Effects of different types of hand gestures in persuasive speech on receivers' evaluations

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Effects of different types of hand gestures in persuasive speech on receivers’ evaluations

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Hand gestures have a close link with speech and with social perception and persuasion processes, however to date no one has experimentally investigated the role of hand gestures alone in persuasive speech. An experiment with undergraduates was conducted using 5 video-messages in which only hand gestures of the speaker were manipulated along five types. ANOVAs reveal effect of gesture type on receivers’ evaluation of message persuasiveness, speaker communication style effectiveness, and speaker’s composure and competence. A control study (Experiment 2) confirms that these effects are due to visible gestures. Speech accompanying gestures appear to play a causal role in social perception.

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INTRODUCTION

In the gesture literature, hand gestures have been considered in coordination with speech (Kendon, 1994; McNeill, 2000; Rime & Schiaratura, 1991). Several studies have focused on the speech-gesture relationship (Alibali, Flevares, & Goldin-Meadow, 1997; Beattie & Shovelton, 2000, 2002; Goldin-Meadow, 1999; Kelly & Church, 1998) or on the purpose hand gestures for speakers (Alibali, Kita, & Young, 2000; Butterworth & Beattie, 1978; Feyereisen & Havard, 1999; Freedman, 1977; Hadar, 1989; Hadar & Butterworth, 1997; Krauss, Chen, & Chawla, 1996; Rimè & Shiaratura, 1991).

Other work has focused on the gesture perceivers' point of view, arguing that gestures are produced in order to aid comprehension by the listener (Beattie & Shovelton, 1999; Kendon, 1994; Özyürek, 2002). 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 (Ekman & Friesen, 1969; McNeill, 1992), hand movements are distinguished as: illustrators or ideational gestures (e.g., iconic, metaphoric, deictic), related to semantic content of concurrent speech; conversational gestures (e.g., cohesive and beats), accompanying speech without a relation to the semantic content; and adaptors, which include self-addressed, and object-addressed or person-addressed movements.

Studies on gesture perception have found that illustrators, used during speech, improve the addressee’s attention, accuracy of understanding (Berger & Popelka, 1971; Graham & Argyle, 1975), as well as recognition and memory about the content described by the sender in her/his discourse (Beattie & Shovelton, 2006; Riseborough, 1981). Illustrators then should have the property of ‘disambiguating’ and clarifying discourse content (Beattie & Shovelton, 2005; Holle & Gunter, 2007). Other studies have demonstrated that object-adaptors, as well as self-adaptors are associated with perception of anxiety, nervousness, and, in some case, deception (Henningsen, Valde, & Davies, 2005). On the other hand, some studies have also found no link between these variables and the production of self/object-adaptor movements (Caso, Maricchiolo, Bonaiuto, Vrij, & Mann, 2006; DePaulo, Lindsay, Malone, Muhlenbruck, Charlton, & Cooper, 2003; deTurck & Miller, 1985). Burgoon, Birk, and Pfau (1990) even found adaptors were negatively correlated to perceived persuasiveness. There are no studies on the perception of other types of gesture. Butterworth and Hadar (1989), however, argue that beats (small single movements stressing words; McNeill, 1985) ‘may enhance communicative effectiveness of emphatic
stress’ (Butterworth & Hadar, 1989, p. 172). However, the effects of this and several categories of gestures on receivers’ perception and evaluation have not been experimentally tested. Moreover, no research has simultaneously considered all gesture categories at the same time.

Gestures can also provide the receiver with information about the speaker (e.g., about her/his cognitive processes during speech, speaker attitude, emotion, etc.; Ekman & Friesen, 1969; Krauss, et al., 1996). Listeners can use gestures and other nonverbal elements to perceive and evaluate the speaker’s features, or her/his attitudes/intentions (Patterson, 1982, 2001), but seldom are they aware of utilizing them to make such judgements about their interlocutors. Grahe and Bernieri (1999), for example, demonstrated that perceivers of dyadic interaction are accurate in judging the degree of rapport in a video-alone condition, particularly when viewing nonverbal cues link with relationship expression (synchrony, proximity, and expressivity). In a successive study, Grahe and Bernieri (2002) found that subjects are less aware of using objective cues (e.g., gestures, head nods, etc.) than subjective cues (e.g., warmth, agreeableness, etc.) in interpersonal judgements. In these studies gesture frequency correlated with rapport judgement accuracy only when verbal cues too were also accessible. Such results on the one hand improve the importance of speech-gesture link, but on the other hand suggest that gestures could affect the perception of social abilities, as well as other individual traits (e.g., competence, persuasiveness, credibility).

Classical studies on interpersonal and social perception and judgement (Asch, 1946; Bales, 1950; Fiske, Cuddy, & Glick, 2007; Rosenberg, Nelson, & Vivekanthan, 1968) found that two dimensions underlie most judgements. Although the definitions and labels may vary, one dimension typically refers to attributes such as warmth, friendliness, sociability, and the other to attributes such as competence, agency, and efficacy.

Classically, the study of persuasion concerns the variables and processes that govern the formation and change of attitudes (Chaiken, Wood, & Eagly, 1996; Eagly & Chaiken, 1993; McGuire, 1966; Petty & Wegener, 1998). Traditional theories on the persuasion process when addressing persuasive communication tried to clarify the role of source’s, message’s and receiver’s features in this process (Hovland, Janis, & Kelley, 1953). These studies suggest that some communicator features, such as credibility in terms of expertise and trustworthiness (Hovland & Weiss, 1951), and/or attractiveness (Chaiken, 1979; DeGroot & Motowidlo, 1999; Mills & Aronson, 1965) would have positive effects on attitude formation and change as well as on the receiver’s evaluation of source and message. Such source features, attractiveness and credibility, can be assimilated to personality dimensions such as warmth and competence.

According to Chaiken (1979), a communicator of a persuasive message may improve his/her efficacy through an effective communicative style. A
speaker’s communication style is a way to affect the perception of her/his features by those receiving the message.

Even though the overwhelming majority of research has highlighted that verbal communication style is the main component of powerful communication (Hollander, 1985; Ng, Bell, & Brooke, 1993), nonverbal characteristics can be important in communication as well.

