesting higher levels of attentiveness to leaders. A study investigating

“microexpressions” of emotion in the facial displays of President George H.W. Bush during his 1991 nationally televised speech announcing the commencement of operations to liberate Kuwait found that several inappropriate expressions of less than one second each led to dampened emotional response in viewers, reinforcing the sensitivity of viewers to thin slices of problematic nonverbal behavior by leaders in times of crisis.¹⁷⁷

Measures. Although most studies employ self-report items and scales to assess experimental effects, the use of psychophysiological measures and latency to respond was also seen in several of the research articles considered in this review, suggesting the importance of multiple methods in measuring viewer responses. Complementary measures allow investigators to triangulate findings or confirm patterns of response from multiple vantage points, whether to determine the signal value or meaning of leader displays as perceived by observers or the cognitive, emotional, or physiological responses that observers have to political display behavior.¹⁷⁸ Studies have also examined viewer evaluations of politicians more generally, typically in the form of feeling thermometers, and have employed trait evaluations including measures of competence, honesty, trustworthiness, attractiveness, leadership ability, and likeability, among others.^{179, 180, 181, 182} The use of multiple measures gives researchers greater latitude to address and resolve perennial concerns over measurement validity and reliability.

Viewer evaluations. When viewer evaluations, including both affective ratings and trait attributions, have been subjected to factor analysis, two distinct yet theoretically congruent factors emerge: reassurance and dominance. In a cross-cultural study comparing responses to leaders in the United States (Ronald Reagan) and France (Jacques Chirac and Laurent Fabius), the first factor extracted was reassurance, with negative loadings for the emotion terms comforting and joyful, and positive loadings for angry and disgusted.¹⁸³ A second factor, dominance, likewise emerged for all three politicians, with positive loadings for strong and interested, and negative loadings for confused and fearful. An administration of the study in the United States¹⁸⁴ found reassurance to be denoted by positive loadings for warm, competent, inspiring, and moral,

and a negative loading for evasive. Likewise, in the U.S. version of the study, trait attributions of confident and aggressive led to the extraction of a dominance factor.

Emotional response. Self-reports of emotional response to the facial displays of leaders were widely employed in the Dartmouth group studies, reflecting an appreciation for the role of emotion in decision making. Although a number of studies consider single measures of emotion,^{185, 186, 187, 188} or summary variables based on theoretical rationales,^{189, 190, 191, 192, 193, 194, 195} factor analysis of emotion terms generally extract two primary factors. With some variation, these loadings reproduce the circumplex model of emotion seen in experimental and survey research^{196, 197} where two orthogonal dimensions of affect are identified. These factors have been referred to as emotional valence and arousal,¹⁹⁸ behavioral approach and behavioral inhibition,¹⁹⁹ or, as described in the political psychology literature, enthusiasm and anxiety, representing the emotional disposition and surveillance systems.²⁰⁰ In the ethological literature, these dimensions are labeled hedonic and agonistic behavioral styles, respectively, and have been used as overarching themes to cluster specific emotional cues.²⁰¹ When derived from factor analysis, the two factors are extracted both in direct response to leader displays of emotion^{202, 203} and from reflections on emotional experience in the days following experimental treatment.^{204, 205}

Psychophysiological responses were analyzed in a select number of studies and provide insight into not just observer reactions but also the process by which participants perceive and react to leader displays. Specifically, in three studies reviewed here,^{206, 207, 208} skin conductance, heart rate, and facial electromyographic (EMG) measures were used to assess viewer responses to leader displays. In this research, skin conductance is employed as an indicator of arousal, heart rate as an indicator of viewer attention, and facial EMG as an indicator of emotional valence. Skin conductance was shown to increase in response to anger/threat display behavior²⁰⁹ as well as upon viewing inappropriate leader displays.²¹⁰ Heart rate in one early study increased as a result of both agonistic expressions of anger/threat and fear/evasion, especially when compared with happiness/reassurance.²¹¹ Bucy and Bradley found heart rate initially *decreased* (signaling attentional focus) upon exposure to high

intensity displays of President Clinton that followed negative news images, suggesting increased attention to agonic display behavior by the president.²¹²

