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Investigating Verbal Utterances and Nonverbal Gestures When People Deliberate About Impressions

By

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Individuals communicate using both words and gestures. Spoken words and gestures work together to form a single unique communication system (Bernardis & Gentilucci, 2006), which facilitates understanding of cognition (Butcher, Goldin-Meadow, & McNeill, 2000; Goldin-Meadow, 2000). Gestures are a universally employed modality. Individuals, including those who are blind, spontaneously gesture without being taught to do or having seen others doing so (Iverson, Goldin-Meadow, 1998). For the deaf community, gestures are used for linguistic functions as well as co-production of sign language (Emmorey, 1999; Duncan, 2005). Early on in development, pre-verbal infants use gestures as a way to communicate with adults, e.g. pointing at items that cannot be reached by themselves (Mood, Szarkowski, Brice, & Wiley, 2020). In short, gestures are important as not only a tool for communication, but also a vehicle to reflect thought.

The use and influence of gestures are revealed across a variety of contexts. Previous research had indicated that when people describe spatial information such as actions, motion, and orientations, their gestures tend to be significantly helpful in conveying the message compared to verbal expression (Parrill, 2010; Sekine, 2009; Marghetis, McComsey, & Cooperrider, 2020). Imagine this everyday scenario: you are asked by a visitor in your hometown how to get to the nearest shopping mall, and you know it is right next to a very tall and salient building such as Big Ben. When you describe the route to the visitor, you would probably say “do you see that tall building? The shopping mall is on the right side of it”. With that as your verbal instruction, your hand would probably point at the outstanding building and then sweep to the right side back and forth. The above example illustrates one of the contexts where people use gestures to describe things that physically exist (Marghetis et al.i, 2020). When describing something that is abstract that cannot be seen or touched, such as time, individuals were found to use both lateral (left and

right), and sagittal (back and forth) gestures to indicate future and past (Walker& Cooperrider, 2016). In addition, gestures may add to or even exceed verbal expression and influence outcomes for the self as well as the other in a communication or learning. For example, Singer and Goldin-Meadow (2005) found that in a mathematical class, when the teacher's speech revealed one strategy while the gestures were suggesting another strategy, students performed better on the posttest exam than if the teacher taught the two strategies in speech. Moreover, students learned better when the two strategies were presented one in speech, one in gesture, than both presented in speech, suggesting the influence of gestures on learning. Taken together, these studies highlight the impact of gestures on cognitive processes.

As a communication tool, gestures are arguably social in nature, meaning, its underlying function is to promote social understanding. Past research has found that while individuals' explicit racial attitudes are reflected via their verbal behavior, one's implicit attitudes may be revealed via nonverbal behaviors (Dovidio, Gaertner, & Kawakami, 2002), suggesting that gestures may serve as a window to one's general beliefs and attitudes about social groups. This finding also opens up the possibility that when people inadvertently gesture as they speak, their implicit thoughts may be revealed, and the information that gestures convey, can be gathered by others. In every social interaction, individuals form impressions that are largely influenced by the stereotypes people have toward others (Grant & Holmes, 1982). These stereotypes can be learned from both people's proximal features (parents and peers), and distal features (institutional and social norms; Bronfenbrenner, 1977); and learned explicitly from others' verbal languages, and implicitly from others behaviors (teacher smiles more at White students; Bigler & Liben, 2006, 2007; Pauker, Brey, Lamer, & Weisbuch, 2019). According to the Stereotype Content Model (SCM; Fiske, Cuddy, Glick, & Xu, 2002), the formation of impressions

(stereotypes) of oneself (Abele et al., 2016; Wojciszke, Abele, & Baryla, 2009) and others can be captured using two dimensions: competence and warmth. Competence refers to people's capability, status, and assertiveness; while warmth refers to people's level of trustworthy and friendliness. Durante et al. (2013) tested this model across 37 countries, and found cross-cultural support for SCM. Additionally, Fiske et al. (2002) found that individuals who are considered high in one dimension do not necessarily also score high in the other dimension. For example, older people are traditionally categorized as being a low competence group (low status), but high in warmth (caring). Furthermore, we want to talk about emotions that can be triggered by impressions of competence and warmth in order to further understand the reason to conduct this study. When people stereotypically "label" others with categorizations across the competence-warmth category, four different emotions (prejudice) can be elicited. (see Figure. 1; Fiske et al., 2002).

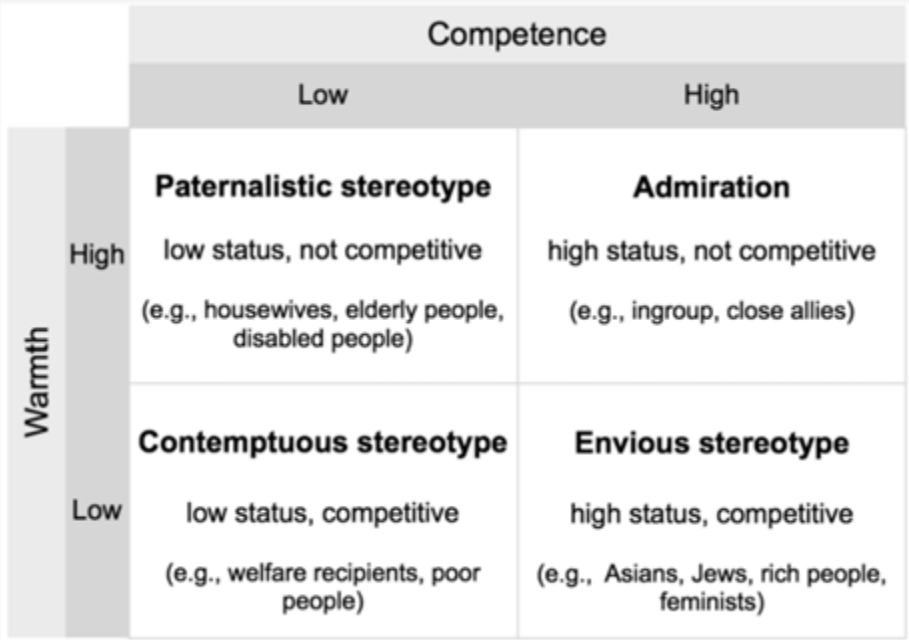

Figure 1. *Source:* Fiske, Cuddy, Glick, & Xu (2002).

Low in competence and high in warmth (LC-HW) groups tend to be empathized (Haddock & Zanna, 1994). High in competence (e.g. status) and low in warmth (HC-LW) social groups tend to trigger envy (Glick, Diebold, Bailey, Werner, & Zhu, 1997). High competence high warmth (HC-HW) perception triggers admiration emotion, while low competence low warmth (LC-LW) condition triggers disgust (contemptuous) emotion (Glick et al., 1997). As a result, within the emotional categories, people from different social groups are also divided into categories. For instance, middle-class individuals are often classified into the HC-HW condition; contrary to homeless individuals who are sorted into the LC-LW condition (Figure 2; Fiske, Cuddy, Glick & Xu, 2002). These emotions, and feelings of prejudice, may indirectly dictate social behaviors (discriminations; Cuddy, Fiske, & Glick, 2007). Coupled with the use of gesture, it is possible that implicit attitudes (such as group-based stereotypes or prejudice) toward an individual or a social group may be inadvertently expressed by the use of gestures, and subsequently, inform perceptions and attitudes of the receiver, thus lead to receiver's discrimination behaviors toward certain social group. As a result, it is crucial to explore whether gestures can reflect one's implicit mind such as social attitude. If gestures can indeed reveal social thought, their role in impression formation warrants further investigation.