Some nonverbal parameters have been associated with perceptions of a credibility, persuasiveness, competency, or effectiveness of the communicator (Aguinis, Simonsen, & Pierce, 1998; Burgoon et al., 1990; Carli, LaFleur, & Loeber, 1995; Leigh & Summers, 2002; Mehrabian, 1970; Mehrabian & Williams, 1969; Schultheiss & Brunstein, 2002). Mehrabian and Williams (1969) found that the degree of liking – nonverbally communicated by high speech volume, high speech rate, higher rate of gesticulation, high eye contact with the addressee, length communications, high facial activity – was positively correlated with the perceived persuasiveness of communication. Burgoon et al. (1990) found that many nonverbal behaviours were associated with different social judgements: vocal cues (fluency and pitch variety) correlated with competence judgements and persuasiveness, while kinesic (illustrator gestures and facial expressiveness) and proxemic (eye contacts) cues were correlated with sociability and character perceptions. Object-adaptors negatively correlated with persuasiveness. The authors found that credibility judgement measures, as competence, sociability, character, composure, and dynamism correlated with persuasiveness and that among these only competence perception predicted persuasion.

As far as experimental tests are concerned, a study demonstrated that different nonverbal styles can affect likeableness, competence, powerfulness, anxiety, and degree of threat and social influence. Social nonverbal style (moderate vocal volume, relaxed posture, friendly facial expression, moderately high amount of eye contact) increased likeability while 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; dominant (loud voice, angry tone, intrusive pointings, constant eye contact, stern facial expression) and submissive (soft, pleading voice, many hesitations and stumbles, slumped posture, nervous hand gestures, averted gaze) nonverbal style increased threat and anxiety perception respectively. Only likeability and competence perceptions were found to affect social influence (Carli et al., 1995).

As far as hand gestures are concerned, few researches have examined their role in perceived effectiveness of the speaker or in persuasive processes. Argentin, Ghiglione, and Dorna (1990), for example, presented university students with two political discourses in which the same verbal discourse was repeated by the same politician changing only his hand gestures. The
politician was perceived as more persuasive when he used many metaphoric gestures, few self-adaptors, and a reasonable amount of punctuate gestures (beats, rhythmical gestures).

No studies have systematically and experimentally examined the effect of only hand gestures on perceptions of speaker effectiveness during a persuasive communication. Previous research has examined the persuasive role of hand gestures only in correlational studies (e.g., Burgoon et al., 1990; Mehrabian & Williams, 1969). Other researches examined gestures experimentally, but not in a crystal clear manner. For example, they either manipulated a global nonverbal style, including six or seven different nonverbal signals at the same time (e.g., Carli et al., 1995); or they manipulated more gesture types in the same experimental condition (e.g., Argentin et al., 1990). On the whole, studies devoted to systematically investigating the effectiveness of each single type of different gestures in persuasive communication remain insufficient. Previous research has not demonstrated how each single category of gesture performed by a speaker during speech is perceived by receivers.

Different types of hand gestures used by a speaker of a persuasive message (a source of persuasive communication) could be used by receivers in different ways to make inferences about personal and social features of the speaker (i.e., warmth, competence, persuasiveness, etc.), his/her communicative effectiveness, and his/her message. No studies have yet tried to demonstrate the role of gestures in such a process, manipulating experimentally the whole range of a speaker’s hand gesture across different main gesture categories (ideational, conversational, self-addressed adaptors, object-addressed adaptors), while holding constant remaining source features.

On the basis of these theoretical considerations, two experiments were designed to experimentally test the effect of the main hand gesture categories on perception and evaluation of a speaker and her communication. Keeping the verbal content constant, one message was prepared in five different versions, manipulating only the speaker’s hand gestures (ideational, conversational, self-addressed adaptors, object-addressed adaptors, and absence of gestures). Ten subjects were randomly assigned to each version (experimental condition). After seeing the video, each receiver evaluated speaker and message through a self-administered questionnaire with a list of adjectives. They were also asked to express attitude and vote intention about the issue presented in the message.

Our aim is to compare in a unique experimental design multiple kinds of gestures among themselves and against a no-gesture control condition to test their effect on speaker and message perception and on the persuasion process.

The main hypothesis is that the manipulation of speaker’s gestures has an effect on receivers’ perceptions. The dependent variables considered
are: communicative effectiveness, competence, composure, and warmth of
the speaker, and persuasiveness of the message. In particular, ideational
gestures, which make discourse more understandable (Beattie & Shovelton,
2005; Graham & Argyle, 1975), and conversational gesture (cohesive and
beats), which enhance discourse emphasis (Butterworth & Hadar, 1989), are
expected to increase effectiveness, competence, persuasiveness perceptions,
and persuasion compared to self-addressed and object-addressed adaptors,
which should decrease perception of speaker composure and message
persuasiveness (Burgoon et al., 1990). A condition with no gestures is used
as control condition and it is expected to have either an average or higher
mean compared to the other four conditions (ideational, conversational,
object-addressed adaptors, self-addressed adaptors).

No effects of gestures are expected on warmth, since in previous research
this feature was related to other nonverbal features such as smile and eye
contact (Burgoon et al., 1990; Carli et al., 1995).

In order to ensure that the above-mentioned effects are attributable only
to gesture, a second experiment was carried out: an ‘audio-only’ version of
the stimuli was evaluated by other subjects in a repeated measures design.
The hypothesis is that such stimuli versions are evaluated in the same way
(no main effects of the manipulated variable – gesture type) on effectiveness,
competence, persuasiveness perceptions.

PRELIMINARY SURVEY

As stimulus for the experiments, a video-message, lasting 2 minutes and 30
seconds, was prepared, in which a professional actress provides arguments
supporting the proposal of introducing a 20% increase of university fees for
the students of the Second University of Naples. A preliminary survey had
been conducted in order to choose the message topic and the arguments
supporting it. Thirty-nine university students (13 males, 26 females)
participated in this research section.

