The Spanish Journal of Psychology
2011, Vol. 14, No. 2, 755-764
http://dx.doi.org/10.5209/rev_SJOP.2011.v14.n2.23

Copyright 2011 by The Spanish Journal of Psychology
ISSN 1138-7416

Hand Gestures and Perceived Influence in Small Group Interaction

Fridanna Maricchiolo[1], Stefano Livi[2], Marino Bonaiuto[2], and Augusto Gnisci[3]

[1]Università degli Studi Roma Tre (Italy)
[2]Sapienza Università di Roma (Italy)
[3]Seconda Università di Napoli (Italy)

A laboratory study was carried out to establish the relative importance of verbal and gestural behavior, as well as their interaction, for perceived social influence in more or less competitive small groups. Forty women (psychology students) participated in leaderless small group discussions of different sizes (four-member and eight-member): at the end, each member rated the perceived influence in decision-making of every other member. Verbal dominance coding is based on traditional quantitative conversational dominance (number of talk turns). Gestural coding (conversational, ideational, object-adaptor, self-adaptor gestures) is based on classical gesture classifications. Beside a substantial effect of verbal dominance, the main result is that frequency of object-adaptors and conversational (only in large groups) and ideational (in both small and large groups) gestures increases perceived influence scores particularly when the verbal dominance of the speaker is low.
Keywords: verbal and nonverbal dominance, hand gestures, perceived influence, small group.

Se ha realizado un estudio de laboratorio para establecer la importancia de la conducta gestual y verbal, así como su interacción, en la influencia social percibida en grupos pequeños más o menos competitivos. Cuarenta mujeres (estudiantes de psicología) participaron en discusiones de grupo sin líder de diferentes tamaños (cuatro miembros y ocho miembros): al final, cada miembro valoró la influencia percibida en la toma de decisiones de cada uno de los otros miembros. El código de dominancia verbal está basado en la dominancia cuantitativa conversacional (número de turnos de habla). El código gestual (conversacional, ideacional, adaptador-objeto, gestos auto-adaptadores) está basado en clasificaciones gestuales clásicas. Además de un efecto sustancial de la dominancia verbal, el resultado principal es que la frecuencia de adaptadores-objeto y gestos conversacionales (sólo en grupos grandes) e ideacionales (tanto en grupos pequeños como grandes) incrementa los valores de influencia percibida, particularmente cuando la dominancia verbal del hablante es baja.
Palabras clave: dominancia verbal y no verbal, gestos manuales, influencia percibida, grupos pequeños.

Correspondence concerning this article should be addressed to Fridanna Maricchiolo, Università degli Studi Roma Tre. Department of Cultural and Educational Studies. Via Milazzo 11B, 00185 Rome (Italy). E-mail: fmaricchiolo@uniroma3.it

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

Social influence within small groups is often exerted through persuasive communication, especially in the case of leaderless group discussions. In social psychology, various studies have been carried out on conversational dominance, i.e. ways in which individuals exercise social influence and power through speech (that is, focusing only on verbal communication in an oral form: Hollander, 1985; Ng, Bell, & Brooke, 1993, amongst others). Everyday communication processes are, however, typically made up of verbal and nonverbal components: they work together to determine the whole communicative process (Kendon, 2004), and therefore social influence and power too.

As regards dominance during interaction, many studies have considered the group size as a condition which can favour or limit asymmetry in a group, which was found to be related to dominance (Kelley & Thibaut, 1978; Kenny & Livi, 2009; Livi, Kenny, Albright, & Pierro, 2008; Mannetti, Battantier, & Pierro, 1996; Mullen, Salas, & Driskell, 1989; Ng et al., 1993). In larger groups, asymmetries among group members increase: they represent therefore a more 'competitive' context compared with smaller groups. In fact, in larger groups (eight/twelve members), usually one or two members have more control than others on the conversational floor (Bass, 1990), and the association between speaking time and dominance is stronger than in smaller groups (Schmid Mast, 2003). Indeed, the number of 'sub-participant' members (people who take little active part in group activities and are 'lost in the crowd') increases with the broadening of group size (Mullen et al., 1989).

On the other hand, in social-psychological studies of conversational dominance, the dominant subject or leader is conceptualised as the most conversationally active person (e.g. Ng et al., 1993; Shaw, 1971). In leaderless group discussion, with no predefined leadership, verbal and nonverbal communication becomes the main persuasive means of exercising interpersonal influence (e.g. Argyle, 1972; Hollander, 1985, Mullen et al., 1989).

On the other hand, humans, like non-human primates, assert dominance in their own group through nonverbal cues (Goffman, 1983; Keating, 1985). Dominant people sit higher, stand taller, talk louder, have more space and more dominant tense posture, may invade other space, touch other things, use a higher voice volume, stand with raised head, maintain constant eye contact and tense facial expressions with lowered brows (Carli, LaFleur, & Loeber, 1995; Dovidio & Ellyson, 1985; Henley, 1977; Mignault & Chaudhuri, 2002; Leffler, Gillespie, & Conaty, 1982). Mehrabian and Williams (1969) found that the degree of liking – communicated vocally or nonverbally by high speech volume, high speech rate, higher rate of gesticulation, high eye contact with the addressee, lengthy communications, high facial activity – was positively correlated with the perceived persuasiveness of communication. Carli et al. (1995) demonstrated that different nonverbal styles can affect likeableness and competence perception and consequently social influence. Social nonverbal style (moderate vocal volume, relaxed posture, friendly facial expression, moderately high amount of eye contact) increased likeability, whereas task nonverbal style (rapid speech rate, firm vocal tone, moderate voice volume, few hesitations, upright posture, calm hand gestures, moderately high amount of eye contact) increased competence perception; likeability and competence perceptions affected social influence.