With facial electromyography, electrodes placed over the corrugator muscles are used to measure frowning or negative affect, while recording of zygomatic muscle activity, which is implicated in smiling, are used to measure positive affect. Both have been successfully employed to measure facial feedback, whether empathetic or counter-empathetic, in response to leader displays.^{213, 214, 215} On the other hand, the obicularis oris, which is used to control the opening of the mouth (i.e., the lips), did not show significant effects in the one study in which it was used. In this study, the authors concluded that participant responses to the experimental stimuli were primarily affective, whereas the obicularis oris could indicate the depth of information processing (i.e., cognitive response) through subvocal argumentation.²¹⁶

Bucy and colleagues have used some of the more novel approaches to analyze information processing and emotional experience. Bucy and Newhagen²¹⁷ assessed thought elaboration by asking participants to write down their thoughts after each news story-leader display stimulus, then content analyzed viewer responses for number of thoughts and type of evaluation made. They also employed recognition latency to measure depth of processing, assessed by how quickly participants identified short video segments as being from the experimental stimuli they saw or from distractor material; finally, they considered cued recall of information from the news narrative through multiple choice identification of audio information as part of the exit questionnaire. In addition to the facial EMG and psychophysiological measures reported above, Bucy and Bradley²¹⁸ asked participants to rate their subjective emotional experience by using the Self-Assessment Manikin (SAM) scales, which consist of a series of pictorial indices along the three emotional dimensions of valence (negative-positive), arousal (calm-excited), and dominance (in control-not in control), finding increased arousal for negative and high intensity news images and leader displays, and reduced feelings of dominance for increased intensity in both news images and leader displays.

Experimental participants. Not unexpectedly, the great majority of studies considered here used undergraduates

as research participants. The reliance on the stereotypical college sophomore has come under fire for being too narrow a database. Notably, Sears²¹⁹ has argued that the portrayal of human nature might be biased as a result of using a predominantly undergraduate research base that has a tendency to be socially compliant, especially to authority figures, and that is more likely to be mercurial in their attitudes because of lack of self-knowledge. At the same time, Sears observed that the use of “relatively well-educated subjects, selected for their superior cognitive skills, along with research sites, procedures, and tasks that promote dispassionate, academic like information-processing, should help produce empirical evidence that portrays humans as dominated by cognitive processes, rather than by strong evaluative predispositions.”²²⁰

Interestingly, this might give greater credence to the work on nonverbal communication presented here, as the findings suggest robust affective results *in spite of* the presumed bias toward cognitive processing by college students.²²¹ Regardless, the findings we have considered may to some extent be tempered by lingering questions about ecological validity (i.e., approximation of real-life situations) and the ability to generalize. Specifically, most studies are populated predominantly by convenience or opportunity samples of undergraduates, samples which in the case of the Dartmouth group’s work (at an elite Ivy League campus) represent highly accomplished young scholars. In terms of interest in and understanding of political information, as well as (at times) close proximity to political events, particularly during the New Hampshire primaries, such a sample population can be expected to not entirely approximate the general population. Although it is worth noting that some scholars have convincingly argued that basic information processing and emotional responding, particularly processes recorded with psychophysiological measures, may not be strongly affected by prior learning.^{222, 223}

In later studies, the problem of ecological validity was taken into account with research comparing viewer responses across different cultures,²²⁴ different ethnicities within the United States,²²⁵ and adult, nonstudent participant pools.^{226, 227, 228, 229} While adult populations enhance the external validity of findings, the systematic analysis of data considering the influence of lifecycle effects remains to be explored.

Future research directions

Future analysis of the effects of televised leader displays will likely follow what has come before in terms of experimental treatments, measures, and participants. Research will also be affected by advancements in recording technology that allows for replication and progression within existing conceptual frameworks. Continued appreciation for the guiding principles of evolutionary theory and ethological methods, as referenced by Tinbergen's four questions,²³⁰ should guide hypothesis generation and testing. Below we consider methodological and theoretical advances that will likely affect future ethologically inspired research concerning the televised facial display behavior of political figures.

Research on the nonverbal communication behavior of politicians has been at the forefront of experimental research by utilizing multiple measures, including not just self-reports but also affective responses, cognitive processing measures, and psychophysiological data. Self-reports can be expected to remain a mainstay of experimental research in this area, whether collected manually or via a computer interface, and will continue to be used to extract underlying factors, albeit with greater conceptual clarity as structural equation modeling (SEM) comes into greater use.²³¹ Analysis of cognitive processes through response time, thought elaboration, and information recall has built upon self-reports and provided a more complete and sophisticated understanding of how participants respond to facial display behavior.²³² Likewise, psychophysiological measures of arousal, attention, and emotional valence are capable of detecting even minute viewer responses to televised leader displays. But they are intrusive and severely limit the "mundane" quality and "psychological realism" of experiments, since having measurement devices on one's face and body is not likely to occur in the "real world" and might affect the applicability of the results.²³³