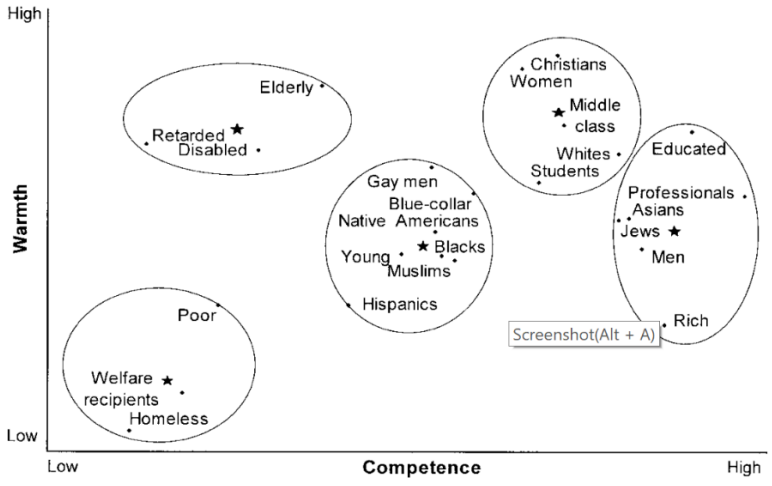

Figure 2. *source:* Fiske, Cuddy, Glick, & Xu (2002).

The current study examines what pattern verbal languages may indicate when participants discuss of warmth and competence of protected and unprotected groups. As well as how non-verbal gestures may communicate impressions. In particular, what gestures people tend to use when they are talking about impressions of competence and warmth. We propose that people tend to use different gestures when they deliberate on competence versus warmth. Researchers have suggested that competence is related to social status, which means individuals from high status groups tend to be considered having high competence level (Caprariello, Cuddy, & Fiske, 2009). In addition, social status is described using vertical hierarchy (Fiske & Bai, 2020), or "social ladder" which indicates that social status can be expressed on a vertical plane (Kraus, Tan, & Tannenbaum, 2013). Therefore, there is a possibility that social status and competence are described by people using vertical movement. On the other hand, in terms of warmth, we found that people tend to avoid (push away) untrustworthy faces, while approach (pull closer) trustworthy faces; and there is a significantly higher trustworthy score when people viewed faces with their arms flexed (potential of pulling movement) than extended (potential of pushing movement; Slepian, Young, Rule, Weisbuch, & Ambady, 2012). Accordingly, this might be indicating that people possibly use sagittal movement to describe warmth. We predict that greater numbers of vertical gestures will be used when participants are describing competence than warmth. We also predict that greater numbers of sagittal gestures will be used when participants are describing warmth than competence. The following paper will be consisted of a small portion of quantitative analysis, and mainly qualitative analysis of six partially coded participants and two fully coded participants.

Method

Participants

Eight young adult participants (all female, five were in the competence-first group; three were in the warmth-first group) (M = 19.88 years, SD = 1.84 years) were recruited. Among all the participants, four were Caucasians, three were Asian, and one was Latino. Participants were either undergraduate students who responded for course credits or were recruited online through Prolific in response to a compensation of 10 dollars per hour of participation.

Procedure

All procedures were completed and recorded using Zoom. We conducted a within-subject design experiment - all the participants commented on both competence and warmth dimensions of all groups employed in the study. However, there was a counterbalance manipulation where participants were randomly assigned into two groups, “competence first” group – where participants received competence-related questions first, or “warmth-first” group – where participants received warmth-related questions first. The angle of the laptop camera and the participants’ distance from the camera were calibrated to ensure the top of their head to the tips of their fingers when their hands were down were clearly captured. The experimenters were told not to use any other gestures except for one emblem gestures – the “okay” sign – during this period of experiment.

All the participants were asked two types of questions in the same order for each dimension. There were two filler questions at the beginning of the process, used as “warm-ups” for participants (e.g. “What do you think of donuts and bagels?”). Next, participants commented on either the competence level or the warmth level of a single social group (e.g. competence for doctors; and warmth for nurses). Then they compared two social groups in terms of either their

competence or warmth. Participants who first commented and compared the competence of groups, then commented and compared groups on warmth, and vice-versa, resulting in four tasks per participant (See Appendix A and B for the experiment script for competence-first and warmth-first participants). Groups for use in the study were selected based on prior work (Fiske & Dupree, 2014; Imhoff, Koch, & Flade, 2018). For example, groups that were employed for participants to comment on competence needed to be the groups that have shown to vary (or not) systematically from other groups in the list in terms of competence. And the groups needed to remind individuals of their competence. For instance, doctors and nurses are both seen as HC-HW groups but doctors are more likely to remind us of their competence, and nurses of their warmth (Nicolas, 2021). This helped us ensure that gestures for one dimension are not likely to be confounded by other dimensions that may come to mind.

After the tasks were all completed and recorded, participants were then given a series of questionnaires to complete, which included a demographic survey, an experimental purpose questionnaire that assessed whether participants knew the purpose of the experiment (see Appendix C for more details). After the participants finished these questionnaires, they were debriefed, and told the real purpose of the study. Coding was completed using ELAN (Sloetjes & Wittenburg, 2008). First, participants' utterances were coded using a verbal manual, and categorized in terms of their competence and warmth according to the SG Dictionary (A dictionary with more than 10 thousand words that were rated with their competence and warmth level; Fiske, 2020). Then, using the gesture coding manual, gestures were marked within the coded utterances, using labels "vertical" or "sagittal".

Results

Utterances Analysis

We conducted both quantitative and qualitative analysis for utterances. When participants were asked about competence questions, out of 368 utterances, 330 (89.67%) competence utterances were used compare to 38 (10.33%) warmth utterances. And when participants were asked questions about warmth, out of 462 utterances, 431 (93.29%) were about warmth compared to 31 (6.71%) utterances about competence (see Figure 3 a & b). A Mann-Whitney test indicated that participants were able to answer the questions with the correct dimensions, in other words, they used much more competence utterances (*Mdn* = 33) than warmth utterances (*Mdn* = 3) in answering competence questions ($U = 64$, $z = 3.31$, $p < .01$). Similar pattern also applied when warmth questions were asked: a significantly higher amount of warmth utterances (*Mdn* = 44.5) were used than competence utterances (*Mdn* = 2.5; $U = 64$, $z = 3.32$, $p < .01$).

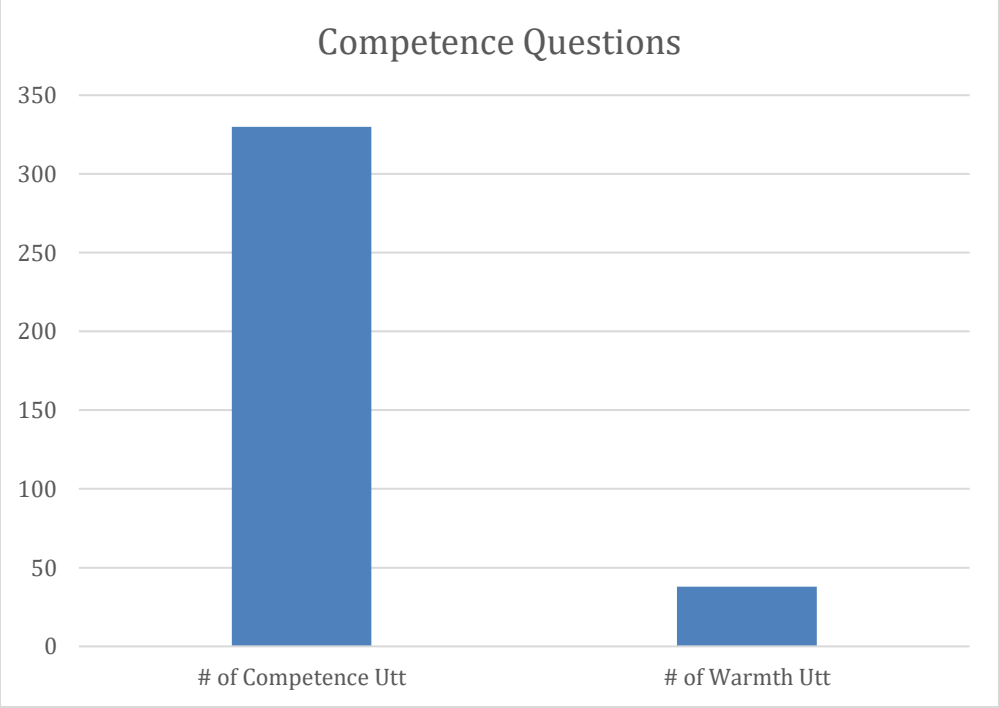

Figure 3a. 330 (89.67%) competence utterances were used compare to 38 (10.33%) warmth utterances.