In this study, attention has been directed to nonverbal communication and verbal communication, in connection with social influence. In particular, among different nonverbal behaviors, we have chosen hand gestures as our object of analysis because they are more intimately connected and are often a necessary adjunct to speech (Kendon, 1983, 2004; Rimè & Schiaratura, 1991, amongst others). Furthermore recent studies showed that hand gestures have an important role in social perception and persuasion processes (Maricchiolo, Gnisci, Bonaiuto, & Ficca, 2009).

A general approach to understanding hand gesture function suggests that there are different categories of gesture (Alibali, Heath, & Myers, 2001), and that these different categories might be perceived by listeners in different ways and thus perform different functions. Indeed, there is general agreement on the main categories of hand gesture. In the literature (e.g. Ekman & Friesen, 1969; McNeill, 1992), hand movements are distinguished as follows: illustrators or ideational gestures, related to semantic content of concurrent speech (illustrating or indicating it), including iconic gestures (reproducing forms or movements of the object being spoken about, which the gesture itself refers to), metaphoric gestures (their form is a metaphor of the abstract concept which they refer to) and deictic gestures (pointing); conversational gestures (e.g. cohesive and beats), accompanying speech without a relation to the semantic content (relating to the internal structure of linguistic emissions as well as controlling synchronisation); and adaptors (hand movements of touching and manipulation), which include self-addressed, object-addressed or person-addressed hand movements.

Studies on gesture perception have found that illustrators improve the addressee's attention, accuracy of understanding (Berger & Popelka, 1971; Graham & Argyle, 1975), and recognition and memory about the discourse content (Beattie & Shovelton, 2006; Riseborough, 1981), 'disambiguating' and clarifying it (Beattie & Shovelton, 2005; Holle & Gunter, 2007). Other studies showed that object-adaptors, as well as self-adaptors, are associated with perception of anxiety, nervousness and, in some cases, deception (e.g. Henningsen, Valde, & Davies, 2005), although some studies have found no link between these variables and the production of self/object-adaptor movements (e.g. Caso, Maricchiolo, Bonaiuto, Vrij, & Mann, 2006; DePaulo et al., 2003). Burgoon, Birk, and Pfau (1990) even found that adaptors were negatively correlated with perceived persuasiveness. Butterworth and Hadar (1989), however, argue that beats (small single movements stressing words; McNeill, 1985) 'may enhance communicative effectiveness of emphatic

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

stress' (Butterworth & Hadar, 1989, p. 172). Maricchiolo and colleagues (2009) experimentally tested that a speaker who uses conversational or ideational gestures is perceived as more competent, effective and persuasive by the addressees of a persuasive message than if s/he uses self-addressed hand movements.

Therefore, gestures can lead to differences in audience perceptions of the actor, and of her/his persuasiveness, in an oratory situation. Moreover, different researchers have studied the role either of verbal dominance or of hand gestures in the social influence phenomenon, considering the communication aspects of each separately, but few studies have clarified the role of speech gesture in small groups (e.g. Livi, Battantier, Maricchiolo, & Mannucci, 2005), and none have examined influence process and social perception in such contexts. The general aim of the present study was to clarify what kind of effect the two aspects together, verbal and gesture, have on perceived social influence in small groups.

Taking into account the gesture categories described above (ideational, conversational, self-addressed, and object-addressed gestures; see Method), the present work examines, in small groups of different sizes (eight-member and four-member groups), which verbal and gestural features of communicative dominance, considered together, could predict perceived social influence.

The aim of this study is to assess the relationship of particular categories of gestures and conversational dominance (defined as the number of conversational turns held) with perceived social influence (by group member), in the context of small group discussions.

Considering the aim of this study, and on the basis of the literature cited in the introduction (e.g. Maricchiolo et al., 2009), we expected to find the following:

(1) The main positive effect of verbal dominance on perceived social influence.

(2) The effect of the interaction between verbal dominance and conversational and ideational gestures on perceived social influence.

(3) The main positive effect of object-adaptor gestures (to touch objects or others) on perceived social influence.

(4) The main negative or no effect of self-adaptor (self-touching) gestures on perceived influence.

In line with the literature on group size (e.g. Livi et al., 2008), we expected these results to be more evident in larger groups (eight members) than in smaller groups (four members).

Method

Participants

The research sample was made up of 40 Italian psychology students (average age 21 years: range 20 to 25 years) divided into seven groups: four groups were composed of four people (16 participants) and three groups were made up of eight members (24 participant). In order to avoid the problem of taking into account the ratio of male/female group components, and adding another variable such as gender, only one gender was selected. Women, rather than men, were chosen because it has been shown (i.e. Carli et al., 1995; Schmid Mast, 2001) that, unlike male subjects, female subjects' perceptions of another person's nonverbal dominance and influence are not mediated by the other person's gender. Moreover a previous study was carried out with female speaker-performers (Maricchiolo et al., 2009).