The survey, consisting of a series of qualitative interviews and ques-
tionnaires gathered within the target population (university students),
measured their degree of involvement, knowledge and agreement about a
wide number of university issues. This was done in order to be sure that the
target population in the experiments herein would perceive the verbal
content as relevant and have a negative attitude towards it. Students in the
preliminary survey (1–7 response scale: respectively, 1 ‘I do not have any
interest in the issue’, 7 ‘I am very interested in the issue’; 1 ‘I totally ignore
the issue’, 7 ‘I perfectly know the issue’; 1, I totally disagree with the issue, 7,
I totally agree with the issue) showed medium-high involvement ($m = 4.88;
SD = 1.99$), medium degree of knowledge ($m = 4.41; SD = 1.94$) and low
agreement \((m = 2.04; \ SD = 1.16)\) towards the issue of raising university fees. The verbal message structure was defined by choosing four crucial arguments supporting the topic: from the student preliminary survey, two of them resulted to have medium-high agreement \((m > 4.85)\) and high involvement \((m > 5)\).

Five experimental conditions were then constructed, differing from each other only by type of gesture by the actress during her speech, with the content of the messages kept identical (see Appendix).

**EXPERIMENT 1**

**Method**

**Participants.** Fifty subjects (35 females, 15 males), aged 19–37 (mean age 22.2, \(\ SD \ 2.8\)), all university students of the Faculty of Psychology at the Second University of Naples, participated in the experiment.

**Materials.** Five experimental conditions were created on the basis of the types of gestures according to a taxonomical system conveying the main categories as discussed in the literature:

1. ideational gestures, linked to the semantic content of the speech: i.e., iconic, metaphoric, and deictic gestures;
2. conversational (cohesive and rhythmic) gestures, linked to the speech structure and rhythm;
3. object-addressed adaptors, hand movement of contact with objects;
4. self-addressed adaptors, hand movement of contact with parts of one’s own body;
5. absence of gesture (the speaker constantly kept her hands on the table without moving them).

Figure 1(a–e) show five frames extracted from the videos of each gesture condition.

Speech-gesture association was established on the basis of different hand gesture category features, mainly for ideational conditions: for example, iconic drawing objects, pointing indicating entities, illustrators describing action, etc. The gesture amount (36 gestures per video, that is, an average rate of about 14 gestures per minute; see Appendix) was maintained equal.

The rate of gestures was kept constant across the five experimental conditions and across each video in order to rule out effects due to frequency or distribution of gestures, rather than to gesture types. This rate was based on preliminary descriptive studies on group and dyadic interactions
video-recorded from samples of the same population from which the present experimental sample has been taken.

Since the aim was isolating and manipulating single gesture aspects (hand gestures) for measuring their influence on message and speaker evaluation, other nonverbal parameters (posture, head and legs movements, face expressions, visual gaze, physical appearance) were controlled and

Figure 1. Frames extracted from each of the five video-messages, representing each gesture level: (a) ideational, (b) conversational, (c) object-adaptor, (d) self-adaptor gestures and (e) absence of gestures (no-gestures).
maintained constant. The actress was always standing behind a white table (her legs were not visible) on which there were a pen and a spectacles-case (touched and manipulated by the actress in the object-addressed adaptors condition); she had on spectacles and a black dress (neutral clothes were selected aiming to avoid signals about source social status); she kept constant posture, head movement and facial expression across the five experimental conditions. A number of preliminary versions of the five videos were developed before the final set.

_Procedure._ Ten subjects (F = 7, M = 3) were randomly assigned, controlling for sex, to each of the five experimental conditions. During recruiting, each subject was asked to participate in a university survey and brought to the lab of psycho-physiology of the Second University of Naples, where s/he sat in front of a monitor connected to the personal computer of the experimenter. The experimenter managed the interfaces sequence screened on the monitor of the subject. The first screen presented the issue (20% increase of university fees) and a survey about it, as follows:

‘The University Council is discussing the possibility of 20% increasing the university fees from the next academic year for all university students. The Council decided to hear many opinions before the decision making. With such aim, the university delegations carried out some video-messages for presenting their points of view about this issue. We are asking students to evaluate the general quality of these video-messages before submitting them to the vision of the University Council.

So we ask you to CAREFULLY examine one of these video-messages and to answer some questions for the general evaluation of it’.

Then the experimenter started one video-message out of the five conditions. After looking at the video-message the subject answered an online questionnaire presented on the monitor. At the end of the questionnaire, the subjects were thanked and explained that the issue (university fees increase) was only part of the experiment and they were debriefed about its true aim and dismissed.

_Measures._ Fourteen measures were gathered through the questionnaire. They include the evaluation of the speaker (10 measures), her communicative style (1 measure), message persuasiveness (1 measure), the receiver’s attitude (favourable or unfavourable) towards the fees increase, and her/his intention to vote about it (items selected from a pilot study and relevant literature; Burgoon et al., 1990; Carli et al., 1995; Leigh & Summers, 2002).

As far as the evaluations, the subjects were asked to evaluate, on a 0–10 response scale:
a. the effectiveness of speaker’s communicative style (‘How do you evaluate the communicative style of the speaker?’ 0 = not at all effective; 10 = completely effective);
b. the speaker (‘How do you evaluate the speaker of the message?’) through 10 adjectives: friendly (0 = not at all friendly; 10 = completely friendly), interesting, pleasant, calm, relaxed, confident, competent, expert, credible, and convinced;
c. the persuasiveness of the message (‘How do you evaluate the message?’ 0 = not at all persuasive; 10 = completely persuasive).

As far as the attitude measures, verbal attitude and intention to vote were gathered: there was a single question along a 0–10 response scale (0 = completely disagree; 10 completely agree) about the receivers’ attitude towards the university fees increase (verbal measures of attitude: ‘How much do you agree about the university fees increase?’). The subject was also asked (0–10 disagreement-agreement response scale) about her/his vote in favour to the university fees increase (vote intention: ‘Would you vote in favour to the University fees increase?’).

