

## *Forte, piano, crescendo, diminuendo.* **Gestures of intensity in orchestra and choir conduction**

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### **Abstract**

Starting from the hypothesis that the signals used in conducting are systematic and shared, so as to make up a lexicon, this work finds out and analyses 23 gesture types, and 11 values in their parameters, that within the body signals of choir and orchestra conductors convey intensity indications: *piano*, *forte*, *crescendo*, *diminuendo*. The gestures selected from a corpus of concerts and rehearsals are analysed through an annotation scheme that describes the body signals soliciting dynamic action, their precise meanings, and the semiotic devices used; for example, enlarging arms progressively, by representing something growing in width, evokes a *crescendo*: an iconic resemblance with transposition across modalities, where amplitude is transposed from the visual to the auditory domain.

### **1. The conductor's job**

The conductor's job is a complex plan of action (Poggi, 2011) aimed at having an ensemble play in a masterly way to convey the enchantment of music. In both concert and rehearsal, the conductor conveys various kinds of information about the sound to produce: who should play or sing, when, what content to express in the words sung, what sound to produce and how. This implies taking care of all the parameters of music: the conductor asks for a particular melody, rhythm, tempo, timbre, intensity, expression, but also reminds of aspects of the piece musical structure, such as coming back to the tonic or turning from minor to major (Ashley 2000; Poggi, 2011). The conductor's work is multifunctional and multimodal: to convey all this information it exploits the whole body, gestures, gaze, head movements, facial expression, posture – and during rehearsals words as well. For all this to be effectively and speedily conveyed during performance, the conductor and the ensemble must share a common language.

The signals used during musical performance are not idiosyncratic but systematic and shared. Concerning a pianist's body movements, a "lexicon" was outlined (Poggi, 2006), i.e., a list of correspondences between signals and meanings. There are communicative signals conveying a performative and a propositional content; expressions of mental states like concentration or cognitive load, and of the emotional states felt about one's playing (e.g., flow or worry) or to be conveyed in music (sadness, mirth). Other body behaviors that typically accompany the technical movement needed to produce a particular sound, timbre, rhythm, intensity, "help" to perform it: e.g. *frowning*, an expression of anger, by mobilizing the energy of this emotion, helps the pianist to play "forte".

Unlike the pianist's body behaviors, the conductor's body signals are all, by definition, communicative, and then more likely to constitute a systematic lexicon. To find out the "lexical items" of such a lexicon, two different paths can be chosen: by modality or by semantic content. In the former case, one tries to find out the meanings conveyed by all signals in a single modality, like did Boyes Braem and Braem (1998) for gestures and Poggi (1998; 2017; in press a) for gaze; in the latter, one may single out a specific class of contents that the conductor must convey during performance, and for each wonder how they are conveyed in whatever modality (Poggi, in press b). This is the approach we adopt in this paper, and the semantic area we investigate in our research concerns the parameter of musical intensity.

### **2. The multimodal lexicon of musical intensity**

This work presents an observational qualitative study aimed to analyse the gestures of intensity, by which orchestra and choir conductors convey the dynamic musical indications “forte”, “piano”, “crescendo” and “diminuendo”. Such indications, that interpret the graphic ones on the author’s score, are conveyed to musicians during performance by voice, hands, gaze, face, head, body movements, through requestive acts that can be paraphrased as “sing/play soft” or “loud” (*piano/forte*), “progressively lower music/voice intensity” (*diminuendo*) or “progressively make it louder and louder” (*crescendo*).

Eleven fragments of orchestra and choir conduction by three different conductors were analyzed: two, respectively, from a concert and a rehearsal by Riccardo Muti, one from a rehearsal by Leonard Bernstein, and eight (4 from concert and 4 from rehearsal) by Alessandro Anniballi, the conductor of the amateur choir “Orazio Vecchi” of Rome. 130 minutes of fragments in total, 35’ of concert and 95’ of rehearsal, respectively, were analyzed through the annotation scheme in Table 1.