Procedure

Each subject participated in a simulated group discussion within a decision-making task with no pre-established leader (leaderless group discussion). Subjects simulated being members of a group of consultants in a meeting, seated around a table, in which they had to examine and discuss two 'company cases' (possible dismissal of an employee with a second job and possibly putting on the market some machines of inferior quality to the prototype shown to customers), make decisions and present a proposal relative to the action to be taken in each case. Each group had to discuss both cases in the same order. Discussions lasted about 40 minutes on average. At the end of the simulation, each student was asked to fill in a short questionnaire to assess how much each member of the group, herself included, had influenced the final decision on the action to be taken: they had to write down and rank from first to last position the names of those who, in their opinion, had exercised most or least influence respectively, while putting those who had had medium influence in the intermediate ranks. All the simulations, which took place in the social psychology laboratory of the Department of Psychology of Developmental and Social Interaction Processes at the University of Rome 'Sapienza', were recorded on audio-video and were integrally transcribed using the Jeffersonian method (Jefferson, 1985) and then systematically coded.

Research variables and measurements

Perceived Influence

The measurement of perceived social influence chosen in this study was a score of influence assigned to each member of the group by the participants in the simulation themselves. The measurement of influence for each subject was the average influence score (ranking position) which they had received from other members of the group (excluding self-assessments). In order to estimate the degree of non-independence of the perceived influence, the infra-class correlation coefficient (ICC) was computed using the Kenny and La Voie formula (Kenny & La Voie, 1985). As

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

expected, the analysis shows a strong, significant and negative ICC: – 0.331 ($p < .001$) in four-member groups and – 0.14 ($p < .001$) in the eight-member group.[1]

Verbal dominance

Each subject's number of turns during conversation has been adopted as the verbal variable of conversational dominance (this index being the main one considered by the literature). For each subject, the turn measure was calculated by the ratio of turns on discussion time.

Gestural behavior

Each hand gesture observed was noted down and coded according to four general categories of gestures (see Bonaiuto, Gnisci, & Maricchiolo, 2002; Maricchiolo et al., 2009), as described above: (1) 'conversational' gestures, including beats and cohesive gestures (McNeill, 1992), are hand/finger movements, repeated more than once over a short time period and in the same gestural space that accompanied the discourse, giving it continuity, coherence and cohesion; (2) 'ideational' gestures refer to the content of speech and include emblems (symbolic gestures, directly translatable into spoken language: for example, 'OK' gesture and thumbs-up) and illustrative gestures (ichnographically reproducing semantic content: illustrators, Ekman & Friesen, 1969); 'adaptor gestures' (Ekman & Friesen, 1969) are hand movements of touching assumed to satisfy needs or maintain interpersonal contacts, and are divided into (3) 'object-adaptor' gestures (contact with what is external to the subject: object or other) and (4) 'self-adaptor' gestures (hand in contact with parts of one's own body).

The agreement between two independent coders in identifying the gestures was higher in groups of four subjects (Cohen's $K = 0.94$) than in groups of eight subjects ($K = 0.86$). Both agreement indices, however, are highly satisfactory ($K > 0.70$: Bakeman & Gottman, 1997).

The score for each gesture category, assigned to each subject for data analysis, corresponds to a ratio: total number of gestures produced by the subject in each category at discussion time.

Interclass correlations among gestures reveal different patterns depending on group size: in four-member groups, conversational gestures are not significantly correlated with others (mean coefficient 0.21, ranging from 0.06 to 0.41, n.s.), whereas ideational gestures, object- and self-adaptors are positively and significantly correlated (mean coefficient 080, ranging from 0.78 to 0.81, $p < .01$.). In eight-member groups, ideative and conversational gestures and object-adaptors are positively correlated (mean coefficient 0.58, ranging from 0.43 to 0.88, $p < .05$.), whereas self-adaptors are correlated only with object-adaptors ($r = 0.41$, $p < .05$) and not with other gestures (mean coefficient - 0.11, ranging from – 0.08 to – 0.13, n.s.),

Data analysis

Following Kenny, Mannetti, Pierro, Livi, and Kashy's (2002) suggestions, the data were analysed by means of multilevel methods, using an SAS Proc Mixed procedure (Littell, Milliken, Stroup, & Wolfingen, 1996). This choice allowed analysis of data collected within small groups (see also Hoyle, Georgesen, & Webster, 2001) and simultaneously allowed for the negative non-independence of observations within groups (Kenny et al., 2002). In the multilevel models analysed, only the lower level was represented, corresponding to the participant's influence perceived by the other members, nested within groups. In order to facilitate the interpretation of the results, independent variable scores were transformed into z scores.

The entire analysis in this study was carried out by distinguishing those subjects belonging to four-member groups and those belonging to eight-member groups. Thus, the same analysis was carried out separately on a sample of sixteen subjects (belonging to four groups of four members) and on a sample of twenty-four subjects (belonging to three groups of eight members).

In order to reduce the number of predictors on each model (Kashy & Kenny, 2000), group size was not introduced among the predictors and for each sample (four-member groups and eight-member groups) we employed four multilevel models using as predictors verbal dominance, one of the categories of gestural behavior (conversational, ideational, object-adaptor, self-adaptor) and the interaction between each gestural behavior and verbal dominance.

Results

As Table 1 shows, in the eight-member sample, regarding main effects, verbal dominance appears to be a stable predictor across all the models submitted. As regards gestural behavior main effects, no gesture category shows a significant effect.

