**SMILES OF AFFILIATION AND DOMINANCE
WHILE COMPETING FOR LEADERSHIP
IN THE 2016 AMERICAN PRESIDENTIAL DEBATE**

Carl Senior^{1,2}, Nathan Ridout¹ & Patrick Stewart³

¹Aston University, UK.

². University of Gibraltar, Europa Point, Gibraltar.

³. University of Arkansas, USA.

Correspondence : c.senior@aston.ac.uk

Key words: Smiles, Affiliation, Dominance, Non-verbal Displays, Politics, Gender differences

ABSTRACT

For human observers' slight differences in the muscular configurations of the smile can communicate dominance or affiliation. Despite the significant role played by smiles, our gender modulates their valence. Females tend to smile more than men and are judged more negatively if they smile less than their male counterparts. Given that the smile is associated with effective leadership it remains to be seen whether or not gender moderates such displays during leadership campaigns. To examine this question the non-verbal displays occurring in the 2016 US presidential debate were analysed in a unique video case-study approach. Specifically, it was hypothesised that the female politician (Hillary Clinton) would engender more smiles in general and displays of affiliation specifically. Given the rehearsed, yet unpredictable, nature of such debates it was further hypothesized that the displays would be more intense when each candidate watched the other respond not when they responded directly. Differences in smiles of affiliation and dominance were analysed and results did indeed support the hypothesis that the more intense displays were engendered by candidates when watching their counterpart respond to the moderator. The female politician made more intense smile displays in general and more affiliative smile gestures specifically than the male politician (Donald Trump). These results are discussed in terms of the sociobiological significance that such honest social signals may have in a contemporary political campaign. As is common practice limitations and proposals for future work are discussed.

INTRODUCTION

The ability to use a range of facial muscles to communicate social intent is present throughout the animal kingdom (Waller & Micheletta, 2013). Research suggests the ability of non-human primates to successfully signal dominance and affiliation confers social and reproductive benefits that are both proximally and ultimately important. The former is especially the case for male primates whose dominance hierarchy is premised upon aggressive behavioural traits underpinned by cues of physical strength (Jack & Fedigan, 2006). While the dominant male holds a less tenable position in human society (Hawley, Little & Card, 2008) dominance and affiliative behaviours remain significant (e.g., van Vugt, Hogan & Kaiser, 2008).

A large and respected body of work links the social traits of dominance and affiliation to certain facial cues and signals they provide for (e.g., Hwang & Matsumoto, 2014). For instance, reduced distance between pupil and eyebrows reliably indicate social dominance (Ueda, Nagoya, Yoshikawa, & Nomura, 2017), whereas affiliative behaviours are reliably communicated through direct, albeit not sustained, gaze (Nurmsoo, Einav & Hood, 2012). However, the general class of smile behaviours are unique by conveying a range of social intent serving both dominance and affiliation (Martin, Rychlowska, Wood, & Niedenthal, 2017).

The ability for smiles to effectively communicate such distinct social impressions occurs due to a variety of muscles enabling a variety of nuanced displays (Ekman & Rosenberg, 1997). While the contraction of the Zygomaticus major muscle is readily recognisable as a smile other muscle groups such as the Orbicularis oculi, Levator labii superioris and the Levator anguli oris enable complex, differentiated, and highly subtle set of displays effective across a range of social settings (Stewart, Bucy, & Mehu, 2015). Evidence dissociating the general class of smile from the experience of happiness suggests its capacity for signalling socially relevant concepts beyond merely expressing an internally felt state (Crivelli & Fridlund, 2018).

Despite its role in signalling intent to affiliate or dominate, the different configurations of smiles are sensitive to a range of biological factors influencing how they are displayed and received; one of these is gender (see e.g., Crivelli, & Fridlund, 2018). While this effect is moderated by factors such as the social status and context, one finding persists – females smile more than males (McDuff, Kodra, el Kaliouby, & LaFrance, 2017). Early work suggested females used smiles to communicate reduced social power compared to males (Ellyson & Dovidio, 1985). However, later work failed to find a link between status and smiling behaviour indeed individuals with high social status may smile more frequently than their low status counterparts (e.g., Mast & Hall, 2004). Despite this, females tend to be perceived more negatively if they smile less than men (Nagle, Brodsky & Weeter, 2014). Thus it would seem that the smile is as an effective mechanism for impression formation moderated by gender, one arena where such formation is crucial is within political leadership (Stewart, Waller & Schubert, 2009).