**Manipulation check.** In order to control likely effects of other nonverbal features on the measures, the same subjects were also asked to evaluate, along a 0–10 response scale, the degree of their attention to and the perceived effectiveness of each one of the following communicative features of the speaker: hand gestures, facial expression, posture, physical appearance, clothing, and gaze. Attention was assessed by asking ‘How much attention did you pay to the following communicative features of the speaker?’; for each of the above-mentioned features they answered on a 0–10 scale (0, I did not pay any attention, 10, I paid full attention). Perceived effectiveness was measured as: ‘How much do you think each one of the following speaker’s communicative features was effective?’; for each of the above-mentioned features they answered on a 0–10 scale (0, not at all effective, 10, completely effective). For the measures (perceived effectiveness and paid attention), differences among the five experimental conditions are expected only when the measures refer to hand gestures. No differences are expected across the five experimental conditions when effectiveness and attention are evaluated for all other bodily features.

**Data analysis.** In order to simplify analysis of evaluation of the speaker, a principal-components factor analysis with varimax rotation was conducted on the 10 measures referring to the speaker, with the aim of identifying underlying dimensions of speaker’s traits perception (e.g., warmth and competence, or credibility and attractiveness) in the adjectives set.
To test the main hypothesis, one-way analyses of variance (ANOVA) were carried out to test the effect of gesture types (5-level factor) on all the measures.

Results

**Manipulation check.** A total of 12 one-way ANOVAs were carried out, six with the evaluations of the effectiveness of the six different communicative features (hand gesture, facial expression, posture, physical appearance, clothing, gaze) as dependent variables and six with the amount of attention paid to the same six features as dependent variables.

A one-way ANOVA reveals a marginal significance for the gesture types effect on the evaluation of gesture effectiveness, $F(4, 45) = 2.172$, $p = .087$. Duncan post-hoc analyses (Table 1) revealed two homogeneous subsets (for alpha $= .05$). In particular, subjects in the ideational gestures condition rated the speaker’s hand gesture significantly more effective than those in the object-addressed and self-addressed adaptors condition. As expected, there are no significant effects of gesture type on the evaluations of effectiveness of all the other five features of the speaker’s communicative style: facial expression, $F(4, 45) = 0.03$; posture, $F(4, 45) = 0.36$; physical appearance, $F(4, 45) = 0.38$; clothing, $F(4, 45) = 0.48$; gaze $F(4, 45) = 0.89$.

As far as the amount of attention paid to the six communicative features, as expected, a one-way ANOVA reveals a significant effect of gesture type on the attention paid to hand gestures, $F(4, 45) = 7.978$, $p < .001$. Duncan post-hoc analyses (Table 1) reveal three homogeneous subsets. In particular, subjects in the no gesture (gesture absence) condition paid less attention to speaker’s hand gesture compared with the subjects in the ideational, conversational gestures condition and to the self-addressed, and object-addressed adaptors conditions. Moreover the subjects in the object-addressed adaptors condition paid more attention to speaker hand gesture than the subjects in the ideational gesture condition. As expected, there are no significant effects of gesture type on attention to the other five features of the speaker’s communicative style: facial expression, $F(4, 45) = 0.39$; posture, $F(4, 45) = 1.49$; physical appearance, $F(4, 45) = 0.46$; clothing, $F(4, 45) = 0.64$; gaze $F(4, 45) = 0.63$.

In sum, ideational gestures are valued as more effective than adaptors; and, obviously, subjects paid less attention to hand gestures when they were absent, while they paid more attention to object-adaptors than ideational gestures. On the whole, this set of analyses shows that the five experimental conditions are perceived as different only in speaker’s hand gesture and not in speaker’s facial expression, posture, physical appearance, clothing, gaze, and vocal cues.
<table>
<thead>
<tr>
<th>Measure</th>
<th>Gesture condition</th>
<th>Ideational</th>
<th>Conversational</th>
<th>Object-addressed</th>
<th>Self-addressed</th>
<th>No gesture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand gesture effectiveness</td>
<td>5.9&lt;sup&gt;a&lt;/sup&gt;</td>
<td>5&lt;sup&gt;a-b&lt;/sup&gt;</td>
<td>2.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.6&lt;sup&gt;a-b&lt;/sup&gt;</td>
<td></td>
</tr>
<tr>
<td>Attention to hand gesture</td>
<td>6.7&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.9&lt;sup&gt;a-b&lt;/sup&gt;</td>
<td>9.0&lt;sup&gt;a&lt;/sup&gt;</td>
<td>8.30&lt;sup&gt;a-b&lt;/sup&gt;</td>
<td>4.5&lt;sup&gt;c&lt;/sup&gt;</td>
<td></td>
</tr>
</tbody>
</table>

0–10 scale range: 0 = not at all effective, 10 = completely effective; 0 = I did not pay any attention, 10 = I paid full attention.

<sup>a, b, c</sup> indicate three homogeneous subsets that are significantly different from each other for Duncan post-hoc analyses.
Hypotheses testing. From the principal-components factor analysis (varimax rotation method) on measures of speaker evaluation, three factors were extracted (69.35% of total variance explained). Individual variables were combined based on the size of their factor loadings; variables were assigned to factors for which they had the highest loadings (Table 2). The factors and their alpha reliabilities were as follows: composure \( (x = .85) \) included rating of calm, relaxed, confident; warmth (or attractiveness/likeableness, \( x = .68 \)) included pleasant, friendly, interesting; competence (or credibility, \( x = .70 \)) included convinced, competent, credible, and expert. Factor scores were estimated through the SPSS default regression method (SPSS, 1999). The estimates of the factors can be expressed as a linear combination of the measures. Thus, for a given participant, the (estimated) factor score for each factor can be computed as a linear combination of his/her responses to the measures. The scores produced have a mean of 0 and the variance equals to the squared multiple correlations between the estimated factor scores and the true factor values (Tabachnick & Fidell, 1996). Table 3 reports the coefficients by which variables are multiplied to obtain the factor scores. The factor scores were used for the subsequent analyses of variance as measures of speaker evaluation for each factorial dimension.

A total of seven one-way ANOVAs, each with gesture type as a 5-level independent variable, were carried out, one for each of the seven different measures: composure, warmth, and competence of the speaker, effectiveness of the communicative style, persuasiveness of the message, attitude, and vote intention toward the fees raise.