Of greater relevance, however, were the participants' conversational, ideational and object-adaptor gestures which interacted significantly with verbal dominance to suggest that if the participants' verbal dominance score was lower the relation between perceived influence and behavioral gestures was more substantial than if the verbal dominance

[1] Those coefficients were close to the theoretical lower limit of the ICC. This coefficient varies according to group size (Kenny & La Voie, 1985): in groups of four participants, it is -0.333, whereas in groups of eight, it is -0.143. These results were owed to the measure used for this variable, which is the mean perception of a rank order of each participant.

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

Table 1
Results summary of hierarchical linear modelling estimates and standard error of verbal dominance and gestural behavior, predicting participants' perceived influence for four and eight-member groups

		Four-Member Groups		Eight-Member Groups	
		Estimates	*S.E.*	*Estimates*	*S.E.*
Model 1					
	Intercept	*2.44*	*0.14*	*5.17*	*0.56*
	Verbal Dominance	0.36	0.34	**1.40****	0.31
	Conversational Gestures	0.18	0.14	0.55	0.50
	Verbal Dom.* Conversational G.	–0.01	0.22	**–0.53***	0.20
Model 2					
	Intercept	*2.70*	*0.17*	*5.11*	*0.58*
	Verbal Dominance	**0.83***	0.32	**1.46****	0.31
	Ideational Gestures	**0.48°**	0.19	0.53	0.42
	Verbal Dom.* Ideational G.	**-0.98***	0.34	**–0.45***	**0.19**
Model 3					
	Intercept	*2.60*	*0.19*	*4.98*	*0.67*
	Verbal Dominance	0.46	0.31	**1.50****	0.18
	Subject-Adaptor Gestures	0.18	0.17	–0.02	0.29
	Verbal Dom.* Subject-A. G.	–0.46	0.41	**–0.96***	0.37
Model 4					
	Intercept	*2.61*	*0.03*	*4.67*	*0.99*
	Verbal Dominance	0.16	0.07	**1.86****	0.27
	Self-Adaptor Gestures	0.19	0.07	0.53	0.43
	Verbal Dom.* Self-A. G.	–0.53	0.22	0.05	0.23

Tests of Fixed Effects: .05 < p < .10; * p < .05; ** p <.01

Table 2
Participants' perceived influence[i] as a function of verbal dominance and conversational gestures (Model 1, eight-member groups).

		Conversational Gesture	
		Low	*High*
Verbal Dominance	*Low*	2.7	4.8
	High	6.5	6.6

[i] Higher values mean higher perceived influence

Table 3
Participants' perceived influence[i] as a function of verbal dominance and ideational gestures (Model 2, eight-member groups).

		Ideational Gesture	
		Low	*High*
Verbal Dominance	*Low*	2.7	4.6
	High	6.5	6.7

[i] Higher values mean higher perceived influence

score was higher. The relevant interaction effects displayed in Table 1 and the predicted mean values pertinent to the significant interactions are shown in Tables 2 to 4. Following the suggestion of Aiken and West (1991), these values were one standard deviation above and below the means of the relevant variables in the regression equation (for a more elaborate discussion of simple slope analysis, see Aiken & West, 1991).

The interaction between verbal dominance and conversational gestures (see Table 2), especially when there is a low verbal activity and low conversational gestures, has a strong negative impact on perceived influence.

The interaction between verbal dominance and ideational gestures also shows the same pattern (see Table 3), with only a small perceived influence corresponding to low frequency of activity and low ideational gestures. Taken together, these results show that discourse-related gestures add significant weight to verbal activity, but only when the last is low.

For non-related to discourse gestures, only object-adaptor gesture interaction with verbal dominance is significant (Table 4). In this case, again, a lower expression of both verbal and gesture behaviors has a negative impact on perceived behaviors. Differently from the discourse-related gestures, however, participants are perceived to be more influential when they have both a high verbal dominance score and low object-adaptor gestures.

In four-member groups, the results scenario is quite different. Asymmetric participation is much softer, and even

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

Table 4
Participants' perceived influence[i] as a function of verbal dominance and subject-adaptor gestures (Model 3, eight-member groups)

		Subject-Adaptor Gesture	
		Low	*High*
Verbal Dominance	*Low*	2.5	4.4
	High	7.5	5.5

[i] Higher values mean higher perceived influence

Table 5
Participants' perceived influence[i] as a function of verbal dominance and ideational gestures (Model 2, four-member groups)

		Ideational Gesture	
		Low	*High*
Verbal Dominance	*Low*	0.4	3.3
	High	4.0	3.0

[i] Higher values mean higher influence

if the pattern is similar to the previous sample, only model 2, concerning ideational gestures, shows a significant effect, although only slightly so, for both the main effect of ideational gestures and the interaction effect (see Table 1).

The table describing the interaction effect between verbal dominance and ideational gestures (see Table 5) shows, again, that the minimal influence impact corresponds in the low discourse-related gesture and low verbal dominance condition, whereas, interestingly, higher influence is shown when there is high verbal dominance and low ideational gestures. When there are many ideational gestures, however, participants are perceived to be more influential if they have lower rather than higher verbal dominance scores.

In model 4 (Table 1) there is only a significant main effect of verbal dominance and no significant (neither main nor interaction) effect of self-adaptor gestures on perceived influence.

