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Gestures and glances: The Effects of Familiarity and Expertise on Singers' and Pianists' Bodily Movements in Ensemble Rehearsals

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ABSTRACT

The types, functions, sources and effects of musicians' bodily movements have been studied in soloists' live and recorded performances, to a lesser extent in their practice sessions and rehearsals, and in ensemble musicians' rehearsals. The present study explored the effects of familiarity and expertise on singers' and pianists' bodily movements and eye contact in ensemble rehearsals. Two established singer-pianist duos rehearsed three songs in different combinations. Quantitative and qualitative analyses were undertaken. Bodily movement and eye contact were used to consolidate technical details, convey musical information and coordinate entries. Singers used gestures to reflect and support the technical production of the sound, as well as conveying information relating to the meaning of the lyrics or the expressive content of the songs, while pianists' gestures and glances were primarily expressive and communicative. Performers used bodily movement and eye contact to a greater extent when rehearsing with familiar and same-expertise partners than new or different-expertise partners; furthermore a wider range of such behaviours was produced in familiar partnerships. While expertise and familiarity do seem to influence the use of gestures and glances the head movements of the unfamiliar student duo became increasingly co-ordinated, suggesting that synchronisation can occur relatively rapidly in new partnerships and supporting existing findings relating to entrainment.

I. INTRODUCTION

The types, functions, sources and effects of musicians' bodily movements have been studied in soloists' live and recorded performances. In her research on the pop singers Annie Lennox and Robbie Williams, Davidson (2001, 2006) draws on the work of Ekman and Friesen (1969) who classified body movements with communication functions into five types: as *emblems* (those with direct verbal translations, e.g. thumbs up for 'yes'), *illustrators* (those used to describe or reinforce points), *adaptors* (those which satisfy personal needs, e.g. twiddling the fingers), *affect displays* (those revealing our affective or emotional state) and *regulators* (those which regulate interaction). Davidson (2005) also draws parallels between non-verbal gestures used in music-making and the four types of gesture Cassell (1998) identifies as accompanying speech: *propositional* (to denote meaning), *iconic* (describing an action), *metaphoric* (illustrating metaphor), *deictic* (indicative or pointing gestures) and *beat* (repetitive motor gestures). These classifications overlap, of course: illustrators could be described as iconic, emblems and adaptors as propositional, regulators as deictic or beat. Illustrators can be further classified in relation to the musical score. Delalande (1988), for example, defined the pianist Glenn Gould's gestures as *meditative, vibrant, fluid, delicate* and *vigorous*.

Musicians' gestures serve, first, a technical function in that they enable the performer to produce the sound itself, and, second, expressive / communicative functions in that they enable him or her to achieve and convey expressive effects. These functions intertwine in such a way that audiences and indeed co-performers may not know which function(s) are being served at any given time; furthermore, the interpretation of bodily movement – generally, and specifically in relation to music – depends on a range of factors, including the perceiver's cultural, social and musical knowledge, their beliefs and mood, the environment in which it is being perceived and, in terms of interpreting visual information relating to music, auditory perception.

Similarly, there are two main sources of musicians' gestures, although these will be understood differently by different viewers: first, the music, as imagined, felt, expressed, shaped and indeed responded to by the performer, and second, the social ritual of performing, with co-performers and before audiences. As the musician's physical gestures enable him or her to produce the music, express and communicate its 'meaning' for the performer and indeed regulate the audience's responses, so those responses have the effect of influencing the musician's performance in a continuous cycle of reciprocation (Davidson 2005; Elsdon 2006).

The literature cited above is based on the study of soloists' recorded performances; research on ensemble rehearsal performance informed the questions addressed in the present study. Early research in this field focused on more and less effective rehearsal strategies for students and professional string quartets (e.g. Young & Colman 1979; Butterworth 1990; Murnighan & Conlon 1991). More recently Maduell & Wing (2007), for example, have explained the synchronization and rhythmic coordination of flamenco dancers by way of a network and social psychological models of communication, and Keller (2008) has shown that shared representations of music are generated in the course of duo pianists' rehearsal through the anticipation of motor as well as auditory images. While some research focuses on established ensembles (e.g. Blum, 1986: Guarneri String Quartet; Ginsborg et al., 2006: singer-pianist duo) while others concern those that are newly-formed (e.g. Williamon and Davidson, 2002: piano duo) there are few detailed cross-comparison studies that specifically address the effects of length of partnership, and therefore familiarity between partners, on ensemble

