Language, Nonverbal, and Audiovisual Cues:
Multimodal Approaches to Understanding Political Behavior

The present line of inquiry presents a novel integration of methods from language, audiovisual, and nonverbal elements, and is grounded in the premise that individuals reveal latent information about their true preferences through the words they use as well as through nonverbal behaviors. The language element includes traditional discourse analysis as well as computational linguistics. Nonverbal communication ranges from aspects of vocalization accompanying speech, such as intonation, stress, pitch, or rhythm, to non-vocal facial expressions, gestures, movement, and interpersonal spatial positioning. A multimodal approach advances the idea that language and nonverbal signals act as environmental cues that can influence neurobiological responses and corresponding behaviors on the part of observers.[1] In order to address questions relating to individual-level political psychology, recent research advocates for the interdisciplinary use of research methods drawn from areas such as psychology and the life sciences.[2] Indeed, technological and scientific advances in computational linguistics and neuro-physiological research have innovated tools useful in assessing the relationship between emotions, cognitions, and behaviors of individuals, including facial expression analysis and voice analysis.

Discourse analysis evaluates the pure linguistic content of speech, providing reliable indicators of tone[3], honesty[4], audience[5], formality[6], and cognitive decline[7]. However, there are limitations to what we can glean from studying language independent of other factors, such as nonverbal[8] and audiovisual elements[9]. Elements of both saying and conveying are essential to understanding the complete intended message. Language can be literal, metaphoric, vague, and specific, and bound by cultural conventions such as politeness[10] and idiomatic expressions[11]. Nonverbal cues also vary by culture, and audiovisual elements may affect audiences differently depending on culturally relevant expectations. Given the highly contextualized and distinct interpretations of language, nonverbal, and audiovisual elements across cultures, what universal themes or patterns may be generalizable in multiple environments? There are several broad multimodal areas of investigation which merit further investigation to answer this question: deception, persuasion, cognition and attention/focus. These areas generate several research questions that can be applied to the study of world leaders as well as non-state actors, including:

- What combination of language, nonverbal, and audiovisual elements signal truthfulness versus deception?
- What multimodal elements are used for persuasion and propaganda?
- What conclusions about cognition and cognitive states can we draw from observing neurobiological responses in subjects experiencing the content of political messaging, i.e., from viewing world leaders or non-state actors?
- How do congruent or dissonant multimodal elements draw the attention of observers?

These questions can help researchers and practitioners better understand pressing and relevant political phenomena, such as: the rise in populist language and sentiment not only in authoritarian regimes but also in mature democracies; the interaction of language, nonverbal, and audiovisual elements in propagandist material from violent extremist organizations (VEOs); the content and tone of communication intended to incite mass violence, such as genocide; and the differences between credible threats and bluffs from both state and non-state actors. These broad issue areas are relevant across geographic, religious, cultural, and linguistic contexts and as such are not tied to specific national security concerns. A multimodal approach offers several avenues for understanding government relations, military actions, social stability and unrest, population sentiment (via social media), information diffusion and belief formation (via propaganda), and the rise of leadership in state and non-state actor environments. A suite of multimodal instruments is available to measure language, nonverbal, and audiovisual elements. These can be deployed as secondary analysis of existing data (via text, video, or audio sources), as well as primary analysis in an experimental setting where participants' neuro-physiological responses are evaluated as they observe the multimodal content.

Deception

Interpersonal Deception Theory is contrasted with more psychologically minded theories such as leakage hypothesis and four-factor theory [12] and focuses more on communicative interplay between sender and receiver, including that individual and social factors are voluntary and intentional and impact credibility and detection accuracy. Threats are, in essence, deceptive statements, which have been studied from multiple perspectives. These include the relationship between profanity and honesty [13], how taxing the cognitive load to indicate the central or peripheral route to persuasion [14], multicultural perceptions and universality of deception indicators [15], and gender and deception. Other research on gendered implications for nonverbal dues have shown that people perceive women as more expressive than men and more skilled at sending and receiving nonverbal messages, while men were louder, more interruptive, and showed more nervous and dysfluent behaviors [16].

Deceptive statements, including bluffs masquerading as threats, are speech acts: the utterance of a threat/bluff is an exercise in distinguishing truth from fiction, and these statements change the nature of reality in the world. Deciphering geopolitical deception involves game theory, including deterrence equilibrium [17], questions of security guarantees [18], crisis stability through threats and cooperation [19], differences between public and private threats [20], and distinguishing between threat typologies, like pure and threats and promises [21], and promises and warnings [22]. Statements of resolve and assurances may convince an adversary of an intended action or restraint from action and can be used in combination to achieve optimal outcomes [23].

Biometric measurements also help reveal indicators of deception [24]. fMRI data indicate that lying is distinguished by prefrontal and parietal activity with 78% accuracy, and that "attentional orientation systems involved in visual target and novelty processing as well as working memory systems involved in contextual processing are active during deceptive behavior [25]". Using the Guilty Knowledge Task, other researchers employed functional near-infared spectroscopy (fNIR) to measure deception, finding that inferior and middle prefrontal cortical areas are associated at least some forms of deliberate deception [26]. Groups of people, rather than individuals alone, shown videos of truthful and deceptive statements are better able to distinguish between the two [27]. Other research has investigated aspects of conditional promises and threats [28], while others have found that threats need to be carried out occasionally to reiterate their credibility [29]. For individuals to judge nonverbal deceptive cues, recent research has shown that the niqab (or face veil) does not inhibit or obstruct others' ability to discern deceptive from truthful statements [30]. Other research uses communication accommodation theory to test the influences of touch, body position, smiling, voice, eye contact, and appearance [31].