Discussion

Results, especially for eight-member groups, confirm most of the hypotheses. First of all, the positive main effect of verbal dominance on perceived influence (Livi, Pierro, & Mannetti, 2000; Mannetti et al., 1996; Ng et al., 1993, among others) in all hierarchical linear models confirmed hypothesis 1. Second, significant interaction effect of discourse-related gestures (ideational and conversational gestures) with verbal dominance on perceived influence confirmed hypothesis 2 and that of object-adaptor gestures with verbal dominance on perceived social influence in eight-member groups confirmed hypothesis 3. These outcomes also confirm previous studies carried out on oratory context (Maricchiolo et al., 2009).

Specifically, in eight-member groups, the effect of gestures (in particular those gestures that are significantly correlated: conversational, ideational and object-adaptor) is higher when verbal dominance is low rather than high. That is, when, in a more numerous small group (i.e. an eight- rather than four-member group), a member takes fewer turns she is perceived as more influential only if she uses more conversational, ideational and/or object-adaptor gestures than if she uses fewer gestures of this kind. Nevertheless, if one takes more turns, then there is no difference between using more or fewer gestures of this kind, except for object-adaptor gestures (if one speaks more and uses fewer object-adaptor gestures, she is perceived as more influential than if she uses more of these gestures). In small groups with this size (eight members or similar), in any case, those who speak more frequently are perceived to be more influential than less vocal members, regardless of the kind and number of gestures they use (except for the negative impact of object-adaptor on dominant speaker).

In four-member groups, a main positive effect (slight trend) for ideational gestures, besides the usual significant positive main effect for verbal dominance (only in the model which includes verbal dominance and ideational gestures), and an interaction effect of the two variables on perceived influence were found. Thus, according to this model, in smaller groups (four-member groups) one could be perceived as influential if one speaks more, uses more ideational gestures or does both.

Unlike the results of other studies (Burgoon et al., 1990; Carli et al., 1995; Henley, 1977; Maricchiolo et al., 2009), which found a negative effect for self-adaptors on influence or persuasion, this study shows that self-adaptor gestures have neither a main negative effect nor interaction effect with verbal dominance on perceived social influence (hypothesis 4 was not confirmed).

This different pattern of results obtained for the two sub-samples – the four-member groups and eight-member groups – is in line with the literature on the differences found for dominance phenomena owing to group size (i.e. Bass, 1990; Mullen et al., 1989; Schmid Mast, 2003). There can be various explanations for these results. One possible explanation is that, in more numerous small groups (eight-member groups), competition for dominance is greater than in less numerous groups (four-member groups) (Livi & Kenny, 2009; Livi et al., 2008). In particular, the results of the present study show that, in smaller groups, verbal dominance either related or non-related to discourse gestures does not have any significant effects (main or interaction) on perceived influence (except in the model with ideational gestures, where the usual pattern of results emerges). This could be connected to the fact that, in these smaller groups,

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

each subject had more conversational space available and did not need to compete for talk turns, more visibility or to be heard (Argyle, Lalljee, & Cook, 1968), as was the case in eight-member groups. This phenomenon (different talk space distribution) could, on the other hand, create greater competition amongst subjects in a more crowded group, where people have fewer possibilities of talk turns and where there is thus more asymmetry in turn-taking.

Besides verbal communication (which traditionally has received greater attention from studies on social influence and persuasive power of communication), the results obtained from eight-member groups show that, in more competitive contexts (given the presence of more people), nonverbal communication, especially gestural communication, could have a certain importance in contributing to participants' influence perception in group conversations, especially for members who usually speak less or take a smaller number of turns (i.e. less verbally dominant members). Similar results were obtained only in oratory and non-interactional situations.

To summarise, in eight-member groups, when verbal dominance is high, discourse-related gestures do not influence the perception of influence, but gestures not related to discourse (object-adaptor gestures) negatively influence this perception; when verbal dominance is low, both discourse-related gestures and object-adaptor gestures positively influence the perception of influence, but this effect is lower than the main effect for verbal dominance.

Therefore, verbal dominance is fundamental to perceived social influence, and only when verbal dominance is low do hand gestures exert any influence. The hypothesis could be that some gestures could partly compensate in the case of insufficient verbal activity. The magnitude of this compensation is not sufficient, however, to restore a high interpersonal influence, which is achieved only through high verbal activity (in line with the compensation hypothesis in neuropsychology: see Hadar & Butterworth, 1997, amongst others).

Looking at the results from a different perspective, we can see they also suggest that scarce communicative participation in groups, and particularly in large groups, is fundamental (Mullen et al., 1989): if reduced verbal participation is not compensated by high gesture participation, group members are convicted of being socially uninfluential. Moreover, as communicative contributions depend on participation of other group members (Bonito, 2002; De Grada, Livi, Mannetti, & Pierro, 2001), gestures represent an important signal for maintaining communication presence even when competition for conversational space control is intense and prevents participants from verbally intervening.