One of the significant takeaway lessons from this synoptic review is the importance of joining experimentation with observation for understanding the behavior of politicians and concomitant news media coverage of them. Documenting how politicians are presented to the public is an important first step; appreciating how nonverbal display behavior then influences viewer perceptions is critical for understand-

ing the influence of media presentations on public opinion. Content analysis findings suggest that media coverage of facial display behavior varies in terms of frequency and type of display depending on candidate status,^{234, 235, 236} cultural setting²³⁷ and which phase of a presidential campaign is analyzed.^{238, 239, 240}

Specifically, signals from the eyes and mouth may be communicated as separate components of the face or as an amalgamation of these cues. Although these expressions may be signs of core emotional states that are masked, modified through display rules, or mixed to express more nuanced emotional states,²⁴¹ facial movements may also reflect behavioral intent in relation to the social context^{242, 243, 244} and manifestations of cognitive appraisals that occur in these contexts.^{245, 246, 247} In other words, the influence of nonverbal behavior might occur through processing of separate components of the face at a microdetailed level. Future experimentation should reflect not only the type of media coverage afforded politicians but also the degree of variance in facial displays and their impact on communicating behavioral intent,²⁴⁸ preferably using a detailed coding scheme such as Ekman's FACS system to provide greater accuracy in measurement.

Finally, the importance of moving beyond the "college sophomore" as the research participant of choice, as duly noted and acted on by the Dartmouth group as their research progressed and in the work of Bucy and colleagues, needs to be emphasized. Findings concerning African-American college participants²⁴⁹ and European participants,^{250, 251} notably their differential responses to leader displays, suggests that, although there might be tenuous consensus regarding what the basic effects of emotional displays are, there is variance in what is perceived as appropriate and how nonverbal communication is cognitively processed by different cultural groups.²⁵²

Discussion

Although the importance of visual representations of political leaders has long been appreciated, as reflected by the research programs considered here, new developments only serve to underscore the importance of understanding the influence of facial display behavior. Not only have politicians become ever more innovative in their media strategies, hitting the talk show circuit to better showcase their likeability to individuals with

lower levels of political interest and motivation,²⁵³ viewing technology has changed with television screens becoming visually larger, aurally richer, and higher in resolution. Looking forward, television is likely to become more realistic with heightened clarity and more lifelike, if not *larger than life*, presentations. In the case of the latter, we know from existing research that the perception of proximity in political dialogue leads to higher levels of arousal, with concomitant effects on attitudes toward and memory of politicians and the legitimacy of their policy positions.²⁵⁴ Furthermore, easily accessible recordings from a range of media sources, whether television, online news pages, or video uploaded directly by viewers to file-sharing sites like YouTube, is greatly expanding public scrutiny of political figures.

With this in mind, research considering viewer responses to ubiquitous, cross-platform recordings of memorable moments in televised politics becomes a pressing concern, especially in light of the accumulated findings reviewed here. Recent results from image-based analyses showing that media bias does exist, albeit in visual form and contrary to popular understandings,²⁵⁵ underscores the importance of fully understanding a rapidly advancing information environment that influences individuals on multiple levels. By coupling theoretical insights from ethology with the research design lessons from studies reviewed here, a fuller, more detailed understanding of human political behavior should emerge.

Notes

The authors would like to thank Erik P. Bucy for his patience and tireless work in bringing this submission to fruition, to the anonymous reviewers for their constructive suggestions, and Jennifer Stewart for the multiple times she has read and edited this manuscript. Finally, the authors would like to thank Roger D. Masters for his pioneering intellectual insights and his ongoing mentoring and support.

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Appendix 1. Summary of biopolitical studies using the face as an experimental stimulus.