rehearsal. Similarly, while some empirical studies address the differences between the practice habits of student and professional pianists (e.g. Gruson 1988; Williamon 1999) or singers (Ginsborg, 2002), little research – other than that of Goodman (2000: student and professional cello-piano duos) has been undertaken to assess the effects of expertise on outcomes for musicians with different levels of expertise working together. Evidence from these studies and others suggests that expertise and familiarity might influence several aspects of ensemble rehearsal. First, duos with greater musical expertise are likely to have – and perhaps be able to articulate – clearer perceptions of musical structure, thus permitting more efficient rehearsal (Williamon & Davidson, 2002); second, duos who know each other well can rehearse more efficiently since there is less need for them to discover each other's styles of performing (Blank & Davidson, 2002), and they may talk less and rehearse more (Goodman, 2000; Williamon & Davidson, 2002); certainly there is evidence that the nature of talk, in terms of social interaction and references to musical dimensions, differs between ensembles of different levels of expertise and familiarity (Ginsborg & King, 2007ab, 2008). Finally, non-verbal communication between performers increases as they familiarise themselves with the music being rehearsed (Williamon & Davidson, 2002).

As part of a larger research project investigating potential differences in approaches to short-term preparation for performance by singers and pianists of different levels of expertise and familiarity as duo partners, we asked in the present study how performers' bodily movements ('gestures') and use of eye contact ('glances') compare when they collaborate in ensemble rehearsal with a) performers of different levels of expertise, and b) their regular (i.e. familiar) and new (i.e. unfamiliar) duo partners?

II. METHOD

A. Participants

An observational case study was carried out using four established singer-pianist duos, each comprising a female soprano and a male pianist (see Table 1: all names are pseudonyms). Students were based at the Royal Northern College of Music in Manchester and the professional musicians were from the Hull region.

Table 1. Participants by age, experience and expertise

Name (singer & pianist)	Mean age (years)	Experience together (years)	Level of expertise
Amanda & Colin	68	10	Professional
Isobel & George	57	15	Professional
Betty & Robert	25.5	2	Student
Sophie & Guy	21.5	2	Student

B. Materials and apparatus

Three songs by the English composer Ivor Gurney (1890–1937) were used: 'An Epitaph', 'On the Downs' and 'I Shall Be Ever Maiden'. The songs were chosen because they were of a similar length and level of difficulty (as judged by independent experts), and they were unknown to the participants who had nevertheless performed other works by the same composer and were familiar with his compositional style. Video-recordings of each practice session, rehearsal and performance were made and stored as DVDs. Quantitative analyses of the video-recorded rehearsals were undertaken using the professional software program *The Observer XP* (Noldus).

C. Procedure

1) Rehearsals

The four duos were asked to prepare a short song individually prior to rehearsing and performing it in two conditions: 1) with their regular duo partner (established / same-expertise); 2) with a new duo partner of the same level of expertise (new / same-expertise). Two duos, one professional and one student, were also asked to prepare a third song, 'I Shall Be Ever Maiden', in a subsequent session 3) with a partner from the other duo (new / different expertise). The participants' lack of familiarity with the selected songs meant that they were all at equivalent stages of practice when the observation of their rehearsals took place. Each session undertaken by the participants took place on a separate occasion and lasted around 90 minutes. It included individual practice (20 minutes) followed by an ensemble rehearsal (40 minutes), a performance of the selected song (4 minutes) and a post-performance discussion. During the rehearsals, singers were provided with a music stand so that their hands were not restricted to holding the score. They were not required to perform the music from memory at the end of the rehearsal, since time was so short. For the purposes of the present study only the rehearsals undertaken by the duos who took part in all three sessions were analysed

2) Analyses

The bodily movements investigated were those made only during rehearsal of the song being prepared for performance involving singing and/or playing (i.e. not during episodes of talk). First, the types of non-verbal communication occurring most frequently were noted and categorised, using *The Observer*, as either *states* (actions with a duration, e.g. pulsing with the hand across several bars of the music; gazing at the co-performer during a bar/phrase) or *points* (actions with no specified duration; e.g. a quick glance at the co-performer; a physical gesture that coincided with a downbeat) in line with the categories used in previous research (see Table 2). 'Gestures' included all kinds of meaningful physical actions that were not otherwise regarded as types of pulsing, shaping, conducting, gazing or glancing. The default category for bodily movement was 'still' (although this of course included movements necessary for playing the piano) and for direction of gaze was 'look at music'.