In conclusion, this study shows that subjects should be perceived as being more influential, not only on the basis of verbal aspects of conversational interaction, as found in a great deal of research in the literature (Bales, 1953; Ng et al., 1993, etc.), but also on the basis of certain nonverbal aspects, such as some gestural behavior of the hands. These findings shed further light on perceived social influence in small group discussions. In fact, dominance in most studies has been associated with particular verbal characteristics and, consequently, with communicative efficacy and competence on a verbal level (see Mannetti et al., 1996; Palmer, 1989), or with some nonverbal aspects per se, like body posture, touch, gaze, smile and vocal signs (Burgoon et al., 1990; Butler & Geis, 1990; Cashdan, 1998; Dovidio & Ellyson, 1985; Hall & Friedman, 1999; Tusing & Dillard, 2000) and in particular hand gestures per se (Argentin, Ghiglione, & Dorna, 1990; Burgoon et al., 1990; Henley, 1977; Leffler et al., 1982; Maricchiolo et al., 2009). These results instead confirm the need to expand the range of dominant and persuasive communication components to include gestural expressiveness of the hands, particularly as regards components intimately connected with the production of verbal content or structure (ideational and conversational), but also those connected with spatial control (object-adaptor). In particular, it can be hypothesised that hand gestures linked to speech allow us to control the 'social-physical space' which is shared, whereas verbal dominance allows us to control the 'social-conversational space'. Therefore, if one is not able to control much conversational space, the control of this physical space through gestures can make the difference in terms of perceived influence.

On the other hand, self-adaptor gestures that would apply more to a 'personal space', which does not regard the group as a whole, could have no effect on perceived influence. Therefore, the control of social space (both physical and conversational), rather than the control of personal space, could allow the concrete realisation of that conversational dominance which leads to the perception of social influence. If this were the case, the methodological implications derived from this would consist of the possibility of using hand gestures as measures of conversational dominance together with the turn-taking system, especially in more competitive contexts.

Finally, the general lack of main effect for gestures and the presence of gesture-turns interaction stress the importance of studying nonverbal behavior together with verbal activity in order to clarify their reciprocal interdependence and to understand how both affect perceived social influence as well as other social phenomena. Nevertheless there were some limitations with respect to the sample: it consisted of female participants only, and although this ensured control of the variability related to gender (Tannen, 1990) it does suggest we need to be cautious in generalising results to all men or mixed gender groups. Moreover, it is necessary to underline that this study was conducted in Italy and it is known that there are a lot of international cultural differences with respect to body communication, especially hand gestures (Kendon, 2004). Therefore, although many researchers have evidenced the importance of hand gestures

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

during speech even in English-speaking cultures (see e.g. Beattie & Shovelton, 2005; Kelly, Manning, & Rodak, 2008, amongst others mentioned above), a further test in other very different cultures is necessary before this outcome can be generalised. This laboratory study is however a first attempt to analyse the role of gesture-speech activity in determining influence on small group discussion.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions.* Newbury Park, CA: Sage.

Alibali, M. W., Heath, D. C., & Myers, H. J. (2001). Effects of visibility between speaker and listener on gesture production: Some gestures are meant to be seen. *Journal of Memory and Language, 44*(2), 169-188. doi:10.1006/jmla.2000.2752

Argentin, G., Ghiglione, R., & Dorna, A. (1990). La gestualité et ses effets dans le discours politique [Gesture and its effect on political discourse]. *Psychologie Française*, *35*, 153-161.

Argyle, M. (1972). Nonverbal communication in human social interaction. In R. A. Hinde (Ed.), *Nonverbal Communication* (pp. 243-269). Cambridge, UK: Cambridge University Press.

Argyle, M. Lalljee, M., & Cook, M. (1968). The effect of visibility on interaction in a dyad. *Human Relations, 21,* 3-17. doi:10.1177/001872676802100101

Bakeman, R., & Gottman, J. M (1997), *Observing interaction. An introduction to Sequential Analysis*. (2nd Ed.) Cambridge, NY: Cambridge University Press.

Bales, R. F. (1953). The equilibrium problem in small groups. In T. Parsons, R. F. Bales, & E. A. Shils (Eds.), *Working papers in the theory of action* (pp. 111-161). New York, NY: Free Press.

Bass, B. M. (1990). *Bass & Stogdill's Handbook of Leadership. Theory, Research, and Managerial Applications*. New York, NY: Free Press.

Beattie, G. W., & Shovelton, H. K. (2005). Why the spontaneous images created by the hands during talk can help make TV advertisements more effective. *British Journal of Psychology*, *96*, 21-37. doi:10.1348/000712605X103500

Beattie, G. W., & Shovelton, H. K. (2006). When size really matters: How a single semantic feature is represented in the speech and gesture modalities. *Gesture*, *6*, 63-84. doi:10.1075/gest.6.1.04bea

Berger, K. W., & Popelka, G. K. (1971). Extra-facial gestures in relation to speech-reading. *Journal of Communication Disorders 3,* 302-308.

Bonaiuto, M., Gnisci, A., & Maricchiolo, F. (2002). Proposta e verifica di una tassonomia per la codifica dei gesti delle mani in discussioni di piccolo gruppo. [Proposal and test of a taxonomy to code hand gestures in small group discussions]. *Giornale Italiano di Psicologia, 29,* 777-807.

Bonito, J. A. (2002). The analysis of participation in small groups: Methodological and conceptual issues related to interdependence. *Small Group Research, 33,* 412-438. doi:10.1177/104649640203300402

Burgoon, J. K., Birk, T., & Pfau, M. (1990). Nonverbal behaviors, persuasion, and credibility. *Human Communication Research, 17,* 140-169. doi:10.1111/j.1468-2958.1990.tb00229.x

Butler, D., & Geis, F. L. (1990). Nonverbal affect responses to male and female leaders: Implications for leadership evaluations. *Journal of Personality and Social Psychology, 58,* 48-59. doi:10.1037//0022-3514.58.1.48

Butterworth, B., & Hadar, U. (1989). Gesture, Speech and Computational Stage: A reply to McNeill. *Psychological Review, 96*, 168-174. doi:10.1037//0033-295X.96.1.168

Carli, L. L., LaFleur, S. L., & Loeber, C. C. (1995). Nonverbal behavior, gender, and influence. *Journal of Personality and Social Psychology, 68,* 1030-1041. doi:10.1037//0022-3514.68.6.1030

Cashdan, E. (1998). Smiles, speech, and body posture: How women and men display sociometric status and power. *Journal of Nonverbal Behavior, 22,* 209-228.