Author(s)	Year	Research design	Subjects	Treatment	Nonverbal variables	Political leaders	Key variables/controls	Dependent variables	Major findings
Exline	1985	Two group between subjects design (Ford response and Carter rebuttal/Carter response and Ford rebuttal)	N = 100 (50F); UG; M = N/A	Audio-visual segments from televised debates, 9–10 min. in duration	Speech non fluencies, moistening lips, gaze shift, eye blinks, body sway, hand gestures, head nods, smiling, gaze direction	Ford, Carter	Primacy vs. recency in debate selection	Perceived competence	All nonverbals with exception of body sway correlated with objective data. Perceived speech nonfluencies, moistening lips, gaze shift, eye blinks, body sway negatively associated with perceived competence. Primacy matters more than recency in competence judgments. Carter judged more competent than Ford.
McHugo, Lanzetta, Sullivan, Masters, and Englis	1985	Within subjects 4 (display type) × 2 (modality: visual, audio-visual) factorial design	N = 40 (9F); UG; M = 20.4 yrs	Audio-visual segments from television news (N = 8) ranging from 37s–74s (M = 50s)	H/R, A/T, F/E, Neutral	Reagan	Prior attitude, pretest trait attributions (moral, dishonest, weak, knowledgeable, power-hungry, inspiring); emotional response (angry, hopeful, fearful, proud, disgusted, sympathetic, uneasy); party ID, ideology, media fairness, attention to Reagan	Self-reported emotion: joyful, happy, amused; interested, eager, curious; angry, mad, aggressive; fearful, worried; anxious; disgusted, scornful, disdainful; comforted, reassured, helped; bewildered; supportive, sympathetic, inspired; Physiological measures: facial EMG (corrugator, zygomatic), skin conductance, heart rate (physiology measured in 15s epochs early and late in the presentation against baseline rates)	Prior attitudes influenced self-reports w/stronger response from supporters; counter-empathy (neg responses to pos displays) reported by opponents. Physiologically, H/R displays increased zygomatic activation, F/E and A/T changes greater with visual-only modality. Skin conductance change highest during A/T, lowest during H/R. Hearing leaders speak in audio-visual modality affected self-reports but not physiological measures.
Sullivan and Masters	1988	Mixed between and within subjects 2 (time of test: Jan, Oct) × 2 (modality: visual, audio-visual) × 2 (display type: H/R, neutral) factorial design	N = 80 (N/A; Jan 1984); N = 94 (N/A; Oct 1984); UG; M = N/A	Visual and audio-visual television news excerpts	H/R, Neutral	Reagan, Mondale, Hart, Jackson, Glenn, McGovern, Cranston, Hollings, Askew	Party ID	Feeling thermometer, Net assessed leader emotion (pos: joy, comfort minus neg: anger, fear); Net self-reported emotion (pos: joy, comfort minus neg: anger, fear)	Both H/R and Neutral displays evoked positive response for all candidates except Mondale. Posttest ratings of Reagan and Jackson increased, while Mondale decreased. H/R affected post-test attitudes more than Neutral displays (except for Mondale, Glenn). Reagan's pos ratings doubled in magnitude from Jan to Oct.

Note: Exp. = experiment; F = female; M = male; UG = undergraduate, HS = high school; M = mean; N/A = not available. s = seconds; ms = milliseconds (1,000 per second). H/R = happiness/reassurance; A/T = anger/threat; F/E = fear/evasion; S/A = sadness/appeasement. Sig = significant.

Appendix 1. Continued.

Author(s)	Year	Research design	Subjects	Treatment	Nonverbal variables	Political leaders	Key variables/controls	Dependent variables	Major findings
Masters and Sullivan	1989	Mixed between and within subjects 3 (display type: H/R, A/T, F/E) \times 3 (modality: visual, audio, audio-visual) factorial design	N = 145 UG (U.S.); M = N/A; N = 65 UG (France); M = N/A	Visual, audio, and audio-visual news excerpts	H/R, A/T, F/E	Reagan (U.S.), Chirac, Fabius (France)	Attitudes toward political parties, leaders, media	Leader evaluations: Reassurance (angry, comforting, joyful, disgusted); Dominance (strong, confident, fearful, interested). Self-reported emotion: positive (joyful, interested, comforted, inspired), negative (angry, fearful, disgusted, confused)	Dominance communicated by H/R and A/T. Political attitudes among French viewers influenced leader evaluations and self-reported emotion more than U.S. viewers. Weaker activation of partisan attitudes with A/T or F/E displays than H/R. More positive overall response to H/R by American viewers.
McHugo, Lanzetta, and Bush	1991	Mixed between and within subjects 3 (display type: mild H/R, A/T, intense H/R) \times 2 (candidate: Reagan, Hart) factorial design	N = 100 (54F); UG; M = 18.8 yrs	Visual only television news excerpts, 32s–40s (M = 35.3s); 4 display orders; mild H/R, A/T, intense H/R (A/T always in middle)	H/R (mild), H/R (intense), A/T	Reagan, Hart	Party ID, viewer sex	Feeling thermometer; Self-reported emotion: joyful, happy, merry; angry, mad, scornful; comforted, warm, reassured; anxious, fearful, worried; Physiological response: facial EMG (zygomatic, corrugator), orbicularis oris; skin conductance, heart rate	Reagan supporters reported more joy following H/R, more anxiety following A/T; post-display, Hart supporters reported more positive emotions than critics. Reagan and Hart supporters showed less corrugator and more zygomatic activation than critics. Interaction for intense H/R displays. Attitude moderates viewer responses to displays.
Patterson, Churchill, Burger, and Powell (Exp.1)	1992	Mixed between and within subjects 4 (modality: audio, visual, audio-visual, text) \times 2 (candidate: Reagan, Mondale) \times 2 (time of test: pre/post Irangate) \times 2 (presentation order) factorial design	N = 144 (94F) + 75 (N/A); UG; M = N/A	Audio-visual segments, 4 per candidate, date, M ~ 40s	Eyeblinks, gaze changes, head movements, brow movements	Reagan, Mondale	Viewer sex, age	Leadership (favorability) traits: competence, relaxation, effectiveness, informed, sincerity, intellectual, likeable, leadership ability, strength, persuasiveness, poise; Debate winner	Main effect for candidate, w/Reagan rated more favorably than Mondale. Sig modality \times candidate interaction, w/Reagan receiving more positive evaluations in visual only and text conditions than Mondale. Reagan judged as debate winner.