Here the simultaneous movements in two modalities (posture and gesture) are analysed: col.1 contains the timecode in the video, col. 2 the dynamic indication written on the musical score, 3 (in case of choir performance), the words sung at the same time of the conductor’s signal analysed; 4, the modality under analysis; 5, a description of the analysed signal in terms of its parameters; col. 6 contains the goal of the body movement performed, which counts as its “bodily” meaning, i.e., the bodily action from which the communicative meaning stems (see the “originary” meaning in Poggi, 2007): here, *Bust forward, shoulders closed, head forward downward* is the posture of someone bending forward to become smaller. Col. 7 contains the meaning conveyed by the movement described in col.5: *bending forward* to get smaller means: “softer” (i.e., “make a ‘smaller’ sound”). Col 8. classifies the signal and col.9 clarifies its underlying semiotic device: *making oneself smaller* is an iconic gesture (col.8) that exploits a transmodal shift (col. 9), from space to sound: a body taking less room recalls a sound taking less energy.

Table 1.  
An annotation scheme for signals of intensity

1. Time	2. Score	3. Words	4. Modality	5. Signal description	6. Bodily meaning	7. Meaning	8. Signal type	9. Semiotic device
3.18	<i>Più piano</i>	Je-e-su-u Chri-i-i-ste	posture	<i>Bust forward, shoulders closed, head forward downward</i>	I make myself smaller →	Softer	Iconic	Transmodal iconicity: space→sound Take less room = make softer sound
			gesture	<i>Elbows folded Rh. Open, palm down, pats downward</i>		please quiet attenuate	Symbolic gesture	Generic Codified

Based on this annotation scheme, with videos in mute mode, a careful analysis was carried out by two independent judges of the conductor’s signals of intensity, setting their correspondences with the dynamic indications “forte”, “crescendo”, “piano”, “diminuendo” or other.

In the resulting tentative lexicon, the body signals for intensification are more frequent than ones for attenuation: respectively, 63 for “forte” and 4 for “crescendo”, 39 for “piano” and 5 for “diminuendo”. Here we focus on intensity gestures, while previous work has overviewed body signals of intensity in all modalities (Poggi, in press).

### 3. Semiotic devices in intensity gestures

Out of the signals of intensity performed in all modalities, within those performed by hands, arms and shoulders, 21 gesture types were singled out, resulting from the operation of five semiotic mechanisms:

1. **generic symbolic gesture:** the conductor uses a symbolic gesture that could also be understood by non-musicians, being also exploited, with the same meaning, in everyday life by laypeople. E.g., *Index finger over lips*, meaning “be silent”, is used to ask for “piano”;
2. **specific symbolic gesture:** a symbolic gesture that in everyday life has a certain meaning is used in conduction with a slightly different or a more specific meaning. *Hands, palm up, oscillating on wrist up-down*, that generally means (Morris, 1977; Poggi, 2007) “come here” in conduction means “come on, play/sing louder”;
3. **direct iconic gesture:** the conductor’s gesture imitates some movement in another modality. E.g., *arms curve widening*, that imitate a swelling body, ask for a “crescendo”: a swelling sound. This is a case of “transmodal iconicity” (a sort of synaesthesia), where an analogy is set between widening of a physical shape and progressive amplification of a sound: from a visual domain to an auditory one;
4. **indirect iconic gesture:** the conductor’s gesture does not directly imitate the movement it refers to, or its transmodal analogue, but some movement that by inference may recall the desired intensity. Such indirect iconicity may pass through two different kinds of movement:
  - a. **motor attitude:** the gesture imitates a movement usually performed while producing another movement or the resulting sound. To mean “sforzato” (forte with effort) the conductor suddenly *clenches his fist*, thus imitating the movement people do when striving in some physical action;
  - b. **emotion expression:** the gesture imitates movements typically performed in the expression of an emotion that, when felt, induces the wanted type of attitude or movement. *Hands in claw shape, vibrating with high muscular tension* work as an indication for “forte”, because tension is typical of an activating emotion like anger, and anger calls up to the energy required for playing or singing “forte”.

In this last case, expression of an emotion (possibly through a body feedback device) evokes the emotion that typically induces the physiological conditions for the right technical movement, thus working as a shortcut to the technical movement. But also, performing the facilitating movement (the emotion expression) becomes a signal requesting that technical movement, i.e., an intensity indication.

#### 4. Meanings of intensity in the global gesture and in its single parameters

Every gesture can be analysed in terms of parameters like handshape, location, orientation and movement (Stokoe, 1978; Volterra, 1987, Calbris, 1990; 2003; Kendon, 1988; 2004; Poggi, 2007), where movement includes, beyond the subparameters of direction, velocity and duration, also the expressivity parameters (Hartman et al., 2002; Poggi, 2007; Poggi and Pelachaud, 2008) of amplitude, tension, fluidity. Each gesture is defined by the values it assumes with respect to all parameters.