Caso, L., Maricchiolo, F., Bonaiuto, M., Vrij, A., & Mann, S. (2006). The impact of deception and suspicion on different hand movements. *Journal of Nonverbal Behavior, 30*(1), 1-19. doi:10.1007/s10919-005-0001-z

De Grada, E., Livi, S., Mannetti, L., & Pierro, A. (2001). Relazioni discorsive e soddisfazione per la propria prestazione e quella del gruppo in un contesto di discussione negoziale [Discourse and performance's satisfaction in group negotiations]. *Rassegna Italiana di Psicolinguistica Applicata, 2,* 99-120.

DePaulo, B. M., Lindsay, J. J., Malone, B. E., Muhlenbruck, L., Charlton, K., & Cooper, H. (2003). Cues to deception. *Psychological Bulletin*, *129*, 74-118. doi:10.1037//0033-2909.129.1.74

Dovidio, J. F., & Ellyson, S. L. (1985). Patterns of visual dominance behavior in humans. In S. L. Ellyson & J. F. Dovidio (Eds.), *Power, dominance, and nonverbal communication* (pp. 129-149). New York, NY: Springer-Verlag.

Ekman, P., & Friesen, W. V. (1969). The repertoire of nonverbal behavior. *Semiotica*, *1,* 49-98.

Goffman, E. (1983). The interaction order. *American Sociological Review, 48,* 1-17. doi:10.2307/2095141

Graham, J. A., & Argyle, M. (1975). A cross-cultural study of the communication of extra-verbal meaning by gestures. *International Journal of Psychology, 10,* 57–67. doi:10.1080/00207597508247319

Hadar, U., & Butterworth, B. (1997). Iconic gestures, imagery and word retrieval in speech. *Semiotica, 15,* 147-172. doi:10.1515/semi.1997.115.1-2.147

Hall, J. A., & Friedman, G. B. (1999). Status, gender, and nonverbal behavior: A study of structured interactions between employees of a company. *Personality and Social Psychology Bulletin, 25,* 1082-1091. doi:10.1177/01461672992512002

Henley, N. M. (1977). *Body politics: Power, sex, and nonverbal behavior.* Englewood Cliffs, NJ: Prentice-Hall.

Henningsen, D. D., Valde, K. S., & Davies, E. (2005). Exploring the effect of verbal and nonverbal cues on perceptions of deception. *Communication Quarterly, 53*(3), 359-375. doi:10.1080/01463370500101329

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

Hollander, E. P. (1985). Leadership and power. In G. Linzdey & E. Aronson (Eds.). *Handbook of social psychology* (Vol. II, pp. 485-537). New York, NY: Random Hoese.

Holle, H., & Gunter, T. C. (2007). The role of iconic gestures in speech disambiguation: ERP evidence. *Journal of cognitive neuroscience, 19*, 1175-1192. doi:10.1162/jocn.2007.19.7.1175

Hoyle, R. H., Georgesen, J. C., & Webster, J. M. (2001). Analyzing data from individuals in groups: The past, the present, and the future. *Group Dynamics: Theory, Research, and Practice, 5,* 41-47. doi:10.1037//1089-2699.5.1.41

Jefferson, G. (1985). On the interactional unpackaging of a "Gloss". *Language & Society*, *14*, 435-466. doi:10.1017/S0047404500011465

Kashy, D. A., & Kenny, D. A. (2000). The analysis of data from dyads and groups. In H. Reis & C. M. Judd (Eds.), *Handbook of research methods in social psychology* (pp. 451–477). New York, NY: Cambridge University Press.

Keating, C. (1985). Human dominance signals: The primate in us. In S. L. Ellyson & J. F. Dovidio (Eds.), *Power, dominance, and nonverbal behavior* (pp. 89-108). New York, NY: Springer-Verlag.

Kelley, H. H., & Thibaut, J. W. (1978). *Interpersonal Relations: A Theory of Interdependence*. New York, NY: John Wiley & Sons.

Kelly, S. D., Manning, S., & Rodak, S. (2008). Gesture gives a hand to language and learning: Perspectives from cognitive neuroscience, developmental psychology and education. *Language and Linguistics Compass, 2*, 1-20. doi:10.1111/j.1749-818X.2008.00067.x

Kendon, A. (1983). Gesture and speech: How they interact. In J. M. Wiemann & R. P. Harrison (Eds.), *Nonverbal interaction* (pp. 13-45). Beverly Hills, CA: Sage Publications.

Kendon, A. (2004). *Gesture: Visible Action as Utterance*. New York, NY: Cambridge University Press.

Kenny, D., & Livi, S. (2009). A componential analysis of leadership using the Social Relations Model. In F. Yammarino, & F. Danserau. *Multi-Level Issues in Organizational Behavior and Leadership*. vol. 8, (147-191), Bingley, UK: Emerald Group Publishing Limited.