Note: Exp. = experiment; F = female, M = male; UG = undergraduate, HS = high school; M = mean; N/A = not available. s = seconds; ms = milliseconds (1,000 per second). H/R = happiness/reassurance; A/T = anger/threat; F/E = fear/evasion; S/A = sadness/appeasement. Sig = significant.

Appendix 1. Continued.

Author(s)	Year	Research design	Subjects	Treatment	Nonverbal variables	Political leaders	Key variables/controls	Dependent variables	Major findings
Patterson, Churchhill, Burger, and Powell (Exp.2)	1992	Mixed between and within subjects 4 (modality: audio, visual, audio-visual, text) \times 2 (candidate) \times 2 (presentation order) factorial design	N = 64 (N/A); UG; M = N/A	Audio-visual segments, 4 per candidate, M ~ 40s	Eyeblinks, gaze changes, head movements, brow movements	Reagan, Mondale		Perceived expressiveness, physical attractiveness	Main effects for modality and candidate, w/Reagan rated more expressive and attractive than Mondale. Sig modality \times candidate interaction, w/Reagan more expressive in visual and audio-visual conditions. Reagan rated more attractive in visual condition. Behaviorally, Mondale prone to more eyeblinking; Reagan more gaze changes and head movements.
Warnecke, Masters, and Kemper	1992	Between subjects 2 (status: high/low) \times 2 (modality: visual, audio-visual) factorial design w/1 high and 1 low status leader per country (U.S., France, Germany)	N = 84 (42F); Adult, paid volunteers; M = N/A	Audio-visual segments, 12s-15s, candidate face > 1/4 screen, B&W	Head movements, Pos: rotational frequency (cut off stare = reassurance) and sagittal movement trend (head upward = dominance); Neg: rotational patterns (stare = threat) and lateral lift (head tilt = maternal behavior)	High status, Reagan, Baker (U.S.); Chirac, Mitterrand (France); Kohl, von Weizsäcker (Germany); Low status = lesser known politicians, white male, 30-70 yrs	Cloninger's "TPQ" personality inventory	Trait attributions: honest, bold, active, inspiring, powerful, energetic, fair, competent, fast, strong, intelligent; Self-reported emotion: joyful, happy, amused; angry, scornful, irritated; interested, attentive, concerned; fearful, worried, anxious; comforted, reassured, supportive; confused, unclear, vague; Feeling thermometer	Main effect for modality, w/higher trait attributions and feeling thermometer ratings among U.S. viewers in visual-only condition than French and German viewers. "Seeing and hearing an American leader did not change the viewer's response, where as the ability to hear foreign leaders' voices led to significantly more favorable judgments than when these same visual quotes were rated anonymously."
Masters and Carlotti	1994	Mixed between and within subjects 3 (time of test: Feb, May, July) \times 2 (modality: visual, audio-visual) \times 2 (display type: H/R, neutral) factorial design	N = 66 UG (N/A, Feb); M = N/A + N = 55 UG (N/A, May); + N = 149 Adult alumni (N/A, July); M = N/A	Visual and audio-visual news excerpts	H/R, Neutral	Bush, Dukakis	Party ID, viewer sex	Feeling thermometer; Net assessed leader emotion (pos: joy, comfort minus neg: anger, fear); Net self-reported emotion (pos: joy, comfort minus neg: anger, fear)	Replication of Sullivan and Masters (1988) with gender results. Female viewers reported greater positive emotions to Dukakis' H/R displays than men. Male viewers reported more fear in response to Bush's H/R displays. But Dukakis polarized male viewers, while Bush neutralized them. For female viewers, neutrals shifted toward Dukakis.