Sometimes the dynamic indication is conveyed by the gesture globally, i.e., by the information borne altogether by all of its parameters (GLOBAL GESTURE); but in some cases only one aspect of it bears the intensity indication: e.g., “forte” is not conveyed by the whole gesture but only by the value “*high muscular tension*” within the expressivity parameter of tension (SINGLE PARAMETER).

All in all, the global gesture types for the four intensity indications are 8 for “forte”, 7 for “piano”, 4 for “crescendo” and 2 for “diminuendo”.

In the following, for each indication we first list the global gesture, then its pertinent parameters.

##### 4.1. Gestures requesting to play or sing “forte”

In our corpus, the gesture types for “forte”, ordered according to the parameter of handshape, are the following:

1. *Open hand*
  - a. *right hand, palm up, oscillates on wrist from musicians to conductor*, as if meaning “come on, come here, come forward”
2. *Extended index finger:*
  - a. *both index fingers pushed towards musicians*
3. *Fist shape:*

- a. *right hand, palm to left, pushed forward towards musicians*
  - b. *both hands, palms to each other, pushed forward towards musicians*
  - c. *both hands, palms down, pushed forward towards musicians (See Fig.1)*
  - d. *both hands, palms to each other, pushed downward along hips (See Fig.2)*
  - e. *right hand, palm up, moved forward with fluid movement towards musicians*
4. *Claw shape (open hand with curve fingers with high muscular tension):*
- a. *right hand, palm up, moves towards musicians*
  - b. *right hand, palm to conductor, vibrating*

In one case, the hand switches from a shape to another:

5. *From fist to claw*
  - a. *right hand in fist shape, palm up, pushed towards musicians opens up in a claw*

That being said, we shall now describe the above gesture types in greater detail:

1.a.: *right hand open, palm up, oscillating on wrist from musicians to conductor*

As mentioned above, some of the conductors' signals are used only in conducting, others also in everyday communication. Gesture 1.a., which means for laypeople encouraging the interlocutor to come closer ("come on, come here"), in conduction may be a request for "forte" for two reasons: first, it conveys encouragement: it means "you are strong, don't be afraid, do dare", hence, finally, "don't be shy, play/sing forte!"; second, since the closer a sound is to your ears, the louder you hear it, requesting "come closer" implies "make your sound be heard louder".

2.a. *both index fingers pushed towards musicians*

This is not a symbolic gesture proper, yet in everyday life it might be interpreted as a peremptory command, a blame or threat of punishment: index fingers violently push forward-downward like daggers or guns, urging the other to do something without discussing the command. The energy impressed to this movement then works as a request for "forte" (Fig.1).

3.a. *right hand in fist shape, palm to left, pushed forward towards musicians*

3.b. *both hands in fist shape, palms to each other, pushed forward towards musicians*

3.c. *both hands in fist shape, palms down, pushed forward towards musicians*



Figure 1

Riccardo Muti: *fists pushed forward* to mean "forte"

3.d. *both hands in fist shape, palms to each other, pushed downward along hips*



Figure 2

Leonard Bernstein: *fists pushed downward* to mean "forte"

These gestures are not generally used in everyday communication, yet in this context their energetic movement conveys a request for high intensity sound, and the variant of both hand vs. one hand corresponds to a gradient of requested intensity.

*3.e. right hand in fist shape, palm up, moved forward with fluid movement towards musicians*

While the gestures above imply a pushing movement with high muscular tension, here the motion is fluid. Yet, the movement towards musicians and the fist shape still ask for higher intensity.

*4.a. right hand in claw shape, palm up, moves towards musicians*

*4.b. right hand in claw shape, palm to conductor, vibrating*

The hand in *claw* shape, i.e., *open hand, fingers curved with high muscular tension*, beside conveying intensity, also indicates a specific way to produce the sound: the muscular tension of the conductor's fingers calls for tense movements by players or tense voice emission by singers.

*5.a. right hand in fist shape, palm up, pushed towards musicians opens up in a claw*

Here the handshape shifts from “*fist*” to “*claw*”: the sound must be “*forte*” but also “*tense*”, possibly vibrating.