The Observer output included an event log recording *when* each action/gesture occurred during each rehearsal, *who* produced the action/gesture (i.e. singer or pianist), and *how long for* (i.e. the duration). For state categories, the

duration of actions was recorded in seconds and subsequently

Table 2. Gestures and glances: types

Category / type	Example from data	Typical function (Ekman & Friesen)	Typical function (Cassell)
States			
Pulsing with the hand	Little beats with the hand	Regulator	Beat
Pulsing with the head	Nods or shakes of the head	Regulator	Beat
Shaping with the hand	Sideways sweep with hand	Illustrator	Metaphoric
Conducting	Beating time to co-performer	Regulator	Deictic
Gazing at each other	Look at co-performer	Adaptor	Deictic
Gazing elsewhere	Look out to 'audience'	Affect-Display	Propositional
Points			
Glancing at each other	Quick look at co-performer	Regulator	Deictic
Glancing elsewhere	Quick look out to 'audience'	Affect- Display	Propositional
Gestures	Hands plead (singer)	Illustrator	Iconic

calculated as a proportion (%) of the overall rehearsal time; for point categories, the frequency of glances/gestures was reflected in the rate of occurrences per minute of rehearsal time. These figures enabled direct comparison of the proportions of time spent gesturing in different rehearsals by each performer.

Qualitative analyses were made in the course of repeated viewings of the DVDs.

III. RESULTS

As shown in Table 2, four types of bodily movement ('gestures') were categorised as states. Three could be conceptualised as having a regulatory function, according to Ekman and Friesen (1969): pulsing with hand or head, and conducting (beating time); according to Cassell (1998) only the first two would be seen as performing a 'beat' function, while conducting would be seen as having a deictic function. The fourth type of bodily movement was shaping with the hand, categorised by Ekman and Friesen as a form of illustrator, and by Cassell as metaphoric. The fifth type of bodily movement was categorised as a point and labelled 'gestures': Ekman and Friesen would categorise these as illustrators, while Cassell might see them as iconic.

'Glances' included the state categories gazing at each other (adaptor or deictic, according to Ekman and Friesen on the one hand, and Cassell on the other) and elsewhere (affect-display or propositional). The point category glancing at each other would, like conducting, be seen as a regulator or having a deictic function, while glancing elsewhere, like gazing elsewhere, could be seen either as representing affect-display or having a propositional function.

As shown in Table 3, more movement of the hands and indeed the head was observed in the singers than the pianists, whose hands were occupied playing the piano. Isobel spent nearly a third of her three rehearsal sessions pulsing with her hand. Qualitative analyses suggest that her pulsing was overt with her regular partner George, and often directed to him so as to share ideas of tempi and secure the 'feel' of the piece. It was more self-guiding and self-reassuring with new partners, sometimes reflecting the character of the music, but rarely as a means of interacting with the pianist. It was larger, in terms of the height of up-down motions when securing pitching and rhythmic details in the music – often when rehearsing short phrases or segments of the piece – and smaller when she felt comfortable with the music, often during run-throughs in the later stages of rehearsal; finally, it sometimes occurred in circular or sideways sweeps which reflected her perception of the character of the music. She also used hand gestures to emphasize particular words, for example on "most" (see Figure 1).