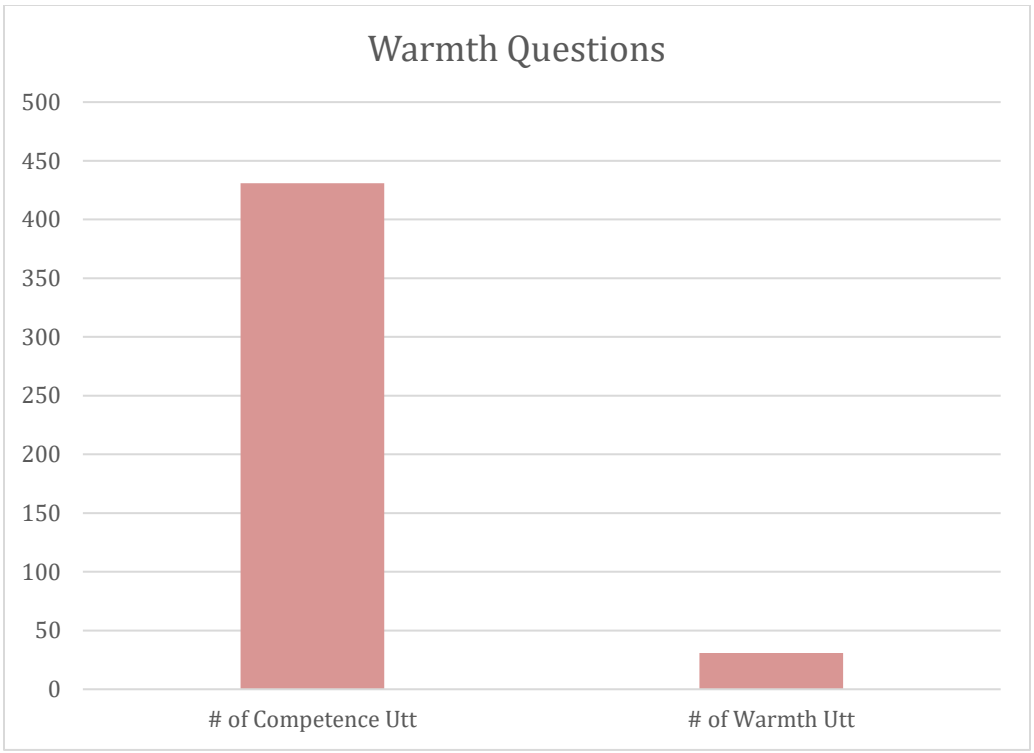

Figure 3b. 431 (93.29%) were about warmth compared to 31 (6.71%) utterances about competence.

Among the total of 830 utterances used by all participants, the overall number of warmth utterances used when participants were talking about warmth questions is 431 (51.92%), compared to 330 (39.76%) number of competence utterances used for competence questions. Participants tended to elaborate more in response to warmth questions than competence questions. However, a paired t-test indicated that this difference was marginal (t (7) = 2.18, p = .064). Interestingly, when the participants were asked about one dimension and in passing, they also commented upon the other. Thirty eight out of 830 (4.58%) warmth utterances were used to answer competence questions, and 31 out of 830 (3.73%) competence utterances were used in warmth questions.

Another intriguing pattern that emerged was for the questions about a particular group comparison – Christians and Muslims. Among 38 warmth utterances used in competence

questions by eight participants, the question that compares Christian's competence level and Muslim's competence level displayed the largest portion of warmth utterances (11 out of 38, or 28.95%), which might be signifying that when it comes to deliberation on religious groups, people automatically bring in concepts that are related to warmth, even if the question is asking about competence. For instance, when asked if the two groups have the same competence level, one participant stated that "I have heard a lot of people who destroyed churches…" (warmth utterance), then some other utterances in between, and she continued "If they (religious people who do not destroy the churches) are proud of their religions, they should stand up for themselves" (warmth utterance). And then after she finished her declaration about the difference between devout people and non-devout people with warmth utterances, she concluded and went back to competence: "but in terms of competence, they are the same". Similarly, another participant also made a shift of category in her utterances comparing these two groups: she first talked about the difference in competence level that the society view these two groups "(Christian is considered more competent by the society because) it is generally being seen as a more dominant religion…" then she shifted to warmth of Muslim "9/11 is a huge reason for the dismiss of Muslim people, even though my impression about Muslim are their kindness…". Anecdotally, when asked to talk about religions, participants tended to include warmth concepts even if the question intended was competence-based.

While seven out of the eight participants had an unreliable difference between the numbers of utterances they utilized for one dimension of the questions versus the other one. For example, 49 (98%) warmth utterances were used by one of the participants when she was responding to the warmth questions compare to only one (2%) competence utterance were used there; and 34 (91.89%) competence utterances were used for competence questions while only

three (8.12%) warmth utterances were used. Participant A's response was particularly informative because her counts of the utterances utilized for one dimension is close to the other one: among 31 competence-or-warmth utterances she utilized to answer the competence questions, 16 (51.61%) were about competence, and 15 (48.39%) were about warmth; similarly, among 56 utterances she used for responding warmth questions, 46 (82.14%) were about warmth, 10 (17.86%) were about competence. So, we examined her responses specifically in detail. We observed that when she talked about disabled people and non-disabled people (the groups of disabled is also considered a PC group) in terms of their competence, she compensated her negative statement toward the competence level of disabled group with a positive warmth statement: "They (disabled people and non-disabled people) are obviously different, there are a lot of thing that disabled people cannot do". The word "do" is a competence word according to the SG dictionary, so it is considered a competence utterance with a negative tone in it (cannot do), then she right away compensated that: "society tries to help them" (warmth). Similar pattern appeared in her later statement about the same question: "even if the disabled people have more (experiences than non-disabled people), they (the job interviewer) are not gonna hire, because you are disabled", followed by a defending statement that "I think the society does not support the disabled people as much as they were supposed to be supported" (warmth). Similarly, another participant also made such a compensation: "Christian is a more dominated religion in the US" (indicating the negative competence of Muslim), followed by "I focus on Muslim people's kindness…" later in her answers. Narratively, participants tend to compensate with positive warmth when they mentioned negative competence of social groups.

Interestingly, this "compensation" only happened when the participants talked negatively about a group's competence level, and then made up with warmth in a positive way, but similar

result did not really happen when the participants were talking negatively about warmth (and compensate with positive competence). When participant A expressed something negatively about the warmth level of black people, she immediately compensated it with some warmth utterances (although the compensation was the negative warmth of white people). She said that "(our society thinks) black people do bad things" (warmth), and instead of continuing with positive competence utterances toward black people, or negative competence speaking of white people, she said that "but white people do bad things as well", which is a negative warmth utterance toward white people.