<table>
<thead>
<tr>
<th>TABLE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotated Component Matrix: Factor loadings for the variables on the three extracted factors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measures</th>
<th>Composure</th>
<th>Warmth</th>
<th>Competence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calm</td>
<td>.899</td>
<td>.099</td>
<td>.016</td>
</tr>
<tr>
<td>Confident</td>
<td>.855</td>
<td>.001</td>
<td>.292</td>
</tr>
<tr>
<td>Relaxed</td>
<td>.822</td>
<td>.287</td>
<td>-.083</td>
</tr>
<tr>
<td>Pleasant</td>
<td>.072</td>
<td>.803</td>
<td>.230</td>
</tr>
<tr>
<td>Friendly</td>
<td>.055</td>
<td>.770</td>
<td>.172</td>
</tr>
<tr>
<td>Interesting</td>
<td>.402</td>
<td>.634</td>
<td>-.083</td>
</tr>
<tr>
<td>Convinced</td>
<td>.035</td>
<td>-.256</td>
<td>.765</td>
</tr>
<tr>
<td>Competent</td>
<td>.212</td>
<td>.400</td>
<td>.756</td>
</tr>
<tr>
<td>Credible</td>
<td>-.154</td>
<td>.275</td>
<td>.669</td>
</tr>
<tr>
<td>Expert</td>
<td>.286</td>
<td>.420</td>
<td>.635</td>
</tr>
</tbody>
</table>
ANOVAs reveal a significant effect of gesture type on the following measures:

a. Composure of the speaker, $F(4, 45) = 5.856, p < .001, \eta^2 = .29$;

b. Competence of the speaker, $F(4, 45) = 3.598, p < .05, \eta^2 = .31$;

c. Effectiveness of the speaker’s communication style, $F(4, 45) = 3.255, p < .05, \eta^2 = .22$;

d. Persuasiveness of the message, $F(4, 45) = 4.106, p < .05, \eta^2 = .27$.

No effect of gesture type was significant for warmth, $F(4, 45) = 0.869$, attitude, $F(4, 45) = 0.639$, or vote intention, $F(4, 45) = 0.828$.

Post-hoc analyses (Duncan test) were carried out for each significant ANOVA (see Table 4): for all the variables, two homogeneous subsets emerged (for alpha = .05).

Higher evaluations of speaker composure resulted for ideational gesture, for conversational gestures, and for the no gesture conditions compared to the self-adaptors and object-adaptors conditions. The speaker was perceived as more competent in the object-adaptors and ideational conditions compared with the absence of gesture condition. Higher evaluations of the effectiveness of the speaker’s communicative style occurred in the object-addressed adaptor, conversational gesture, and ideational gesture conditions, compared with the gesture absent condition. Higher evaluations of message persuasiveness resulted for object-addressed adaptor, ideational, and self-addressed adaptor conditions in comparison to the gesture absent condition.
<table>
<thead>
<tr>
<th>Measures</th>
<th>Ideational</th>
<th>Conversational</th>
<th>Object-addressed</th>
<th>Self-addressed</th>
<th>No gesture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Speaker composure</td>
<td>0.41a (.46)</td>
<td>0.48a (.85)</td>
<td>-0.73b (1.11)</td>
<td>-0.68b (1.05)</td>
<td>0.52a (.55)</td>
</tr>
<tr>
<td>Speaker warmth</td>
<td>0.01 (.40)</td>
<td>0.11 (1.27)</td>
<td>0.23 (.83)</td>
<td>0.21 (1.30)</td>
<td>-0.47 (.97)</td>
</tr>
<tr>
<td>Speaker competence</td>
<td>0.49a (.93)</td>
<td>0.04a-b (.60)</td>
<td>0.54a (.97)</td>
<td>-0.32a-b (.66)</td>
<td>-0.75b (1.23)</td>
</tr>
<tr>
<td>Style effectiveness</td>
<td>6.20a (1.81)</td>
<td>6.30a (1.70)</td>
<td>6.40a (1.07)</td>
<td>5.30a-b (2.50)</td>
<td>3.60b (2.80)</td>
</tr>
<tr>
<td>Message persuasiveness</td>
<td>5.70a (3.30)</td>
<td>3.30a-b (2.16)</td>
<td>5.80a (2.70)</td>
<td>4.40a (2.95)</td>
<td>1.70b (2.16)</td>
</tr>
<tr>
<td>Attitude</td>
<td>2.80 (2.94)</td>
<td>1.10 (1.29)</td>
<td>2.10 (1.91)</td>
<td>2.20 (2.82)</td>
<td>2.40 (3.03)</td>
</tr>
<tr>
<td>Voting intention</td>
<td>2.40 (3.60)</td>
<td>0.90 (1.60)</td>
<td>1.30 (1.64)</td>
<td>1.80 (3.05)</td>
<td>0.70 (1.16)</td>
</tr>
</tbody>
</table>

For speaker composure, warmth, and competence, factor scores are reported.
For other measures scale ranges are from 0 to 10 (0 = ‘not at all’; 10 = ‘completely’).

a, b indicate two homogeneous subsets that are significantly different from each other for Duncan post-hoc analyses.
EXPERIMENT 2
Since presence or absence of gesture could alter speech rate (Rauscher, Krauss, & Chen, 1996) and intonation pattern (Krahmer & Swerts, 2007), a further experiment in order to control for the possible effects of vocal features on the measures was carried out. The five ‘audio-only’ versions of the message from Experiment 1 were submitted to another group of participants in a repeated measures design. The hypothesis is that there would be no within-subjects effects of conditions on evaluation measures of the message and the speaker.

Method. Eleven students (5 males and 6 females) participated in the control experiment. All five gesture conditions but only in vocal form (i.e., no video) were presented to the 11 subjects ‘blind’ to the study aim, within lab setting. Each participant listened through headphones the five audio-recorded messages. At the end of each message the subjects completed a questionnaire measuring the same 12 evaluation measures as used in Experiment 1.