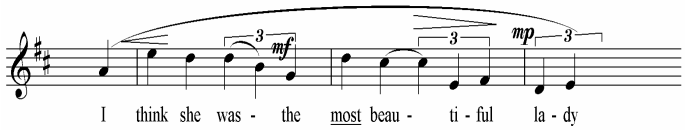

Figure 1. Gurney: 'An Epitaph', bars 11-13, vocal line

Betty spent a similar proportion of her rehearsal session with her regular partner Robert pulsing with either hand or head, and gesturing – although she barely pulsed at all with her new partners, preferring to 'shape' the music with her hand for at least 10% of her session with George, her new, different-expertise partner. Qualitative analysis suggests that shaping gestures appeared to be expressive in function, such as to reflect a sustained note, the direction of a line, a high point or phrase end. They seemed to be directed inwardly, including cradle-like and rounding off movements, which might have provided a sense of self-assurance.

Like his regular partner Isobel, albeit to a much lesser extent, George pulsed with his hand; he also gestured with Isobel at nearly as high a rate as did Betty with Robert. In all his rehearsals, he exhibited a small repertoire of expressive gestures, notably 'resonating' hand lifts and regulatory head nods; with Isobel and Amanda (new, same-expertise) he produced a similar range of gestures, including pulsing, shaping and some bodily movements, including leaning forward – particularly at locations of structural importance,

Table 3: Bodily movement: duration and rate per minute

Participants	Type	Song	Duration	Pulse hand		Pulse head		Shape hand		Conduct		Gesture
			M/S[1]	M/S	%	M/S	%	M/S	%	M/S	%	Rate/M[2]
Isobel-George	E[3]/SE[4] (P)[5]	Epitaph	45'17"	15'44"	34.7	0		0		0		0.4
Isobel-Colin	N[6]/SE (P)	Downs	42'41"	14'49"	33.1	0		15"	0.01	0	0	0.61
Isobel-Guy	N/DE[7]	Maiden	43'56"	12'53"	29.3	0		10"	0.38	0	0	0.07
Betty-Robert	E/SE (S)[8]	Downs	40'20"	6'56"	17.2	4'15"	11.4	1'12"	3	0	0	1.66
Betty-Guy	N/SE (S)	Epitaph	40'04"	48"	1.83	5"	0.21	17"	0.71	0	0	1.3
Betty-George	N/DE	Maiden	46'01"	1'39"	3.59	17"	0.62	4'46"	10.36	0	0	0.8
George-Isobel	E/SE (P)	Epitaph	45'17"	2'15"	4.97	0		25"	0.92	6"	0.22	1.15
George-Amanda	N/SE (P)	Downs	39'52"	2"	0.08	0		2"	0.08	0	0	0.6
George-Betty	N/DE	Maiden	46'01"	0	0	0		0	0	0	0	0.7
Guy-Sophie	E/SE (S)	Downs	43'44"	2"	0.08	0		0	0	2"	0.08	0.59
Guy-Betty	N/SE (S)	Epitaph	40'04"	0	0	0		0	0	0	0	0.87
Guy-Isobel	N/DE	Maiden	43'56"	0	0	0		0	0	0	0	0.52

[1] Minutes/seconds [2] Rate per minute [3] Established [4] Same-expertise [5] Professional [6] New [7] Different-expertise [8] Student

Table 4: Eye movements: duration and rate per minute

Participants	Type	Song	Duration	Gaze other		Gaze elsewhere		Glance other	Glance elsewhere
			M/S	M/S	%	M/S	%	R/M	R/M
Isobel-George	E/SE (P)	Epitaph	45'17"	0	0	0	0	0	0
Isobel-Colin	N/SE (P)	Downs	42'41"	0	0	6	0.23	0	0.14
Isobel-Guy	N/DE	Maiden	43'56"	1	0.04	0	0	0.02	0.05
Betty-Robert	E/SE (S)	Downs	40'20"	0	0	0	0	0	0
Betty-Guy	N/SE (S)	Epitaph	40'04"	1'54"	4.74	0	0	0.12	0
Betty-George	N/DE	Maiden	46'01"	0	0	0	0	0	0
George-Isobel	E/SE (P)	Epitaph	45'17"	5	0.18	0	0	0.09	0
George-Amanda	N/SE (P)	Downs	39'52"	3	0.13	0	0	0.05	0
George-Betty	N/DE	Maiden	46'01"	0	0	0	0	0	0
Guy-Sophie	E/SE (S)	Downs	43'44"	17"	0.65	0	0	0.16	0
Guy-Betty	N/SE (S)	Epitaph	40'04"	0	0	1'19"	3.29	0.2	0
Guy-Isobel	N/DE	Maiden	43'56"	5"	0.19	0	0	0.02	0

such as the arpeggio flourish beneath the climax at 'and the gods came' (see Figure 2), but he produced more physical gestures with his regular partner than with his new partners, particularly Betty, who was of a different level of expertise.