Gestures Analysis

General Analysis of Gestures

We conducted only qualitative analysis for gestures. Among the two participants we coded for both utterances and gestures, we found that greater numbers of vertical gestures were used by both participants when they were deliberating on competence. Participant A used in totally 33 gestures during the session, 16 (48.49%) were vertical gestures when she was elaborating on competence, compare to seven (21.21%) sagittal gestures. Participant B displayed a similar pattern that among 81 gestures she made during the session, 39 (48.15%) were vertical gestures used for competence, while only 12 out of 81 (14.81%) sagittal gestures were used (see Figures. 4a & b). We also found that other than vertical and sagittal gestures which we were mainly interested in, there were a large amount of horizontal gestures being used in deliberating competence as well (participant A used 10 out of 33 – 30.30% horizontal gestures, while B used 30 out of 81 – 37.04%).

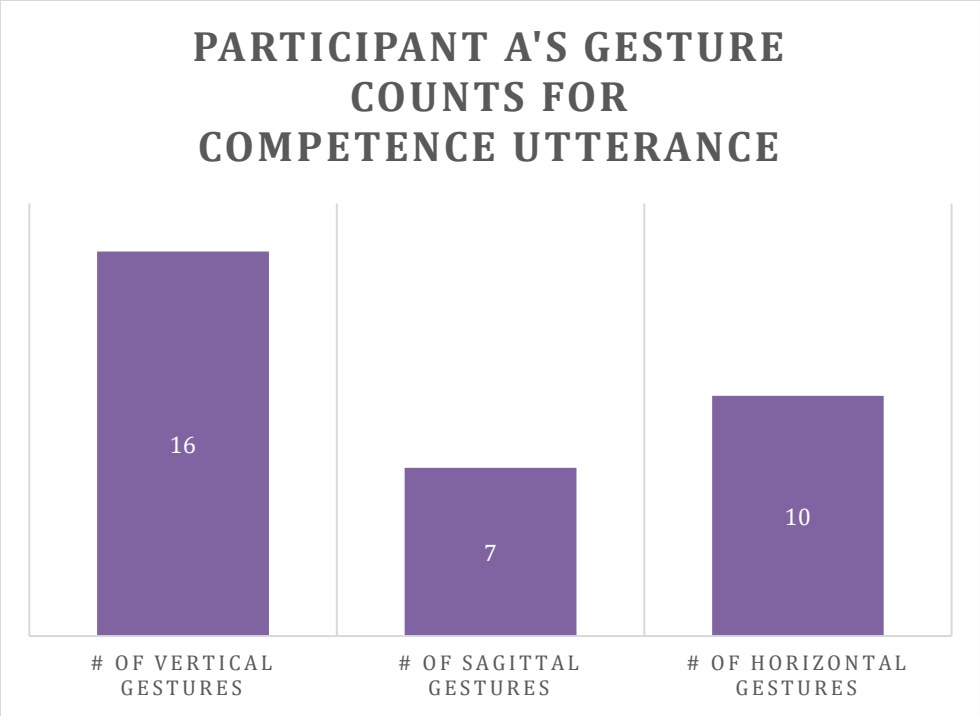

Figure 4a. 16 (48.49%) vertical gestures, 7 (21.21%) sagittal gestures, and 10 (30.30%) horizontal gestures were used.

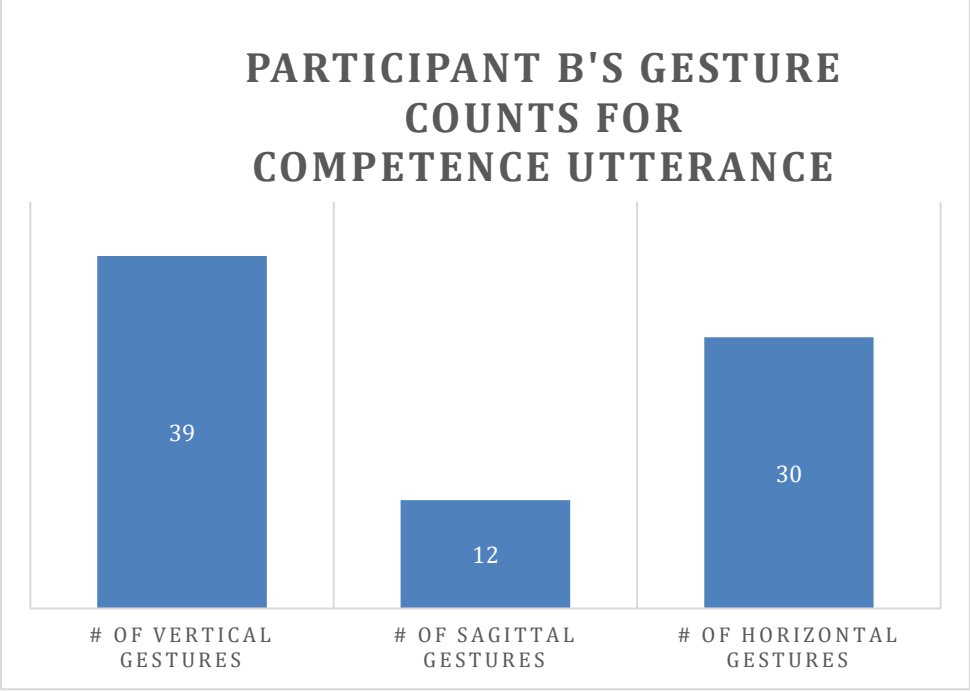

Figure 4b. 39 (48.15%) vertical gestures, 12 (14.81%) sagittal gestures, and 30 (37.04%) horizontal gestures were used.

On the other hand, when both participants deliberated on warmth, unlike what we predicted in the hypotheses that more sagittal gestures will be used, we found a similar pattern as when participants were talking about competence. More vertical gestures were used than sagittal gestures: participant A used 42 (46.67%) vertical gestures compare to 26 (28.89%) sagittal gestures (see Figure. 5a); and participant B used 21 (38.18%) vertical gestures when she was elaborating on warmth, while only 10 (18.18%) sagittal gestures were used (see Figure. 5b). Similarly, we also found a large amount of horizontal gestures being used in this situation (22 – 24.44% were used by A, and 24 – 43.64% were used by B).

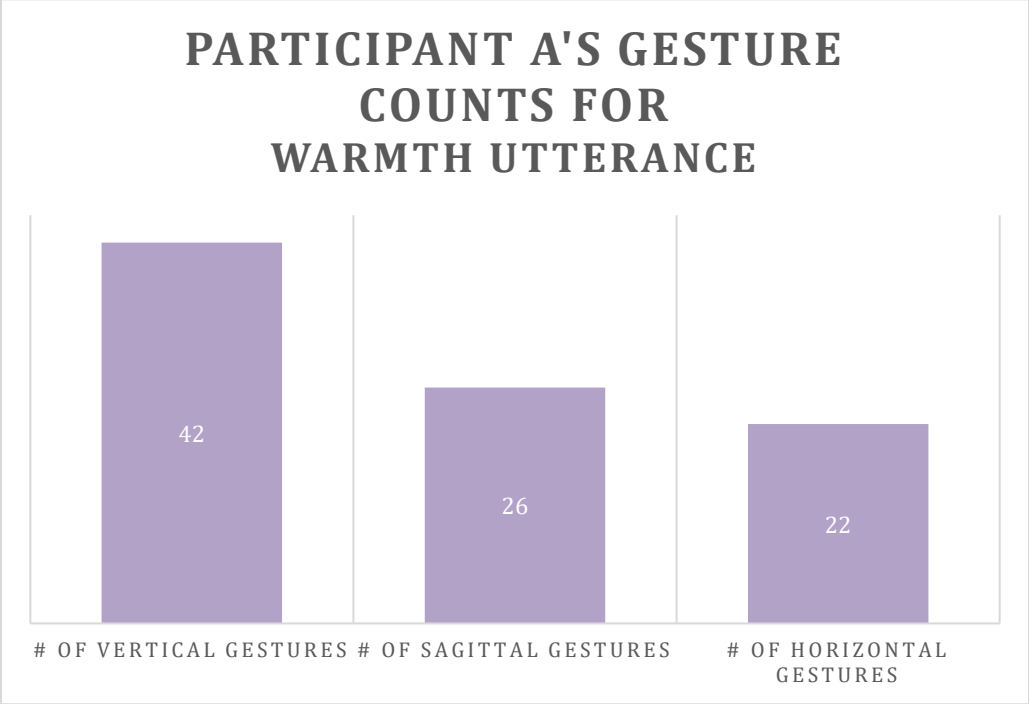

Figure 5a. 42 (46.67%) vertical gestures, 26 (28.89%) sagittal gestures, and 22 (24.44%) horizontal gestures were used.