Data analyses. Five repeated measures ANOVAs, using gesture type (experimental variable) as within-subject factor, were carried out on the same evaluation measures gathered in Experiment 1. Due the low amount of subjects, factor analysis could not be performed. Average scores of the variables of each dimensions extracted in the factor analysis from the previous experiment were calculated.

Results
Repeated measures ANOVAs, comparing the evaluations among the audio of the five experimental conditions, show no significant effects of gesture variable on any of the measures:

a. evaluations of the speaker: composure, $F(4, 40) = 0.763$; warmth, $F(4, 40) = 1.53$; competence, $F(4, 40) = 0.804$;
b. style effectiveness: $F(4, 40) = 0.635$;
c. message persuasiveness: $F(4, 40) = 0.202$.

On the basis of the audio only, participants perceived and evaluated the speaker, her communicative style, and the message of the five different experimental conditions in the same way (Table 5). The differences found in Experiment 1 are attributable to the speaker’s visual gestures and not any audio cues.
<table>
<thead>
<tr>
<th>Measures</th>
<th>Ideational</th>
<th>Conversational</th>
<th>Object-addressed</th>
<th>Self-addressed</th>
<th>No gesture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaker composure</td>
<td>4.24 (1.12)</td>
<td>4.48 (0.98)</td>
<td>4.30 (1.21)</td>
<td>4.24 (0.98)</td>
<td>4.76 (0.67)</td>
</tr>
<tr>
<td>Speaker warmth</td>
<td>3.67 (0.70)</td>
<td>4.03 (0.59)</td>
<td>3.91 (0.75)</td>
<td>3.70 (0.96)</td>
<td>4.09 (0.73)</td>
</tr>
<tr>
<td>Speaker competence</td>
<td>3.94 (0.83)</td>
<td>3.97 (0.79)</td>
<td>3.91 (1.16)</td>
<td>3.79 (1.07)</td>
<td>4.27 (0.77)</td>
</tr>
<tr>
<td>Style effectiveness</td>
<td>3.63 (1.21)</td>
<td>4.00 (1.34)</td>
<td>4.09 (1.37)</td>
<td>3.64 (1.57)</td>
<td>4.09 (1.14)</td>
</tr>
<tr>
<td>Message persuasiveness</td>
<td>3.36 (0.68)</td>
<td>3.54 (1.29)</td>
<td>3.73 (1.10)</td>
<td>3.55 (1.57)</td>
<td>3.64 (1.12)</td>
</tr>
</tbody>
</table>

For speaker composure, warmth, and competence, average scores are reported (for all variables scale ranges from 0–8).
DISCUSSION

The study addressed the causal effect of a speaker’s hand gesture on the receiver’s assessment of the speaker and her persuasive message. While scholars have argued in favour of a causal effect of gestures, their correlational research design has left the issue untested (Atkinson, 1984; Bull, 1986; Burgoon et al., 1990; Mehrabian & Williams, 1969). We show for the first time in a true experiment that hand gestures (ideational, conversational, object-addressed adaptors, self-addressed adaptors, and no gesture condition) cause differences in audience perceptions of both the message sender and the persuasiveness of the message.

Manipulation checks show that the hand gesture manipulation – a 2’30’ speech by a professional actress who held constant verbal, vocal, and bodily communication except hand gestures – was successful. Participants paid more attention to speaker’s hand gestures in condition of gesture presence than in the no-gesture condition. Furthermore, the speaker’s hand gestures were perceived by the receivers. Effectiveness was higher for ideational than for self-addressed and object-addressed adaptors. At the same time the five experimental conditions did not affect evaluations of speaker’s facial expression, posture, physical appearance, clothing, or gaze. Therefore, gesture in itself proved to be psychologically relevant and salient for subjects: they notice their presence and they can discriminate among them.

Principal components analysis showed three underlying dimensions of speaker’s features perception: composure, competence or credibility, and warmth or likeableness/attractiveness. This result is in line with previous research on speaker evaluation and social perception (Burgoon et al., 1990; Carli et al., 1995; Fiske et al., 2007). Other dimensions of speaker interpersonal features, such as powerfullness, threatening (Carli et al., 1995), were not found herein. This is probably due to the nature of the stimulus of this study, an oral persuasive speech in the form of monologue. This is different from the stimulus of Carli et al.’s study which involved an interactional dialogue where powerfullness and threat are probably more salient characteristics during the ongoing interactional dynamic.

Hand gesture type affected two out of the three factors of speaker evaluation and two out of the other four measured dependent variables, namely speaker composure and competence, speaker communication style effectiveness, and message persuasiveness. On the whole, these results show that the experimental manipulation of a speaker’s hand gesture type can affect interpersonal perception and judgement.

As far as the specific direction of the effect of hand gesture type is concerned, the hypothesised better efficacy of linked-to-speech gestures (ideational and conversational) compared with non-linked-to-speech gestures (self- and object-addressed adaptors), was confirmed for speaker
composure: ideational, absence, conversational vs. self- and object-addressed adaptors. The expected negative effects of adaptors on composure also confirm results of previous correlational researches that found adaptors as cues of anxiety and nervousness (Carli et al., 1995). Linked-to-speech gestures (ideational and conversational) also elevate ratings of perceived effectiveness of communicative style as found in previous studies for illustrators (Burgoon et al., 1990) and as hypothesised for beats (included in conversational condition) by Butterworth and Hadar (1989). Therefore, half of the measured speaker's attributes are more positively evaluated when the speaker talks using linked-to-speech gestures. This is consistent with previous observations (Burgoon et al., 1990; Carli et al., 1995; Leigh & Summers, 2002; Schultheiss & Brunstein, 2002). For the receiver's evaluation of the speaker (competence), object-addressed adaptors were evaluated as equally efficacious as linked-to-speech gesture types (object-addressed adaptors, ideational vs. absence). This result is not problematic since other observations claim that during ongoing interactions, object-addressed adaptors are characteristics of leadership and social influence (Burgoon et al., 1990; Henley, 1977; Moore & Porter, 1988). Finally, on one dependent variable, message persuasiveness, self-addressed adaptors trigger more positive evaluations than expected (object-addressed adaptors, ideational, self-addressed adaptors vs. absence). This result shows that for the perception of message persuasiveness both non-linked-to-speech gesture and ideational gesture are better than absence of gestures.