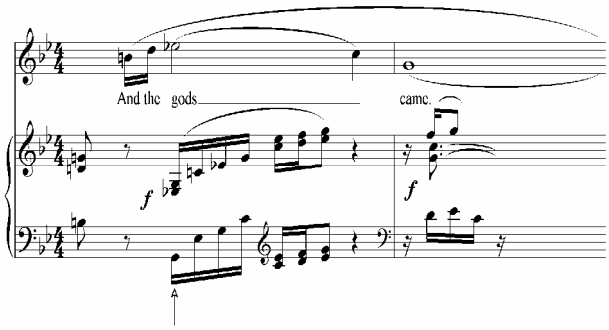

Figure 2. Gurney: 'On the Downs', bars 20-21 (arrow indicates location of pianist's bodily lean)

Guy's characteristic bodily movement involved a wide circular sway not captured in this analysis; he produced what we can infer as his 'normal' repertoire of gestures with Sophie, his regular partner, as well as additional ones for technical purposes, including pulsing, conducting and lifting his hands at the end of the arpeggio in bar 20 of 'On the Downs' apparently for expressive purposes (see Figure 2). He gestured more with Betty, his new, same-expertise, partner than with his other partners, but produced fewer gestures overall with Isobel, his new different-expertise partner.

As shown in Table 4, eye movements were observed comparatively rarely. Betty was the most likely of the performers to gaze at her new, same-expertise partner. This could be inferred to express both the nature of the song ('An Epitaph' is reflective in tone) and to assist in coordination of entries with an unfamiliar partner. In return Guy was most likely to gaze elsewhere while working with Betty. All performers glanced occasionally at their partners, Guy most often; Isobel was the only performer to be observed glancing elsewhere, as though to the audience.

IV. DISCUSSION

We asked how performers' physical gestures and use of eye contact compare when they collaborate in ensemble rehearsal with a) performers of different levels of expertise, and b) their usual, familiar and new, unfamiliar duo partners. Quantitative and qualitative analyses were carried out, although it should be noted that qualitative analyses of these data relating gestures and glances in more detail, to a much wider range of specific locations in the songs, over the course of the rehearsals, are to be found in King and Ginsborg (in press). The quantitative analyses show that the performers used physical gestures to a greater extent when rehearsing with familiar and same-expertise partners than new or different-expertise partners. Furthermore, a wider range of gestures was produced in familiar partnerships. The study also highlighted the common functions fulfilled by the physical gestures of singers and pianists (individually and combined), whether in new or mixed-expertise partnerships. These functions were as follows: to consolidate technical details via 'emblems' and 'illustrators' used to establish rhythms and secure pitching, and 'beats' used in conducting; to establish tempo or pulse – 'beat' or 'deictic' gestures were particularly important to singers feeling the pulse; to convey musical information via 'metaphoric' gestures and 'illustrators' used to share ideas about conveying the narrative of the song by shaping phrases and striving to achieve simultaneous climaxes; to coordinate entries via 'regulators', such as pianists' nods of the head and leaning forward with the whole body, which provided cues for vocal entries and coordination at structural boundaries.

A range of gestures was used by the singers and pianists for technical, expressive and/or communicative ends. Both singers appeared to use gesture for self-assurance or self-guidance, for example pulsing throughout the song to feel the tempo, pointing down to indicate awareness that the pitch needed to be flattened and moving the hand upwards to help the support of high notes; they also clearly used gesture to indicate understanding or convey the expression of the text, for example making little hand motions or flicks to emphasize key words, mark the ends of verses, sustain sound and mirror the direction from which high notes were approached. The two pianists tended to use hand lifts and head nods at 'structural' points such as the beginnings and endings of verses, and coordination points such as vocal entries; also they both swayed with their bodies in the tempo of the song, and tended to lean forward into climaxes or the high points of phrases, and the frequency of these gestures increased as each rehearsal progressed.