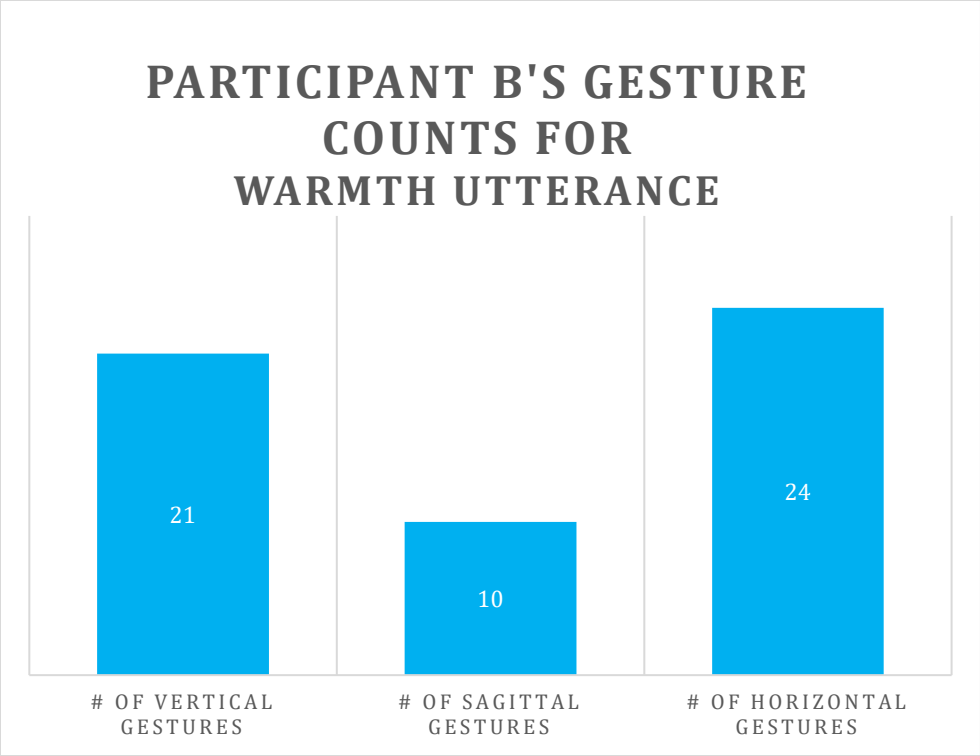

Figure 5b. 21 (38.18%) vertical gestures, 10 (18.18%) sagittal gestures, and 24 (43.64%) horizontal gestures were used.

Non-comparative & Comparative Competence Gestures Analysis and Examples

Since our exploratory results are counter to what we hypothesized, we examined participant A and B's responses to see if there are any noteworthy pattern of gestures that the two participants indicated. As we mentioned before, participants tended to use a large amount of vertical gestures for competence utterances, and these gestures were usually straightforward, with clear borderlines. Here we want to talk about gestures in two ways: gestures for non-comparative utterances and gestures for comparative utterances. Non-comparative utterances refers to the comments toward one single social group, where we found that the participant tend to use vertical movement gestures.

Example 1: when participant B was answering competence questions, her hands moved up and down directly – When she talked about CEOs as a social group, which most of the people

consider them as high competence (Fiske, Cuddy, Glick & Xu, 2002), she explained that “They (CEOs) were able to make business, they were able to elevate themselves…” (competence utterance), while making a straight linear gestures from the height of her waist to the height of her chest (see Figure 6a & b).

In contrast to that, comparative utterances refer to the comparison between the competence of two social groups, and we found that the participant tended to use posited gesture. Example 2: When participant B was comparing disabled people and non-disabled people, and expressed that there is a difference between the two groups, a noticeable gesture that we hoped to observe appeared. When she explained that “(in terms of their physical competence) disabled people would be considered less than non-disabled people” she posited her left hand, which represented disabled people, around the height of her waist; while her right hand which meant non-disabled people around her chest, which created a difference of height with the more competent group on top and the less competent group below (see Figure. 6c). A similar pattern was also found in her answers toward other groups comparison such as Black people and White people. This is a particularly interesting finding, given the fact that when she was thinking about the differences in her mind (and expressing it), her hands were also indicating her internal thoughts.

Example 3: Unlike participant B, participant A did not show such a distinct vertical movement during her speech about competence, rather her movements were more like riding a bicycle with her arms: a mixture of vertical and sagittal movement, drawing circles in front of her body. However, there indeed were some noticeable movements of participant A: when she deliberated on competence, her hand shape tended to be flat and straight, and the two hands

tended to move away from each other; compared to her warmth gestures where her hands were more likely to be curved and were usually staying at the middle of her body.

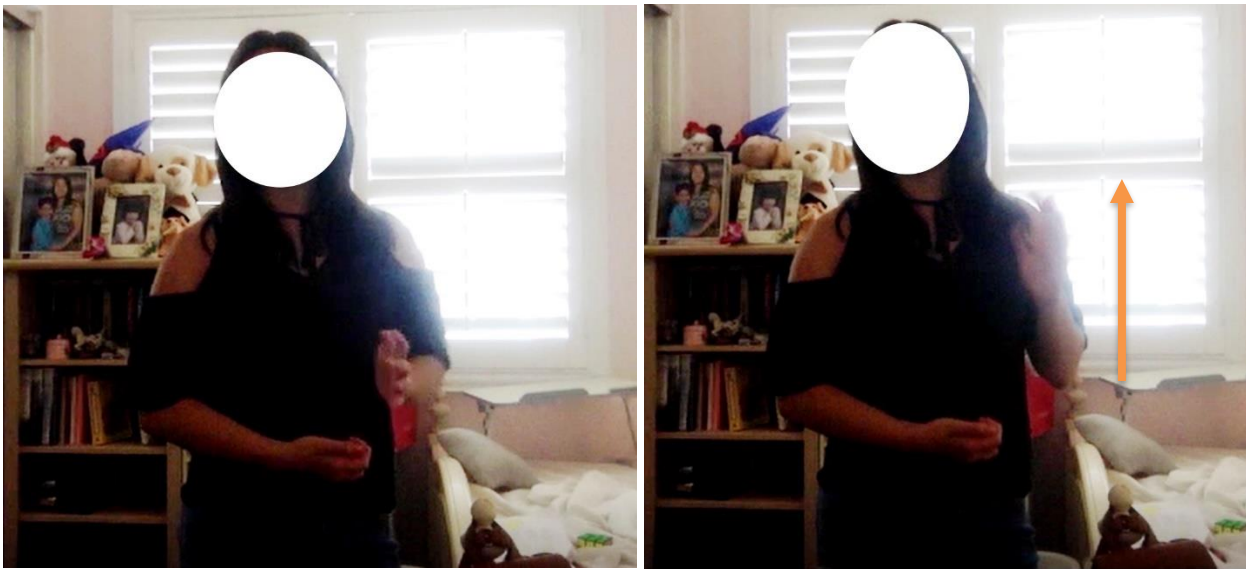

Figure 6a & b. Linear vertical gesture moving straight up.