Note: Exp. = experiment; F = female, M = male; UG = undergraduate, HS = high school; M = mean; N/A = not available. s = seconds; ms = milliseconds (1,000 per second). H/R = happiness/reassurance; A/T = anger/threat; F/E = fear/evasion; S/A = sadness/appeasement. Sig = significant.

Appendix 1. Continued.

Author(s)	Year	Research design	Subjects	Treatment	Nonverbal variables	Political leaders	Key variables/controls	Dependent variables	Major findings
Sullivan and Masters	1994	Between subjects 3 (display type: H/R, A/T, mixed/neutral) × 2 (time of test, day 1, day 2) factorial design	N = 220 (84F); UG and HS; M = N/A	Television news stories, 33s–75s (<i>M</i> = 48.6s); silent candidate plays in background, 16s–22s	H/R, A/T, Neutral, Blended (H/R and A/T)	Reagan	Attitude toward Reagan, viewer sex	Self-reported emotion: angry, fearful, joyful; Assessed leader emotion (next day); Neg (anger, fear, disgust, uneasiness); Pos (hope, pride, sympathy, happiness); Trait attributions (next day): Reassurance (evasive, warm, competent, inspiring, moral); Dominance (confident, aggressive)	Male viewers reported more joy in response to H/R displays, females more in response to A/T. Reagan A/T displays were less reassuring for neutral female viewers than H/R displays. Critics more reassured by A/T than H/R. Neutral viewers reported less pos emotion in response to A/T and A/T displays were polarizing for female viewers. Post-test feeling thermometer most pos among neutral male viewers in response to H/R displays.
Masters	1994	Mixed between and within subjects 2 (time of test: Feb, Nov) × 2 (display type: H/R, neutral) factorial design	N = 154 (21 Black M, 51 White M, 25 Black F, 57 White F); UG (Dartmouth, SIU, SUNY-Potsdam, Boston U., Grambling State U.); M = N/A	Visual and audio-visual television news excerpts, 20s–120s	H/R, Neutral	Reagan, Hart (1984); Bush, Dukakis, Dole, Gephardt, Jackson, Robertson (1988)	Prior attitude, party ID, ideology, leadership evaluations, issue agreement, viewer ethnicity (white, black)	Self-reported emotion (comfort, happiness, anger, fear); Assessed display emotion (strength, happiness, anger, fear); Feeling thermometer	Whites affected by H/R displays (except for Jackson, Reagan) and Neutral displays of Jackson, Robertson, Reagan, Hart. Blacks less affected by H/R and Neutral displays (except for Dole and Robertson). For black viewers, cognitively mediated response to leader displays was not experienced as arousing. Responses to display patterns similar among black and white viewers.
Way and Masters (Exp.1)	1996	Three-group between subjects design (emotional prime: positive, negative, control)	N = 44 (N/A); UG; M = N/A	Network logo (1s), 1s delay, 33ms emotional prime, followed by 2s leader display (<i>n</i> = 5 per candidate)	Neutral	Hollings, Askew, Clinton, Mondale	Party ID	Net assessed leader emotion (pos: strong, determined, confident; joyful, happy, amused minus neg: angry, threatening, aggressive; fearful, worried, anxious); Self-reported emotion (joyful, happy, amused, angry, scornful, irritated, fearful, worried, anxious, comforted, reassured, supportive); Feeling thermometer	Preattentive emotional prime decreased viewers' self-reported warmth and perceptions of Clinton, but also led to higher favorability ratings. Not sig for other political leaders.

Note: Exp. = experiment; F = female, M = male; UG = undergraduate, HS = high school; M = mean; N/A = not available. s = seconds; ms = milliseconds (1,000 per second). H/R = happiness/reassurance; A/T = anger/threat; F/E = fear/evasion; S/A = sadness/appeasement. Sig = significant.

Appendix 1. Continued.