Persuasion and Propaganda

The Elaboration Likelihood Model states that speakers pursue two routes to persuasion: a central and a peripheral route.[32] The central route is the more cognitively demanding style, requiring listeners to judge the content of the speech, whereas the peripheral route is more informal, relying on catch phrases, personality, and appearance to convey the message. As a persuasive strategy, populist language "Manichaean discourse that identifies Good with a unified will of the people and Evil with a conspiring elite".[33] This strategy is used by leaders like Chavez in Venezuela as well as Marine LePen in France.[34] Huang[35] notes that propaganda may signal government strength rather than indoctrination, and Lasswell[36] wrote that propagandist symbols may be embodied as spoken, written, visual, or musical stimulus. Further, mass media can incentivize violence, as was observed during the Rwandan genocide.[37]

Cognition

Social scientists frequently try to measure various aspects of the cognitive state of individuals often as a prelude to a conscious attempt to alter an aspect of that cognitive state. A persistent problem is how to measure a subject's cognitive state. If the subject is a willing participant in the research, then frequently survey instruments are used. Unfortunately, subjects may be consciously or unconsciously deceptive in their responses. The more "intimate" the question the greater the likelihood of deception. If the subject of the research is not a willing participant, then their cognitive state must be inferred from artifacts. One aspect of our research looks at measuring the cognitive states of individuals using physiological, verbal, and linguistic

features of their response to stimuli. The goal is to get quantitative measures of a subject's cognitive state that are less subject to deception. Another aspect of the research concerns the conscious attempt to alter a subject's cognitive state, that is to persuade them.

In the burgeoning field of "text-as-data," researchers use computational linguistics programs to assess syntactical features of language (Coh-Metrix)[38], sentiment (Linguistic Inquiry and Word Count – LIWC)[39], document topics (Latent Dirichlet Allocation)[40], and psychological/diagnostic attributes (IBM Watson Personality Insights, P-CAD). Using this battery of linguistic tools, it is possible to make inferences about an individual's intended audience, cognitive framework, emotional state, group affiliation, organizational hierarchy, and issue priorities. Additionally, applied neuroscience encompasses an array of neurological and biometric measurement methods that we intend to use in the analyzing the speaker's delivery of content as well as subjects' response to the videos. These measurement tools include: electroencephalography (EEG), eye tracking, automated facial expression analysis, galvanic skin response, heart rate, speech analysis, and implicit attitude testing[41]. These methods are useful in providing more objective measures of various dimensions of cognitive activity, visual attention, engagement, emotional arousal, and approach-avoidance behaviors.

Attention/Focus: Congruence and dissonance across modalities

Multimodal congruence is the coordination of language, nonverbal, and sound/audio/visual cues that can help to reveal psycholinguistic cognitive states like deliberate and inadvertent deception, including implicit bias [42]. Related, expectancy violation theory posits that sometimes violations of expectancy are preferable to confirmation [43]. With multimodal congruence, no expectancy violation occurs. However, with multimodal dissonance, either positive or negative expectancy violations occur. Studies of infant cognition and attention fail to show facial surprise reactions, but that instead show behavioral freezing and changes in gaze [44]. Expectancy violations have been linked empirically to nonverbal cues. Our proposal advocates for combining computational discourse and audiovisual analyses that can help uncover the extent to which nonverbal and audiovisual cues accentuate or obscure the linguistic content delivered. Further, our suite of linguistic and audiovisual instruments can effectively measure emotional affect, as we describe in our methods section.

Ekman and Friesen identify several ways in which language and nonverbal cues complement and contradict each other.[45] These include: emblems (gestures with direct dictionary translations); illustrators (movements tied to speech); affect displays (facial expressions); regulators (acts which help to coordinate turn-taking in conversations); and, adapters (self-learned nonverbal habits or mannerisms with meaning encoded). We define linguistic and audiovisual congruence as being the coordination of language and nonverbal cues that can help to reveal psycholinguistic cognitive states like deliberate and inadvertent deception, such as implicit bias.[46] Combining computational discourse and audiovisual analyses can help to uncover the extent to which nonverbal cues accentuate or obscure the linguistic content delivered.

Conclusions and Implications for National Security

The implications for synergy between the social and behavioral sciences and the intelligence community are clear: while each category (linguistic, nonverbal, and audiovisual) contributes valuable information independently, their combined potential for explaining political phenomena increases as each element informs the others. The intelligence community has access to real-time, global multimodal data streams for world leaders as well as VEOs and other non-state actors. The social and behavioral science community has the research capacity to test hypotheses in experimental settings and conduct analyses of secondary data. By leveraging the collective capacity of linguistic, nonverbal, and audiovisual instruments for measuring phenomena like deception, persuasion, cognition, and attention, we can generate new insights useful for understanding processes like leadership transitions in opaque political environments, radicalization, and threat escalation.

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