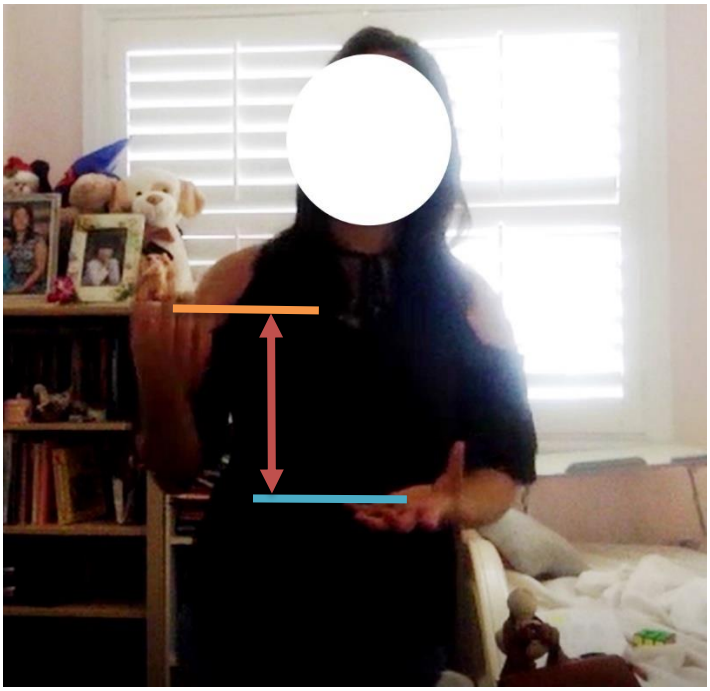

Figure 6c. The participant created a difference in height when she was talking about disabled people and non-disabled people.

Non-comparative Warmth Gestures Analysis and Examples

As for warmth, we also found some typical gestures used by the two participants during their speech. Example 4: When participant B was answering non-comparative questions with warmth utterances, the pattern of her gesture became more complicated and ambiguous; but she seemed to be creating a sphere space with both her arms and hands. when she explained that "(In terms of their warmth) people do see politicians in a negative way…", her palm and fingers curved into a shape as if she was holding a ball in her hand, and the movement of her arm was no longer clearly moving straight up and down, instead, it was making a subtle curve that pushed her hand slightly away from her body (see Figure 7a & b). However, the more obvious movement was still a change of the height of her hand (we marked it as a vertical gesture instead of a sagittal gesture).

Example 5: Another typical "circling" gesture that participant B presented all the time during her non-comparative warmth talk was the "parentheses" gesture: her two palms would be facing each other, with the same round handshape as if she was holding a bowl. Then she would move her two hands up and down to draw a circle without the top and the bottom part, which formed a shape like a parentheses (see Fig. 7 c & d). Alike the other gesture she made, this parentheses movement was considered a completely vertical movement, but it was also very different from the vertical movements when she was elaborating on competence.

Example 6: Comparably, participant A also used such hand shape when she was talking about warmth, especially when she mentioned words such as "help", or "support". For instance, "we try to support them" (warmth utterance), her fingers curved and formed the parentheses shape to "support", and her hands tended to stay close to each other; which was different from her relatively flat and separated hand shape when she was talking about competence.

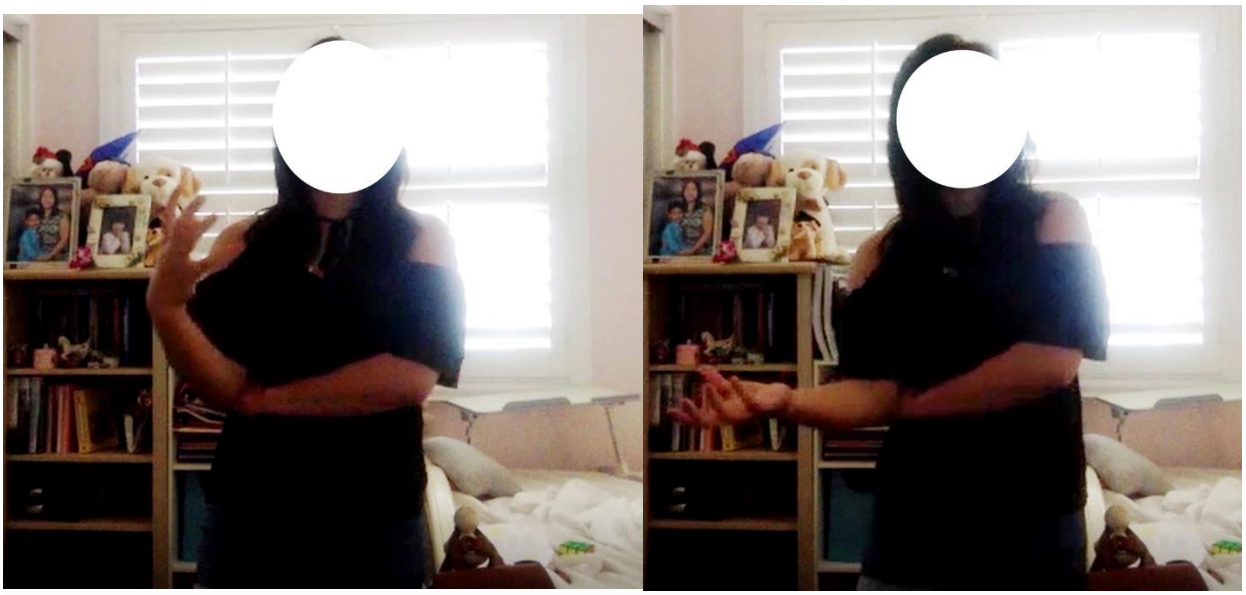

Figure 7a & b. The participant's fingers were curved; the movement of her arm was mainly vertical, with subtle sagittal movement.

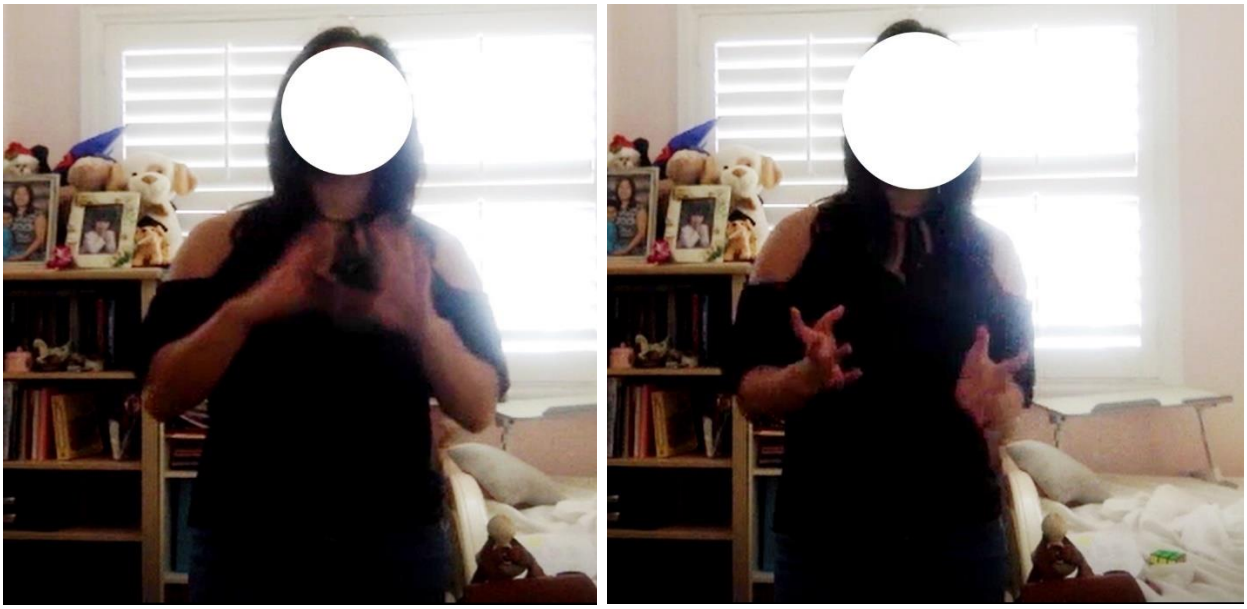

Figure 7c & d. Parentheses movement.