While leadership across multiple animal species may be exercised in a range of functional domains (Smith, Ortiz, Buhbe, & van Vugt, 2018), the tendency in modern human societies is to focus on the competitive context in which candidates contend for attention, votes, and ultimately power. As a result, understanding the role played by non-verbal signals such as smiles is important for a number of reasons (Masters, Sullivan, Feola, & McHugo, 1987). First, national politics tends to be televised with politician faces shown up-close-and-personal mimicking the face-to-face environment in which humans evolved, while also providing a significant corpus of facial display material to examine. Secondly, the status of candidates during electoral campaigns tends to be influenced by the degree and type of televised coverage. Finally, political campaigns affect the lives of many people with cases such as the US Presidential election redounding to the global level. Understanding the effects facial displays have in driving impression formation clearly is of great importance.

Because debates, especially ones between contenders for the U.S. presidency, are watched by millions of individuals (if not more), they have the opportunity to influence electoral

outcomes through candidate verbal and nonverbal performance. One might argue that professional politicians engender facial displays in accordance with display rules that cohere with the relatively predictable nature of the debate forum. Conversely, facial displays that are unconsciously evoked by a debater when observing their counterpart respond may be more ecologically valid when compared to directly responding to the moderator as this interaction is likely to be one that is well practiced but more contextually valid (Stewart et al, 2009).

The first aim of this study is to examine differences in the presence of smiles with affiliative or dominance intent that are made when speaking compared to listening to an argument. Such a finding would suggest that such behaviours play an important role in political discourse and furthermore suggest they are prone to specific display rules. Secondly, to examine differences in these displays between male and female politicians which would provide some support for the finding that gender-based display rules exist. To address these aims the following hypotheses are stated: 1). There will be significant differences in the valences of the affiliative and dominance displays between the male and female politician and 2). This difference will be modulated by the phase of the display i.e., there will be greater smiles in response to an individual listening to their counterpart (reception of non-verbal displays) compared to when the individual is actually speaking (transmission of non-verbal displays).

METHODS

Stimuli

Video excerpts were taken from the first of the three US Presidential debates that was held on the 26th September in 2016 between Republican party candidate Donald Trump and the Democratic party candidate Hillary Clinton. The debate itself was hosted at Hofstra University in the US and moderated by the NBC news anchor, Lester Holt. The footage of the entire debate and associated transcript was downloaded from a publicly accessible archive and consisted of excerpts that were taken from both split (which contained the images of both candidates side by side) and

switched camera feeds (which showed one or the other candidates on screen)¹. All material was edited with Camtasia Studios so that the face of the individual debater was prominent in the video window. Excerpts where the debater looked down, away from the camera view or whose faces was occluded by hands etc were removed. Excerpts were retained that clearly consisted of both debaters either transmitting or receiving (taken to be silently watching the other debater respond to the question) a non-verbal response. Therefore, a debater who was speaking directly to camera in response to a question by the moderator or in counterpoint was classified as transmitting a facial display. Conversely the debater who was watching the response and not speaking was considered to be receiving. The remaining corpus of material consisted of 26 video pairs that consisted 35 mins 21 secs of overall video footage with an average duration of 1 min 35 secs. To identify the various muscular contractions that were displayed in the excerpts all material was batch processed with FaceReader 7 (VicarVision, Ltd) and the valence of each display calculated with SPSS (see Figure .1).