Kenny, D. A., Mannetti, L., Pierro, A., Livi, S., & Kashy, D. A. (2002). The statistical analysis of data from small groups. *Journal of Personality & Social Psychology, 83,* 126-137. doi:10.1037//0022-3514.83.1.126

Kenny, D. A., & La Voie, L. (1985). Separating individual and group effects. *Journal of Personality and Social Psychology, 48,* 339-348. doi:10.1037//0022-3514.48.2.339

Leffler, A., Gillespie, D., & Conaty, J. C. (1982). The effect of status differentiation on nonverbal behavior. *Social Psychology Quarterly*, *45,* 153-161. doi:10.2307/3033648

Leigh, T. W., & Summers, J. O. (2002). An initial evaluation of industrial buyers' impressions of salespersons' nonverbal cues. *Journal of Personal Selling & Sales Management, 22,* 41-53.

Littell, R. C., Milliken, G. A., Stroup, W. W., & Wolfingen, R. D. (1996). *SAS system for mixed models*. Cary, NC: SAS Institute.

Livi, S., Battantier, A., Maricchiolo, F. & Mannucci, F. (2005, August). Verbal and nonverbal cues of dominance in small groups discussions. In L. P. J. J. Noldus, F. Grieco, L. W. S. Loijens, & P. H. Zimmerman (Eds). *Proceedings of measuring behavior 2005, 5th International Conference on Methods and Techniques in Behavioral Research* (pp. 632-634). Wageningen, The Netherlands: Noldus Information Technology.

Livi, S., & Kenny, D. (2009). Thoughts on studying leadership in natural contexts. In F. Yammarino, & F. Danserau. *Multi-level issues in organizational behavior and leadership*. (Vol. 8, pp. 215-224), Bingley, UK: Emerald Group Publishing Limited.

Livi, S., Kenny, D., Albright, L., & Pierro, A. (2008). A social relations analysis of leadership. *Leadership Quarterly, 19*(2), 235-248. doi:10.1016/j.leaqua.2008.01.003

Livi, S., Pierro, A, Mannetti, L. (2000). Self Monitoring, controllo dello spazio conversazionale e dominanza percepita in discussioni di piccoli gruppi in azione. [Self Monitoring, conversational space control and perceived dominance in small group discussion] *Rassegna di Psicologia, 17*. 127-139.

Mannetti, L., Battantier, A., & Pierro, A. (1996). Dominance in group conversations. *International Journal of Psycholinguistics, 12,* 297-307.

Maricchiolo, F., Gnisci, A., Bonaiuto, M., & Ficca, G. (2009). Effects of different types of hand gestures in persuasive speech on receivers' evaluations. *Language and Cognitive Processes, 24*(2), 239-266. doi:10.1080/01690960802159929

McNeill, D. (1985). So you think gestures are nonverbal? *Psychological Review*, *92,* 350-371.

McNeill, D. (1992). *Hand and mind*. Chicago, IL: The University of Chicago Press.

Mehrabian, A., & Williams, M. (1969). Nonverbal concomitants of perceived and intended persuasiveness. *Journal of Personality and Social Psychology, 13*, 37-58. doi:10.1037/h0027993

Mignault, A., & Chaudhuri, A. (2002). The many faces of a neutral face: Head tilt and perception of dominance and emotion. *Journal of Nonverbal Behavior, 27,* 111-132.

Mullen, B., Salas, E., & Driskell, J. E. (1989). Salience, motivation, and artifacts as contributions to the relation participation rate and leadership. *Journal of Experimental Social Psychology, 25,* 545-559. doi:10.1016/0022-1031(89)90005-X

Ng, S. H., Bell, D., & Brooke, M. (1993). Gaining turns and achieving high influence ranking in small conversational groups. *British Journal of Social Psychology, 32,* 265-275.

Palmer, M. T. (1989). Controlling conversations: Turns, topics and interpersonal control. *Communication Monographs, 56,* 1-18. doi:10.1080/03637758909390246

Rimè, B., & Schiaratura, P. (1991). Gesture and speech. In R. S. Feldman & B. Rimè (Eds.), *Fundamentals of Nonverbal Behavior* (pp. 239-281). Cambridge: Cambridge University Press; Paris, France: Editions de la Maison des sciences de l'homme.

Riseborough, M. G. (1981). Physiographic gestures as decoding facilitators: Three experiments exploring a neglected facet of communication. *Journal of Nonverbal Behavior, 5*, 172-183. doi:10.1007/BF00986134

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press

Schmid Mast, M. (2001). Gender differences and similarities in dominance hierarchies in same-gender groups based on speaking time. *Sex Roles, 44,* 537-556.

Schmid Mast, M. (2003). Dominance as expressed and inferred through speaking time: A meta-analysis. *Human Communication Research, 28,* 420-430.

Shaw, M. E., (1971). *Group dynamics: The psychology of small-group behavior*. New York, NY: McGraw-Hill.

Tannen, D. (1990). *You just don't understand: Women and men in conversation*. New York, NY: Ballantine

Tusing, K. J., & Dillard, J. P. (2000). The sounds of dominance: Vocal precursors of perceived dominance during interpersonal influence. *Human Communication Research, 26,* 148-171. doi:10.1093/hcr/26.1.148

Received March 23, 2010
Revision received October 8, 2010
Accepted November 22, 2010

https://doi.org/10.5209/rev_SJOP.2011.v14.n2.23 Published online by Cambridge University Press