Comparative Warmth Gestures Analysis and Examples

Example 7: In terms of the gestures comparing the warmth level of two social groups participant B followed her general "rule" of making round shape with her arms and hands. However, other than the shape, the overall movement pattern also indicated some intriguing

changes toward a horizontal way. For instance, when she explained that “people perhaps would not view black people as warm as white people”, other than positing her hands in a shape as if there was a ball in between and moving vertically; she turned her body from left (black people) to right (white people) which led her arms move as well, therefore formed a horizontal linear movement at the same time (see Figure e & f). Similar horizontal movement happened later in her speech of comparing disabled people and non-disabled people, she said “I would say that hopefully society would view them (non-disabled people) as warmth in comparison (with disabled people)”, while moved both of her hands together from one side to the other for a few times, which also formed a horizontal line to indicate that she was comparing two social groups. Close to what she did, participant A also made that horizontal movement of turning both of her hands together from one side to the other when she was comparing two social groups.

Example 8: Horizontal movement were used many times during participant B’s speaking of warmth: in addition to the movements of both hands from one side to the other, we also found a “sweeping” gesture that was also utilized as a “comparing signal”. When participant B stated that “I don’t think they (the society) would consider either group (disabled people or non-disabled people) in a negative way”, she put her hands in the middle, then sweep to the opposite side and then come back to the middle like the movement of opening and closing two gliding doors (see Fig. 7g & h). These horizontal movements (with round hand/ arm shape) seems to form a pattern that may also be worthy to investigate.

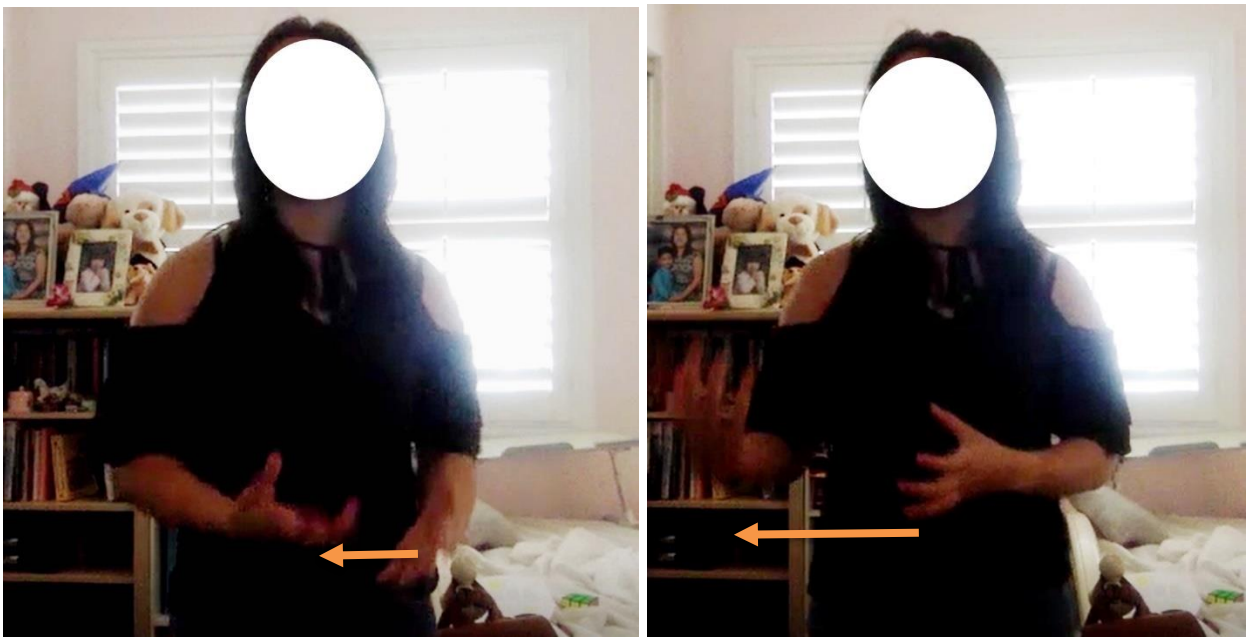

Figure 7e & f. Horizontal linear movement.

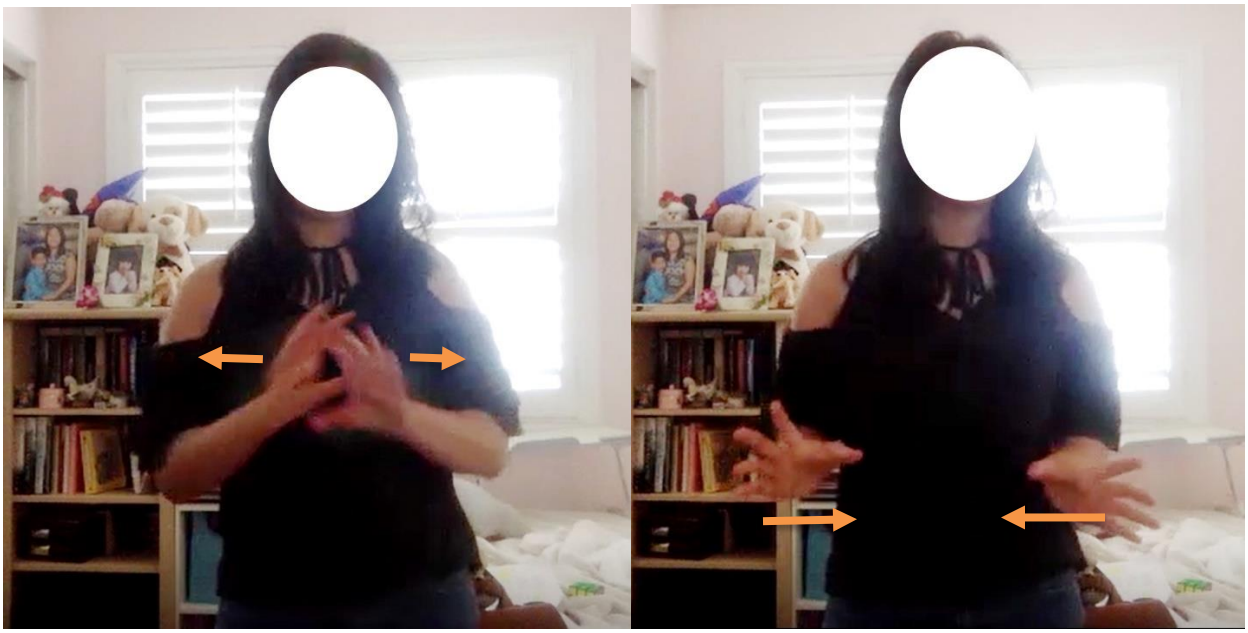

Figure 7g & h. “Sweeping” horizontal movement.