¹ Both the video and transcript material were downloaded from the Washington Post website and freely available on :
https://www.washingtonpost.com/video/politics/watch-the-first-presidential-debate-in-full/2016/09/27/bce8c7c4-8493-11e6-b57d-dd49277af02f_video.html

Figure 1. Smiles of affiliation and dominance: To effectively identify and measure the full range of muscular contractions that make up the smile displays the Facial Action coding system was used (FACs: Ekman & Rosenberg, 1997). Here each of the unique muscle contractions that may occur within any given display can be coded and identified with an action unit number (AU). The accumulation of AUs can provide a unique signature for a specific facial display. Indeed, the FACs system has recently been used to identify the unique classification of both smiles displays of dominance and affiliation (Rychlowska et al, 2017). Here Rychlowska and colleagues found that affiliation could be conveyed by the contraction of the orbicularis oris that results in a closed mouth (AU 24) as well as contraction of the buccinator muscle to result in characteristic dimples (AU 14). On the other hand, dominance is conveyed by the levator palpebrae superioris and the superior tarsal muscle to raise the eyelids (AU 5), the contraction of the levator labii superioris alaesque nasi (AU 9) that results in the nose wrinkling, pars orbitalis aspect of the orbicularis oculi (AU 6) which results in the raising of the upper cheek regions and finally the levator labii superioris to elevate the upper lip (AU 10). Both smiles are also associated with the contraction of the zygomatic major (AU 12) which results in the stereotypical grin. The dominance display can be further distinguished by an asymmetrical contraction of the zygomatic major while displays of affiliation are symmetrical. Face Reader 7 (FR7) is commercially available software that utilises a computerised algorithm that can identify a particular facial state be it a display of emotion or a brow position / eye gaze etc. The software records the intensity of 20 Action units into either trace, slight, pronounced, severe or maximum intensity for each of the specific groups of muscular contractions associated with each AU. The mean valence of the action unit sets for both the affiliative smile i.e., AUs, 12, 14 and 24 and dominance smile i.e., AUs 5, 6, 9, 10, 12 were recorded. It is worth noting that FR7 records 20 AUs at the level of the 30/1 secs so for any one second of video material there is a possibility of recording 600 data points. Image depicts a frame grab from the FR7 interface of President Trump's official inauguration photograph that is within the public domain and licensed as CC-BY with all permissions. Here Trump is displaying AUs 6, 12 and 25.

RESULTS

Alpha was set at 5% and in all cases the mean percentage valence and standard error is shown.

To examine differences in the smile displays all data were entered into a 2 by 2 by 2 factorial repeated measures analysis of variance with the debater (Trump vs Clinton), non-verbal category (transmission vs reception) and the type of smile displayed (dominant vs affiliative) as within subject variables. Here, a main effect of the non-verbal category was revealed $F(1,24)=16.95$, $p<0.001$, $\eta^2=0.41$ which was driven by a more intense valence overall for those affects that were displayed when the debater was listening to their counterpart respond to the questions from the

moderator (receiving $MN = 21.19$, $SE = 1.29$ vs transmitting $MN = 15.22$, $SE = 0.93$). Differences in between Trump and Clinton were also revealed when either responded directly to the question from the moderator or waited for their turn to respond with a significant candidate by category interaction $F(1,24) = 4.06$, $p = 0.05$, $\eta^2 = 0.15$. Pairwise interrogation of this interaction revealed that Clinton was significantly more emotive when she was listening to Trump than when she directly responded to a question $F(1,25) = 8.28$, $p = 0.008$, $\eta^2 = 0.25$; $MN = 30.73$, $SE = 4.92$ vs $MN = 9.30$, $SE = 2.90$). On the other hand, Trump showed no difference in the valence of the displayed smiles across both categories $F = 1.5$, n/s. There were also differences between the two types of smiles and the candidates with a second interaction $F(1,24) = 4.41$, $p = 0.05$, $\eta^2 = 0.16$ which was driven by Clinton displaying more intense affiliative smiles than dominance smiles $F(1,25) = 9.34$, $p = 0.005$, $\eta^2 = 0.27$; $MN = 20.41$, $SE = 1.60$ vs $MN = 19.64$, $SE = 1.52$) while there was no difference in the intensity of either of affiliative or dominance smile displays that were evoked by Trump $F = 1.26$, n/s.

DISCUSSION

The current study examined differences in facial display behaviour by Donald Trump and Hillary Clinton as they engaged in the first 2016 US Presidential debate. The aim of this case-study was to examine the effects of gender on the production of smiles of affiliation or dominance. Additionally, we examined whether or not these two types of smiles were modulated by type of social interaction i.e., whether or not the transmitter of the display was responding directly to a question or watching their counterpart respond.