The singers engaged, occasionally, with an imaginary audience through glancing or gazing outwards, although there was surprisingly little direct eye contact between the co-performers, other than in Betty's rehearsal with Guy. Indeed, the extent to which the singers and pianists were aware of each other's gestures during the rehearsals was hard to gauge, although they must have been conscious of some of each other's physical actions via peripheral if not central vision. In the case of the established professional duo, Isobel and George, there appeared to be more explicit sharing of gestures in their rehearsal than evidenced in the other rehearsals we observed, suggesting a closer working relationship.

The pianists' use of gesture at the same locations – such as the climax of 'On the Downs', although there were similar occurrences at phrase boundaries and vocal entries – suggests that these contributed to the development of mental representations for the formal structure of the songs, supporting earlier findings by Williamon and Davidson (2002). Otherwise the pianists' gestures seemed to be primarily expressive and communicative, while the singers used gestures to reflect or support the technical production of the sound as well as to convey information relating to the lyrics or expressive content of the songs. For this reason the singers' and pianists' bodily movement reflected each other less than would be expected in same-instrument ensembles such as piano duos and string quartets; our observations support the claim that, for musicians in mixed ensembles, 'movement-related information may be limited to relatively general, instrument-independent forms of body motion (e.g., swaying, rocking, and expressive gesturing)' because they cannot readily synchronize with one another (Keller, 2008, p. 209).

Nevertheless, the members of the established duos gestured more frequently and for longer periods of time than did the members of the new duos, whether they were of the same or different levels of expertise, and seemed better able to communicate non-verbally. This suggests that familiarity and expertise do influence the use of physical gestures in ensemble practice. In the case of Betty and Guy, the new, same-expertise duo, the two performers' head movements became increasingly coordinated in the later stages of their rehearsal, which suggests that the synchronization of body movements can develop relatively quickly in new partnerships. Yet the established professional duo revealed closer harmonisation of gestures in the establishment of the tempo and 'feel' of the song through joint pulsing than did the established student duo, as well as the individual production of gestures. They reflected something of a 'combined rhetoric' of gestures insofar as their non-verbal communication was integral to their rehearsal style.

How might this have come about? Keller suggests that ensemble performers anticipate, attend and adapt to their own and each others' playing. Here we would argue that the complex cognitive processes underlying the development of joint mental representations and the ability to implement shared decisions, whether made implicitly or explicitly, involve predicting, reading and responding to the auditory and motor information – the latter in the form of physical gestures – provided by partners. This is complemented of course by information provided verbally in the course of the discussions that take place during rehearsal (see Ginsborg & King, 2007ab, 2008).

A number of limitations should be addressed in future research of this nature. The students, although younger and less experienced than the professionals, were of extremely high expertise; greater contrasts might well have been observed with less expert students. While singer and pianist who did not otherwise take part in the research had rated the songs as being of comparable difficulty, it transpired during the post-rehearsal debriefing that all of the duos found 'An

Epitaph' the easiest; liked 'On the Downs' the most and found 'I Shall Be Ever Maiden' the most challenging. The nature of the piano accompaniment in each song could well have influenced the gestures that were made by the pianists (for example, the sustained chords and rests in 'An Epitaph' meant that they were able to use their hands more freely than in the other songs, which included busy passagework), as indeed the nature of the vocal lines and meanings of the lyrics influenced those made by the singers.

Thus, it would be worth considering asking participants to rehearse specially-composed songs or pieces in future research. Finally, the use of gesture and glances in a range of duos – same-instrument as well as mixed-instrument – could be explored further in a variety of genres and repertoires.

V. CONCLUSION

This comparison of the gestures and glances made by the members of professional and student singer-pianist duos during the course of rehearsing three songs with their regular, same-expertise, new same-expertise and new different-expertise partners, demonstrates the range of bodily and eye movements made while singing and playing, supports existing findings relating to individual and shared mental representations of music and lyrics, and complements research on verbal and social interactions on collaborative rehearsal.

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