On the whole, results showed that linked-to-speech gestures in general are usually better than non-linked-to-speech gestures in affecting message evaluation and judgements about the speaker by the receivers.

Ideational gestures are perceived as more effective and make the speaker appear more composed and competent, as well as having a more effective style and conveying a more persuasive message. In general, ideational gesture revealed to be the gesture type with the strongest positive effect.

Absence of gestures from a speaker who is providing a message which is contrary to the receiver’s opinion is in general evaluated negatively. This could be due to the fact that in this case gestures do not interact with speech, so the perceiver pays attention only to the (negative) content of the message. Only for speaker composure, which compared with other evaluations can be less linked to speech content, did the no-gesture condition lead to higher values than the adaptors-conditions. This unexpected variability could be also linked to the differential meaning that the absence of gesture has within a cultural/linguistic context across different social situations as well as across cultural/linguistic contexts. Since gesture-speech occurrence has been claimed to be culturally variable (Kendon, 2004), results for the gesture absence condition are particularly in need of cross-cultural comparison. It is possible that while the asymmetry generally favouring linked-to-speech
gesture over non-linked-to-speech gesture can be expected cross-culturally, the relative advantage/disadvantage of the gesture absent condition is particularly sensitive to cross-cultural variability. It should be borne in mind that this study was carried out in Italy, a culture in which, traditionally, hand gestures are very important in communication (Kendon, 1995).

With respect to adaptors, their relation with anxiety, nervousness, and emotional insecurity seem established: adaptors gestures negatively affect speaker’s composure, compared with other kinds of gesture and to gesture absence. Moreover, self-adaptors only result in a lower impression of speaker’s competence. Notwithstanding such effects, however, this study also highlights that, in the presence of a negative message, both adaptors can be efficacious in other respects, i.e., in conveying both an efficacious speaker’s style and the persuasiveness of her message.

As far as attitude and vote intention are concerned, speaker’s hand gestures had no direct effect on the receivers’ attitude or voting intention about the issue addressed in the message. The reason for these null results could be that these measures investigated subjects’ attitudes toward the topic of the message rather than towards the speaker. In the questionnaire, subjects were requested to express their evaluations about the speaker and about her message on the topic. They were not queried about their attitude towards the speaker (or a vote intention about, for example, her likely election as a university officer or as the spokesperson or testimonial for the issue), but subjects were asked about their attitude and intentions surrounding the topic of the message. It is possible therefore that if subsequent measures inquired about the speaker (e.g., attitude towards her and voting intentions and actual vote for her) hand gesture might also affect these measures and evaluations measures might mediate such effect. This issue is also in line with the ‘specificity issue’ in classical attitude-behaviour literature (Ajzen & Fishbein, 1977). The relevance of this for the present kind of research can be empirically addressed in future research.

Such an issue, and the above-mentioned argument, are also relevant for theoretical models on the importance of a speaker’s bodily communication for social judgement formation and, in turn, for social behaviour (Patterson, 2001).

As far as the present research is concerned, it should be noted that the findings of the current study regarding the difference among different gesture types cannot be explained by any differences in vocal signals. Experiment 2 shows that, administering the experimental conditions in an audio-only version, no differences in the measures emerged. The audio alone did not generate the effects found in Experiment 1. This means that, having held constant all other relevant communicative features of the speaker (as the manipulation check measures showed), all of the effects found in Experiment 1 can be attributed solely to the speaker’s hand gestures.
Further research can address possible relations among the dependent variables. For example, some of the evaluations pertaining to the message could be correlated to evaluations of the source (e.g., speaker competence/credibility). Message persuasiveness, having the same pattern of evaluation results in the present study, could be conceptually linked and therefore empirically interdependent. When the speaker is evaluated as a competent source (e.g., thanks to type of hand gestures), the receiver is in turn more oriented to evaluate the messages as persuasive. Procedural variations in the adopted paradigm should be adopted in the future to address the point, via mediation analysis on larger samples. Other questions could be addressed with this paradigm, including relevant variables from persuasive communication research: e.g., manipulating the receiver’s involvement in the topic presented in the message (high vs. low involvement, Petty & Cacioppo, 1986) or the formal verbal features of the speech (e.g., powerful vs. powerless speech, Ng & Bradac, 1993). Finally, in order to evaluate the generalisability of our funding, gender and age should be varied in larger samples, and cross-cultural comparisons should be carried out. Some of these developments are the current focus of our ongoing investigations.

Given that this experimental study has found that gestures have a role in conveying a negative message, further research should explore the effects of different kinds of message (e.g., positive vs. negative) mediated by different types of gesture.

Our results confirm that it is possible to experimentally manipulate a speaker’s hand gestures keeping constant other communicative features. Such a paradigm provides a firm foundation for establishing a cause-effect relationship among type of speaker’s hand gestures and the audience’s reaction. These results also highlight the importance of bodily communication and of hand gesture in particular, in the study of social perception and judgement within persuasive communication.

REFERENCES


APPENDIX

English translation (first line) and original Italian version (in italics, second line) of the experimental stimulus message, and gestures location and description: ideational gesture condition (third line), conversational gesture condition (fourth line), object-adaptors condition (fifth line), self-adaptor condition (sixth line). Gestures are performed about in co-occurrence of the underlined words.

First of all I’d like to express my opinion about this
Vorrei cominciare questo intervento comunicando che mi trovo ad essere favorevole a questo

iconic (ic): thumb up (‘one’)

cohesive (co): palms up (backward and forward movements)

object-adaptor (oa): taking the pen with the right hand and pass it to the left one

self-adaptor (sa): putting the hair behind the ear

administrative decision.

provvedimento.

deictic (de): index down (abstract pointing - ap)

beats (bt): up down movements of one hand

slowly turning the pen through the fingers

arranging spectacles

I think there are many reasons why I quite agree with the proposal for raising
Penso che ci siano diversi motivi per cui si potrebbe essere favorevoli all’aumento delle tasse

de: fingers on the actress’s breasts (‘I’) metaphor (mt): down-top movement

cq: one hand repetitive movement co: turning hand movement

quickly moving the pen

pushing the pen’s tongue with the thumb

scratching the nose

arranging the clothes

University fees by 20%,
universitarie del 20%.