Some cases where a single parameter is responsible for the meaning “*play/sing forte*”. Within HANDSHAPE, “*fist*” is prototypically connected with a meaning of strength, since it embeds the visual metaphor (Boyes Braem, 1981) of a firm grasp: strength, power, energy. The “*claw*” shape incorporates the idea of a strong tense grasp. As to DIRECTION OF MOVEMENT, *towards musicians* generally asks for “*forte*”; so does, sometimes, PALM ORIENTATION, with *palms up* meaning “*forte*” and *palms down* “*piano*”. In the expressivity parameters, low FLUIDITY and high TENSION typically convey “*forte*”. At times “*forte*” is expressed by various parameters of the gesture, like in a case from Leonard Bernstein's rehearsal of Stravinskij's “*Rite of Spring*”. To provide a visual image of the dawn of the world, he evokes the dinosaurs, reminding of how heavy their steps could have been, and while conducting, with his arms along his hips, he *pushes both fists downward alternatively* (Fig.2). This gives the image of the dinosaurs' steps, but also scans rhythm and asks for “*forte*”, heavy and tense, by exploiting two parameters: the *fist* handshape, and its *jerky* (low fluidity) *movement*, with its sudden blocked impact.

#### 4.2. Pertinent values in the gesture parameters asking for “*forte*”

In summary, within the parameters and subparameters of gesture, the values that most typically convey the dynamic indication “*forte*” are the following:

- within HANDSHAPE, “*forte*” is most typically conveyed by *fist* and *claw*
- within the subparameters of movement and the expressivity parameters:
  - o DIRECTION: “*forte*” is conveyed by *towards musicians*
  - o FLUIDITY: *jerky* as opposed to *fluid* movements
  - o TENSION: *high*
  - o AMPLITUDE: *wide* movements (for instance, *wide open arms*)
  - o QUANTITY OF MOVEMENT: *high*
  - o MANNER OF MOVEMENT: *vibrating*

Apparently, these aspects of body movement seem to “*naturally*” convey ideas of strength and energy.

#### 4.3. Gestures for “*piano*”

The whole gestures used to request “*piano*” are the following:

6. Open hand
  - a. *Both hands open with close fingers, palms down, move inward – outward like smoothing a surface*

- b. *Both hands open with close fingers, palms down, slightly move downward, as if keeping a surface down*
  - c. *Both hands open with close fingers, palms forward, move forward*
  - d. *Both hands open with close fingers, palms forward, oscillate on wrist left-right*
  - e. *One or both hands open, palms down, alternatively move fingers up and down gently*
7. Extended index finger:  
a. *Right hand, palm to left, puts extended index finger before mouth*
8. Precision grip:  
a. *right hand or both hands with thumb and index finger touching, palms forward move forward fluidly.*

The *extended index finger touching lips* (n.7) is the symbolic gesture for “keep silent” (Fig. 3).



Figure 3

Alessandro Anniballi: *extended index finger touching lips* to mean “piano”

The *precision grip (thumb and index finger touching)* (n.8) carries the visual metaphor of taking something with caution and delicacy. The *open hand* (6), instead, is used in various gestures:

- 6.a. *Both hands open with close fingers, palms down, move inward – outward as if smoothing a flat surface*



Figure 4

Riccardo Muti: *hands palms down as if smoothing a flat surface* = “piano”

This iconic gesture imitates someone smoothing a flat horizontal surface: a metaphor for something continuous, without any abrupt change, meaning “a sound without any peaks of intensity”.

- 6.b. *Both hands open with close fingers, palms down, slightly move downward, as if pushing a surface down*

One more iconic gesture that means: “keep it down”. Again, preventing a surface from coming upward resembles, in a spatial domain, the act of keeping something low in the acoustic domain.

- 6.c. *Both hands open with close fingers, palms forward, move forward*

As a symbolic gesture, this means “stop there, do not come further”; but since coming closer spatially implies being heard louder, the spatial request not to come closer implies a request for a lower sound.

- 6.d. *Both hands open with close fingers, palms forward, oscillate on wrist left-right specularly*

This symbolic gesture is an augmentative form of *shaking index finger* to mean “No” (not only one finger, but both whole hands shaking): an emphatic negative request, “don’t do this”, which here means “don’t sing/play so loud”.

*6.e. One or both hands open, palms down, alternatively move fingers up and down gently*

This gesture is not used in laypeople’s everyday communication. The shape is the open hand, but fingers move as if gently playing an imaginary piano, conveying an image of a surface that moves in a gentle and non-conspicuous way, like the twinkling of a calm sea under the moon.