In nearly all contrasts the displays that were made when a politician was watching their counterpart respond to a question was more intense than those displays made in direct response. Here it would seem that while political debates do indeed encourage politicians to *'to speak a common language'* they may be at their most natural when they perceive themselves to not be the focus of attention (Hart & Jarvis, 1997, p. 1095). This also suggests that analysis of facial displays engendered during political discourse provides us with an opportunity to examine the 'honest' signals used to influence interlocutors and viewers (e.g., Crivelli & Fridlund, 2018).

The analysis of the displays of dominance or affiliation revealed marked differences between the two protagonists. Clinton displayed more intense displays of both dominance and affiliative smiles when listening to Trump whereas no differences were revealed between these two types of smiles when Trump was either watching Clinton speak or he was responding. Further analysis revealed Clinton made more intense displays of affiliation overall compared to Trump. The findings here therefore support the first hypothesis showing that more intense affiliative displays were made by the female politician when she was watching her male counterpart respond. Smile displays are largely regarded as being a fundamental mechanism to convey effective leadership and indeed there was no difference in the *number* of smiles engendered by either candidate (see e.g., Senior, 2018). Thus it may in fact be that different types of smiles play a role in the social relationships that define leadership.

That Clinton engendered more intense affiliative smiles may in part reflect a more fundamental display response that is embedded within our evolutionary history (Martin et al., 2017). Gender specific differences in the ability to establish and maintain affiliative ties where tend-and-befriend type behaviours that promote mutually beneficial access to resources ensure a peaceful environment and are based on cooperative strategies rather than aggressive and competitive behaviours that would place females at a disadvantage compared to their male counterparts (see e.g., Luxen, 2005). Here comparative sociobiology suggests that not all social bonding is dependent on consanguineal or affiliative kin bonds but that some may in fact be driven by environmental factors that incentivise females towards cooperation (Mehu et al, 2007).

Within human groups gender based cooperative strategies are thought to have evolved from the different needs for intergroup conflict for men compared to intragroup co-operation for females (van Vugt, Cremer & Janssen, 2007). Indeed, the mechanisms for such intragroup co-operation are so significant that behaviour that may facilitate a co-operative environment has also been seen to manifest itself with female managers during employment interview scenarios (Senior et al., 2007). It may seem that despite the negative connotations underlying the perception of a smile

from a female politician (Bauer, 2015) there remains immense utility in the effective use of its various forms in contemporary social intercourse (Centorrino et al., 2015).

With the above in mind it is worth considering if the effective use of smiles by females would have a positive impact in the field of high politics? There is no doubt that gender-based cues drive voter preferences alongside the aligned political context (Grabo & van Vugt, 2018). A candidate displaying feminised facial features is likely to be favoured by the voting public when confronted with a contextual situation that is firmly co-operative in nature (Senior, 2018). Indeed the 2016 presidential election was polarised insofar as Trump had a clear campaign platform while Clinton's was often judged to be ambiguous (see e.g., Linsky, 2016). Trump's campaign strategy which was clearly based on a threat to the social status of the privileged few was clearly the more effective (Mutz, 2018). It could be argued that the paucity of affiliative gestures displayed by Trump was congruent with his overall campaign message.

There are obvious limitations to this initial study that highlight the importance of replication. First, the present study is solely a case study of a political debate, albeit an important one. While the case study approach is a necessary and externally valid one, the findings should be considered exploratory until further work is carried out with a wider collection of political exchange types such as speeches, interviews, and hearings and with other politicians. Furthermore, this study did not consider how a particular display evokes different responses in others. Strictly speaking each of the debaters were responding in a very controlled environment where turn taking was implicitly agreed upon and followed.

There is also the possibility that the act of speaking may mitigate the intensity of various muscular contractions that would have been produced as each candidate responded to the moderator. The interrogation of the category by candidate interaction in the present data revealed differences in the reception stage of the non-verbal display only hence rendering this outcome unlikely in the present study. Future work should explore these areas along with the study of other social displays

such as pride and shame in fully understanding the complex social interplay of power within political discourse.

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