Author(s)	Year	Research design	Subjects	Treatment	Nonverbal variables	Political leaders	Key variables/controls	Dependent variables	Major findings
Way and Masters (Exp.2)	1996	Mixed between and within subjects 3 (emotional prime; positive, negative, control) × 2 (display type: A/T, neutral) factorial design	N = 76 (N/A); UG; M = N/A	Network logo A/T, 1s delay, 33ms emotional prime, followed by 2s leader display (N = 5 per candidate)	Neutral	Hart, Clinton, Bush	Party ID	Feeling thermometer; awareness of emotional prime; recognition memory	Viewers report more favorable responses to Clinton after negative emotional prime. Partisanship declines after each image shown with neg prime. Awareness of preattentive images = 13%; once notified, reported awareness = 85%. Recognition for H/R displays = 69%.
Bucy and Newhagen	1999	Within subjects 4 (news image emotion: valence by intensity) × 4 (leader display emotion: valence by intensity) × 4 (presentation order) factorial design	N = 40 (23F); M = 42 yrs	Television news packages (N = 4 per subject): anchor lead-in (10–15s), news story (30s), presidential display (30s)	Display valence (pos, neg); Intensity (high = close-up + forceful, rigid body language; low = medium shots + conciliatory gestures, fluid body language)	Clinton	News story topic: Oklahoma City bombing, U.S. troops in Haiti, U.S.-Bosnia intervention, fed. gov't shutdown	Recognition memory; information recall; thought elaboration; appropriateness evaluations	Neg and low intensity displays regarded as appropriate; pos and high intensity displays inappropriate. Inappropriate displays prompt more thoughts. Recognition (response latency) slowest for high intensity and inappropriate displays. News story emotion and display emotion congruence led to greater recall.
Bucy (Exp.1)	2000	Within subjects 4 (news image emotion: valence by intensity) × 4 (leader display emotion: valence by intensity) × 4 (presentation order) factorial design	N = 40 (23F); M = 42 yrs	Television news packages (N = 4 per subject): anchor lead-in (10–15s), news story (30s), presidential display (30s)	Display valence (pos, neg); Intensity (high = close-up + forceful, rigid body language; low = medium shots + conciliatory gestures, fluid body language)	Clinton	News story topic: Oklahoma City bombing, U.S. troops in Haiti, U.S.-Bosnia intervention, fed. gov't shutdown	Self-reported primary emotions (anger, fear, disgust, happiness, sadness, surprise); Information seeking (alert, confused, curious, apathetic, bored); Sadness (remorseful, depressed, discouraged, despair, resigned, helpless); Annoyance (anxious, suspicious, frustrated, troubled, upset, contempt, irritated, apprehensive)	Expressive displays elicit a broader range of emotional states (hopeful, optimistic, despair, apprehensive, suspicious, contempt, irritated, frustrated) than news events (curious, despair).

Note: Exp. = experiment; F = female, M = male; UG = undergraduate, HS = high school; M = mean; N/A = not available. s = seconds; ms = milliseconds (1,000 per second). H/R = happiness/reassurance; A/T = anger/threat; F/E = fear/evasion; S/A = sadness/appausement. Sig = significant.

Appendix 1. Continued.

Author(s)	Year	Research design	Subjects	Treatment	Nonverbal variables	Political leaders	Key variables/controls	Dependent variables	Major findings
Bucy (Exp.2)	2000	Within subjects 4 (news image emotion: valence by intensity) × 4 (leader display emotion: valence by intensity) × 4 (presentation order) factorial design	N = 41 (F21); M = 22 yrs	Television news packages (N = 4 per subject): anchor leader in (10–15s), news story (30s), presidential display (30s)	Display valence (pos, neg); Intensity (high = close-up + forceful, rigid body language; low = medium shots + conciliatory gestures, fluid body language)	Clinton	News story topic: Oklahoma City bombing, U.S. troops in Haiti, U.S.-Bosnia intervention, fed. gov't shutdown	Self-reported emotion (hopeful, angry, fearful, proud, disgusted, sympathetic, uneasy); Trait attributions (appropriate, honest, trustworthy, credible)	Expressive displays again elicit broader range of emotional states (hopeful, proud, uneasy, disgusted, fearful) than news events (sympathy, disgusted, angry). Congruence of emotional response with leader displays (pos-pos/neg-neg). Sig interaction for news story valence and display intensity on trait attributions (leaders more credible and trustworthy w/low intensity displays to intense news images and high intensity displays to low intense news images. Neg displays led to higher trait ratings (of appropriateness, honesty, trustworthiness, credibility).
Tiedens	2001	Two-group (angry vs. sad Clinton testimony) between subjects design	N = 54 (F34); M = N/A	Televised leader displays of Lewinsky scandal grand jury testimony: angry (47s), sad (45s)	A/T, S/A	Clinton	Party ID, viewer sex	Assessed leader emotion (anger, sadness); Approval (Clinton, Democrats, Republicans); Impeachment support scale (“should be removed from office,” “House Judiciary committee wrong,” “Senate should find guilty,” “severely punished,” “should resign,” “matter should be dropped”)	Perception of emotion congruent with display behavior. Viewers of anger clip more pro-Clinton than those viewing sadness clip.