Discussion

The current paper serves mainly as an informative proof of concept examining what gestures individuals make when deliberating about other social groups. We will first discuss the patterns of utterances and gestures we found, and their potential implications. Within these implications, we recommend possible future investigations on these topics. We will conclude with deliberations on methodology in studying the usage of gestures in social psychological reasoning – comparing and contrasting qualitative and quantitative methods, and the limitations.

Overall, participants responded accordingly to questions regarding each of the two dimensions – warmth and competence, although a discussion of the other dimension within the same question seemed to be unavoidable; and this "mismatch" of the dimensions happened during both commenting on a single social group and comparing two social groups. When being asked about the competence of a social group, participants talked about competence mostly, with a few comments on the warmth of that group, and vice versa. This inevitability may be explained by SCM (Fiske, Cuddy, Glick, & Xu, 2002), that social perceptions are mainly generated from competence-warmth dimensions and they are usually not mutually-exclusive, but orthogonal (e.g. high competence – low warmth), thus when one dimension appears in mind, the other one often automatically does too. However, the unreliable distinct differences of the number that participants used for answering the questions might be indicating that people's judgements of competence and warmth are independent from each other. In other words, adult participants seem to judge competence and warmth distinctively. This discovery is in line with Roussos and Dunham (2016)'s findings about adults. However, unlike adults, Roussos and Dunham (2016) also found that children do not distinguish warmth to competence as much. Therefore, future directions can explore the differences between adult and children's judgements of the two

dimensions by asking adult and children respectively their opinions about social groups in terms of competence and warmth, and investigate the differences among the two groups.

Moreover, while anecdotal, we observed that participants used more warmth utterances in their responses. Research had shown that compared to the competence level of a brand, the warmth level of a brand is the key driver of the brand identification, which as a result lead to purchase intention of customers (Kolbl, Arslanagic-Kalajdzic, & Diamantopoulos, 2019). Coincidentally, warmth is a more influential trait for voters in evaluating a political candidate than competence and its relevant traits such as leadership (Laustsen & Bor, 2017), suggesting that warmth may be emphasized differently compared to competence. Combined with the findings that adults and children perceive competence and warmth differently (Roussos and Dunham, 2016), future work on the utterance dimensions of warmth and competence should examine potential differences across development to better understand this difference.

We also observed the use of positive warmth utterances to compensate for negative competence utterances. In other words, if one social group was evaluated as less competent than the other one, participants were likely to follow up a positive comment about that group immediately. However, we could not find such a compensation the other way around – the participants did not compensate for negative warmth with positive competence. Previous research has offered some evidence that are consistent with our findings partially. For instance, Kervyn, Yzerbyt, and Judd, (2010) argued that when comparing two targets in competence-warmth dimension, if one target was judged more positively in one of the dimensions, the second one would be judged more positively in the other dimension; but according to their findings, such a compensation rule was found in both directions (warmth compensating for competence, as well as competence compensating for warmth), which we only found it in one direction (warmth

compensate for competence). Similarly, Holoien and Fiske (2013) also found a unique compensation between warmth and competence: if the participants wanted to be considered more competent, they would downplay their own warmth, and vice versa. Interestingly, we only found participants used warmth utterances to compensate for negative competence. This might be due to the usage of a different method of collecting data: unlike the previous studies that asked participants to make choices, we let the participants talked freely about their opinions. It is possible then that when participants use free speech to talk about the two dimensions of social groups, their judgements can vary from using other forms such as multiple choice or questionnaires.

Consistent with our initial hypothesis, participants used more vertical gestures for competence utterances. This result is consistent with previous research that demonstrated competence and status are usually measured using vertical hierarchies (Fiske & Bai, 2020; Kraus, Tan, & Tannenbaum, 2013). Moreover, we also found that when the participant was comparing disabled people and non-disabled people, and considered their competence level differently, she gestured by positing her hands in different heights. This finding deserves further investigation because the participant was gesturing out her internal opinions without realizing it. It is possible that gesturing along with inner perception is an automatic behavior people possess when they are talking and thinking, and that gestures can "reveal the truth" when our verbal content mismatches our mind. Future investigations will need to examine occasions when one's speech is indicating one way in social dimensions, while the gestures are indicating the opposite.

On the other hand, instead of simply using sagittal gestures (as we originally hypothesized), the two participants in the current study exhibited a round or sphere space with their handshape and arms when gesturing, suggesting that the pattern of gestures for the two

dimensions are traceable. Just like the Kiki-Bouba effect (Kolher, 1929), where adult automatically associate certain speech sound with shapes (Kiki with the spiky shape and Bouba with the round shape); we speculate that it is likely that individuals might link gestures that move up and down (vertical) with competence speech, and connect gestures that create a sphere space with warmth speech. Future studies should use a different method that where video clips that contain explicit vertical or round gestures are created while they verbally comparing two targets in competence-warmth dimension. Doing so would allow participants to make comments or choices about dimension, competence and warmth to test the linkage between gestures and speech of social dimensions.

We outline several limitations and constraints in the following paragraphs. First, we had a small sample size which can restrain the accuracy of our statistical analysis for utterances. Moreover, we only analyzed gestures from two participants which restrict the scope of our interpretations. Furthermore, the manual we utilized during gesture coding did not cover complicated movements of hands. The hand movement of one participant exhibited subtle sagittal direction; however, it was ignored and was only coded as vertical gesture. Similarly, the parentheses gestures were also coded as vertical, although they indicated curving movements, which could have led to a larger amount of coded vertical gestures. Future work can extend our findings by adjusting the manual used to encompass a greater scope of gesture type (e.g. ‘sphere gestures’).

The current paper is a proof of concept paper with mainly qualitative analysis and only a small portion of statistical analysis. A lack of quantitative analysis can be a limitation that it is hard to replicate our results due to the lack of data and systematical statistical methods, which decreased the external validity of our study (Rahman, 2016). Moreover, quantitative approach

can focus and test on a specific phenomenon we wanted to study in a population, thus, the qualitative findings in our study need to be tested by data and quantitative approach in order to be validated (Rahman, 2016). While our conclusions are limited by the fact that there is little quantitative backing, we argue that qualitative methods can provide several unique angles. First, in-depth analysis of observations can be provided. In comparison, quantitative analyses only provide a snapshot of a phenomenon, and can sometimes overlook the participants' experience as well as the meaning behind it (Rahman, 2016). Second, qualitative analysis can be seen as the ingredient that we are able to use to be creative in doing research (Graebner, Martin, & Roundy, 2012).

In our case, although past work has examined either SCM or gestures, few have combined the two together to look at the gestures used while talking about the warmth and competence of social groups. Therefore, by taking a qualitative lens to it, we can analyze participants' gestures in details, such as one participant moved her hands in a round shape when she talked about warmth, and then look for the meanings behind it (maybe she had such a movement because she associated warmth with round shape unconsciously), thus coming up with an informative analysis for future studies (future studies can consider that possibility when they design the experiment). Future work may benefit from using a mixed-methodology to receive reciprocal validations of data and observations, and further achieve a more coherent and consistent image of the explored area (Kelle, 2006).

Overall, our findings underscore the observations of gestures and utterances as participants deliberate on competence-warmth dimensions of social group. Our qualitative analyses leave open the possibility that individuals use strategy (such as compensation) when comparing two social groups; and also widen out lens on finding the linkage between gesture

patterns and each dimension. Our findings can be used as an informative tool for future studies (as we mentioned previously), especially with quantitative approach being brought in, researchers can hopefully make new discoveries about gestures under the circumstance of SCM.

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