It would improve University teaching and the
Intanto, questo provvedimento potrebbe essere utile a migliorare l’insegnamento universitario e

de: index down (ap) mt: backward-forward hand movement

cq: one hand palm up movement co: repetitive turning hand movement

scratching the table

continuing (ctg)

rubbing the hands

ttg

the didactic organisation of theoretical units, laboratories, and exams; moreover,
l’articolazione didattica dei moduli teorici, dei laboratori e degli esami di valutazione; inoltre,

metaphoric; iconic: thumb up (‘one’); thumb and index (‘two’); thumb, index and middle (three)

bt: repetitive top-down movements thumping on the table ctg

slowly turning the spectacles-case drumming with the fingers on the table

ttting

turning the ring around the finger
ttg

It could improve both the theoretical knowledge and the practical competences of prospective
potrebbe incrementare la preparazione teorica e le competenze pratiche dei futuri

mt: down-top hand movement

cq: repetitive turning little movements

drumming with the fingers on the table

touching her nape
graduates in Psychology in order to give them, after finishing their studies,
laureati in Psychologia. Infatti, credo che questo miglioramento in qualche modo potrebbe
de: indexes towards left and right (ap, indicating the Faculty)
co: repetitive left-right little movements
taking the pen and passes it on a hand to an other
arranging the hair

more opportunities to enter into the world of work.
Consentire ad una buona parte dei i futuri psicologi di collocarsi meglio nel mondo del lavoro.
mit: one hand fingertips towards down
bt: repetitive top-down little movements (one finger)
unscrewing and screwing the pen
arranging the pullover

Then, it could give a real impetus to the development and progress
Inoltre, questo provvedimento potrebbe servire in un certo senso allo sviluppo e all’avanzamento
ap (index towards down)  
co: repetitive movements, both hands move near and far each other, the fingertips touch each other
fiddling with the pen
opening/closing the pen
touching the nape
arranging the hair

of Italian scientific research in the psychological field. This would result
della ricerca scientifica italiana in campo psicologico. Questo potrebbe essere probabilmente un

of keeping pace with the other international scientific communities regarding both knowledge and
modo per essere al passo con le comunità scientifiche internazionali nelle conoscenze e anche nei
mt
bt
co: both hands repeatedly move horizontally
pen right/left
scratching the nose
arranging the clothes

country would occur.
Paese.

Then, again, thanks to this administrative action the Faculties of Psychology could become
Poi, penso che grazie a questo provvedimento, le facoltà di Psicologia potrebbero anche adeguarsi
de: pointing her own
co: palms up (backward and forward movements)
drumming on the table
arranging the clothes

comparable to other scientific faculties such as Chemistry, Biology,
ai nuovi standard delle altre facoltà scientifiche, come, ad esempio le facoltà di Chimica, Biologia,
counting: one, two,
co: repetitive turning hand movements
rubbing the hands

counting: opening/closing the spectacles-case
touching the watch
HAND GESTURES PERSUASIVENESS

Medicine and others which have already considered a 20% increase.

Medicina, eccetera, che non a caso stanno già considerando questa possibilità di maggiorare le
three index left-right (‘no’)
co: repeated palms up (backward and forward movements)
turning the spectacles-case in the hands
arranging the clothes in three movements

tasse universitarie del 20%.

Finally, as a further reason in favour of this proposal, I have to point out that some
Infine, un possibile motivo per cui si potrebbe essere favorevole riguarda gli esiti di alcune
mt
co: repetitive left-right little movements
rubbing a finger on the table
touching the eyebrow

economic analyses have shown that the increment in fees
analisi economiche. Dalle quali risulterebbe che questa maggiorazione delle tasse universitarie
ap: right hand points on left palm-up
mt
co: repetitive left-right little movements
ctg
touching the eye
co: repetitive turning movements of both hands
turning the pen on the table
touching the necklace

would bring the Faculties improved architectural
potrebbe permettere alle facoltà di migliorare anche alcuni degli aspetti fisico-architettonici della
mt
co: repeated movements, hand fingers close to clamp and touch each other
unscrewing and screwing the pen
arranging the hair
fiddling with the pen
ctg

structures and a higher environmental quality. Rooms and facilities would be
strutture e si potrebbero rendere più vivibili gli ambienti. Si potrebbero avere aule e sale lettura
ap
co: one hand repetitive turning little movements
ctg
scratching the table
touching the nose

more usable (along with hallways and socialisation and meeting places); laboratories
un po’ più agibili (come anche i percorsi, gli spazi di incontro e di socializzazioni); i laboratori
mt
turning the spectacles-case on the table
rubbing the hands

could be better equipped, libraries would be richer; bulletin boards would be
potrebbero semmai essere più attrezzati, le biblioteche più fornite; le bacheche informative un po’
mt
mt
the same co
spectacles-case in the hands
arranging the hair
co: repetitive left-right
tctg
ctg
more easily accessible. I also think secretarial offices and
più accessibili, e penso che potrebbero diventare più efficienti sia i servizi di segreteria sia quelli
mt
little movements of both hands
rubbing the eyeglass-case on the table
arranging the clothes

Internet information service would become more efficient.
d’informazione su Internet.

I think, therefore, that it would be useful to consider this act a necessity,
Penso dunque che sarebbe utile riflettere sulla necessità di questo provvedimento, perché

mt
c: repetitive movements
scratching the table
arranging the eyeglass

because it could be one of the first step towards Faculty development, but
eventualmente potrebbe essere uno dei primi passi verso un possibile sviluppo della facoltà, ma

bt
‘one’
co: palms up
drumming
passing the pen on a hand to an other
touching the watch
rubbing the hands

also towards the growth of the disciplines of psychology and of the general University.
anche verso una crescita delle discipline psicologiche e dell’istituzione universitaria in generale.

two,
ctg
continuing
arranging the hair
three
ctg

fiddling with the pen
ctg