Note: Exp. = experiment; F = female, M = male; UG = undergraduate, HS = high school; M = mean; N/A = not available. s = seconds; ms = milliseconds (1,000 per second). H/R = happiness/reassurance; A/T = anger/threat; F/E = fear/evasion; S/A = sadness/appeasement. Sig = significant.

Appendix 1. Continued.

Author(s)	Year	Research design	Subjects	Treatment	Nonverbal variables	Political leaders	Key variables/controls	Dependent variables	Major findings
Bucy	2003	Within subjects 2 (news image intensity: high, low) \times 2 (leader display potency: high, low) \times 4 (presentation order) factorial design	N = 85 (41F); UG & Adult paid volunteers; M = 20 (UG), M = 53 yrs (Adults)	Television news packages (N = 4 per subject): anchor leader in & news story (M = 82s), presidential display (M = 43.8s)	Display potency: high, low (sorted by ratings on activated, subdued, intense, aroused, in control, self-assured, fearful)	G. W. Bush	News story topic: 9/11 World Trade Center attacks	Self-reported emotion (overwhelmed, hopeful, angry, sympathetic, fearful, proud, disgusted, uneasy, apprehensive, sad); SAM scales (valence, arousal, dominance); Viewer presence	Communicative potency discriminates between confident and timid leader displays. High potency displays are more arousing and reassuring, esp in response to low intensity news images. High intensity news images elicit more neg emotion and less feelings of control than low intensity images. High potency displays following intense news generates anxiety; following low intensity news images, potent displays help mitigate anxiety.
Bucy and Bradley	2004	Within subjects 4 (news image emotion: valence by intensity) \times 4 (leader display emotion: valence by intensity) \times 4 (presentation order) factorial design	N = 41 (21F); UG; M = 22 yrs	Television news packages (N = 4 per subject): anchor leader in (10-15s), news story (30s), presidential display (30s)	Display valence (pos, neg); Intensity (high = close-up + forceful, rigid body language; low = medium shots + conciliatory gestures, fluid body language)	Clinton	News story topic: Oklahoma City bombing, U.S. troops in Haiti, U.S. -Bosnia intervention, fed. gov't shutdown	Self-reported emotion (SAM scales: valence, arousal, dominance); Recognition memory; Physiological responses: facial EMG (corrugator, zygomatic), skin conductance, heart rate	Appropriate display behavior elicits congruent emotional responding (corrugator and zygomatic activation). Greater attention (lower heart rate) given to high intensity displays, esp following neg news images. Arousal (skin conductance) greatest with emotionally congruent news images and leader displays. Self-reported emotion higher for neg, high intensity displays, dominance lower for intense images and displays. Positive displays (considered inappropriate) interfered w/recognition memory.
Stewart, Waller, and Schubert	2009	Single factor between subjects pre-/post-test design (with and w/out micro-expressions, control group)	N = 206 (141F); UG; M = 20 yrs	Excerpt of televised Iraq War speech, 11:52 in duration, with and w/out micro-expressions	Micro-expressions (N = 7), 0.5s-1s; non-Duchenne smile	Bush	Iraq war	Self-reported emotion (threatened, angry, anxious; reassured, determined, inspired)	Viewing Bush's speech increased perceptions of threat and feelings of anger; at the same time, exposure decreased anxiety. Micro-expressions reduced feelings of threat, anger, anxiety, determination.

Note: Exp. = experiment; F = female, M = male; UG = undergraduate, HS = high school; M = mean; N/A = not available. s = seconds; ms = milliseconds (1,000 per second). H/R = happiness/reassurance; A/T = anger/threat; F/E = fear/evasion; S/A = sadness/appeasement. Sig = significant.