#### 4.4. Pertinent values in the parameters of the gestures for “piano”

Within the expressivity parameters of movement, those calling for a decrease in musical intensity are the following:

- FLUIDITY: movements are always very *fluid*: hands are often rocking, almost dancing
- TENSION: *low*
- AMPLITUDE: *low*
- QUANTITY OF MOVEMENT: *low*

All these values are related to a decrease in energy, which points at decrease in sound intensity. Lower energy implies lower quantity of movement, lower amplitude and tension, and higher fluidity.

Interestingly enough, the gestures for “forte” and “piano” are characterized by opposite values in their parameters: “forte” by fist handshape, high muscular tension, jerky movement, high quantity of movement, upward direction, while “piano” by flat hand, low tension and high fluidity, low quantity of movement, downward direction. This reminds of Darwin’s (1872) law of opposition, according to which opposite movements correspond to opposite emotions (or opposite meanings?).

#### 4.5. Gestures for “crescendo” and “diminuendo”

Out of the four gestures for “crescendo” in our corpus, in three of them the hand is *open* and *loose*, one is in the *claw* shape.

9. Open hand curve loose

*a. Arms with open hands curve open outward while shoulders raise upward*



Figure 5

Alessandro Anniballi: swelling movement = “crescendo”

*b. Left hand open curve loose, palm to conductor, rotates forward repeatedly in wider and wider rounds*

*c. Both arms open curve loose, palm up, alternatively move fingers up and down gently towards conductor*



Figure 6

Alessandro Anniballi: fingers gently moving up and down = “crescendo”

Gestures 9.a. and 9.b. exploit the visual metaphor of something swelling; 9.c., like gesture 6.e above, imitates something moving and changing softly.

10. Claw shape

*a. right hand in claw shape, palm down, raises upward*

Here the high tension of the claw handshape parallels the tension of progressively increasing intensity. The two gestures for “diminuendo” are the following:

11. Open hand loose

*a. left arm with open hand palm down retracts backward*

12. V shape (*index and middle fingers extended open*)

*a. right hand in V shape, palm to conductor, moves rightward progressively closing index and middle finger*

The first gesture, mainly in its parameters of movement (retraction) and direction (backward) conveys the idea that something previously larger should now decrease. The second is iconic too, but one that does not imitate the musicians’ movements or the perception of their acoustic effects; it imitates the graphic symbol used in musical scores for the dynamic indication of “diminuendo”: >, called “forchetta” (fork), that graphically represents something which first is larger and then becomes thinner; with “forchetta” being in its turn an imitation – through graphic means – of lowering acoustic intensity.

## 5. Conclusions

Our study aimed at outlining the lexicon of intensity in the gestural language of orchestra and choir conductors. The recurrence of the same gestures, or of the same values in their parameters, in different conductors, shows that intensity gestures constitute a specific lexical area within the system of musical indications, governed by recurrent and systematic semiotic devices.

These gestures do not make up a specialist jargon, rather they are quite similar to everyday gestures and likely comprehensible by laypeople. Among the symbolic gestures used, only a few of them have a more specific meaning, and the direct and indirect iconic gestures exploit the same mechanisms for gestural creation as plain language, such as metaphor and metonymy. When a conductor widens his arms imitating a swelling body, he is transferring some properties of something in the visual domain onto something in the acoustic domain: by communicating: “Swell the sound the same way I swell my body”, he relies on the mechanism of metaphor. On the other side, when he clenches his fists he implicitly conveys “sing/play with the same strength I express with the muscular tension of my fists”, here exploiting a metonymy.

Those that we call rhetorical figures are in fact powerful devices for the creation of new signals, and their operation can be found in many of the conductor’s gestures. This again reinforces our hypothesis of continuity between gestures for musical indications and everyday gestures.

The study of bodily signals in musical performance will be widened and deepened in future. First, the signals for intensity in other modalities, e.g. gaze, will be investigated. Second, other musical indications – like expressiveness, timbre or rhythm – will be overviewed, and the possible polysemy of some signals will be studied in depth; in fact, sometimes the same gesture or gaze may be ambiguous between conveying intensity or simply rhythmic accent. Finally, moving from observational to empirical studies, our hypotheses on the meanings of single gestures and other signals will be tested by asking laypeople and musicians to guess the meanings of conductors’ gestures: this will tell us if the supposed iconicity of some gestures may be of help to comprehension even to non-expert people, and if the lexicon of conduction is not so tightly codified as to be regarded as an overspecialized language.

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