14

GROUP FLOW

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Introduction

> I don't know if I can describe it, but I know it when I feel it. Just one night, everybody can feel what each other is thinking and everything. You breathe together, you swell together, you just do everything together, and a different aura comes over the room.
>
> *(Trombonist Melba Liston in Berliner, 1994, p. 392)*

> DALLEY: I only felt that we were coming close to the essence of what Beethoven had in mind when he wrote the piece: that kind of hymnlike obeisance to a higher power. . . . I felt that all of us shared the same sense of something special taking place.
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> SOYER: Of course, by its very nature such a movement demands that we have a completely homogenous sound. But as John says, it's sometimes more than our attempt to make it so: everything becomes concerted and blended and propelled as if by itself. The music seems to take over.
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> *(Violinist John Dalley and Cellist David Soyer in Blum, 1986, p. 169)*

> It's sort of stumbling into this area where there's a lot of energy and something happening and not a lot of control. So that the sense of individual control disappears and you are working at another level entirely. Sometimes this feels to me as though you don't really have to think about what's happening. Things just flow.
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> *(Guitarist Jerry Garcia in Bailey, 1992, pp. 42–43)*

These statements from jazz, classical, and rock musicians are representative of a fairly rare but very distinctive and treasured experience that can sometimes occur in ensemble musical performance. Musicians report a sense of intense absorption, as if they are connected to each other and the music in an especially immediate manner. The question of this chapter is: How should we make sense of these experiences?

In a recent article, Schiavio and Høffding (2015) argue that such intense musical experiences help justify a radical enactivist view of the mind. According to this view, a great deal of mental processing does not require internal representational states (i.e., brain-based structures that both point to and stand in for objects in the external world). Instead, musical understanding may be constituted by interactions between the individual and the musical activity. Thus:

> Perfectly coordinated musical interaction is possible without any conscious perception of others, and it seems to us that the only way to make sense of this is by appeal to a fundamental bodily-based reciprocity or interaction that bypasses most levels of high-level cognition
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> *(Schiavio and Høffding, 2015, p. 16)*

Schiavio and Høffding's argument seems to be that because the group's performance relies so heavily on spontaneous behavioral interactions, and because the musicians tend not to report classic representational states like mental imagery or inner speech, this is good evidence that such representations are not a necessary feature of meaningful cognitive activity.

However, the common complaint about embodied views of the mind is that it is perfectly coherent to emphasize the *causal dependence* of certain mental processes on behavioral interactions while maintaining that the immediate realizers of conscious experiences are brain-based representations. Moreover, Schiavio and Høffding do not, in my view, sufficiently recognize how sophisticated musical understanding must be in order for a musician to parse musically significant features and to respond appropriately to such features. All parties agree that musical interaction is hardly a simple matter of stimulus-response. On the contrary, it displays an extraordinary degree of flexibility in response to various high-level features of sound. Responding flexibly then seems to demand that one choose among options, but it does not seem possible for multiple options to be considered unless they are represented in some form (as non-actual but possible). Meanwhile, an advantage of representationalist views of the mind is that representations share a common computational form that allows for abstract recombination and inference processes to guide such sophisticated actions.

In contrast to Schiavio and Høffding, I believe that the best way to make sense of the musician's reports is by appeal to a representationalist account of "group flow" (cf. Hart & Di Blasi, 2015; Sawyer, 2006). Group flow is structurally analogous to individual flow, as described by Csíkszentmihályi (1990). Thus, I will hypothesize a process by which flow occurs, common to both individual and collective cases, in which the usual sense of mismatch between intentions and performance is lost. Since the interaction between intentions and performance is basically the interaction between two representational states, this will contradict the enactivist approach. So, if my account is able to explain the musician's reports, this rather undermines support for an enactivist interpretation. At the same time, I will argue that spontaneous interactions with the overall musical product play a vital role in generating the content of each musician's intentions. In this sense, group flow does involve a genuinely collective cognitive task. However, the content-generating cognitive task is not the same thing as the mental state that results from this task (i.e., the feeling of being absorbed in the music; cf. the approach I develop in Cochrane, 2009).

Individual Flow in Music

The phenomenon of flow was brought to widespread academic attention with the publication of Mihaly Csíkszentmihályi's 1990 book, *Flow: The Psychology of Optimal Experience* (which draws together research going back to the 1970s). It has come to be explicitly defined with the following nine characteristics (slightly re-ordered here from Csíkszentmihály, 1990; Jackson & Marsh, 1996):

1. *Action-awareness merging*: A lack of awareness of self as separate from the actions being performed
2. *Loss of self-consciousness*: Concern for the self disappears and the person becomes one with the activity
3. *A sense of control*: A sense of exercising control without actually trying to be in control
4. *Transformation of time*: A loss of time awareness or time disorientation
5. *Autotelic experience*: An intrinsically rewarding experience involving a deep sense of enjoyment
6. *Concentration on the task at hand*: Narrowing of focus and the centering of attention on a limited stimulus field
7. *Clear goals*: Goals either set in advance or developed out of involvement in the activity are clearly defined
8. *Unambiguous feedback*: Clear and immediate feedback concerning performance in relation to the goal(s) set

9. *Challenge-skill balance*: The requirement that there be a balance between ability and the demands of the task

I regard the first five of these conditions to be descriptive statements about what it's like to experience flow. The next four then read to me as generative conditions for flow. Condition six notably has both generative and descriptive aspects, since attention is partly voluntary but at the same time difficult to totally focus on a given task. Meanwhile, condition nine, regarding the balancing of skill and demand, seems to best explain how attention can be so fully captured. Consider, if the difficulty of the task exceeds the individual's capacity to perform it, then the individual's attention will be drawn to his or her own actions for the sake of error discernment and correction. On the other hand, if the individual's ability far exceeds the demands of the task, a strong focus of attention is no longer required for successful performance, and his or her attention is likely to wander. Thus, attentional capture should be optimally achieved when the individual is only just capable of successfully performing the task. In this condition, the individual's experience can be focused on the unimpeded continuation—the flow—of the activity.

While the balance between skill and demand can explain attention capture, it does not seem to me that either this or the other generative conditions can plausibly explain the sense of action-awareness merging, the loss of self-consciousness, or the sense of effortless control. In order to explain these features, I think we should say more about the relationship between intentions and performance. This relationship is captured in the (very) simplified schema (neutrally covering both scored and improvised music) in Figure 14.1.

Each of the stages depicted in Figure 14.1 represents the output of a fairly complex cognitive process. First, the *musical intention* is the accumulation of a number of factors, including the performer's understanding of the music as developed over the course of rehearsal, her aesthetic goals, and perhaps personal or social goals for the performance. In the diagram I have highlighted that a key psychological feature of the musician's intention is a "map of saliencies" (which I adapt from Keller, 2008). That is, as the musicians rehearse, she develops a mental schema or script of what features she needs to pay particular attention to in order to ensure successful performance. This can include particular notes, rhythms, fingering techniques, expressive features, or timbral effects.

Second, the *musical performance* is the combination of how the music sounds to the musician and her awareness of wider contextual details, such as the reaction of the audience or how her body feels. How the music sounds to the musicians is of course informed by her sophisticated capacity to parse

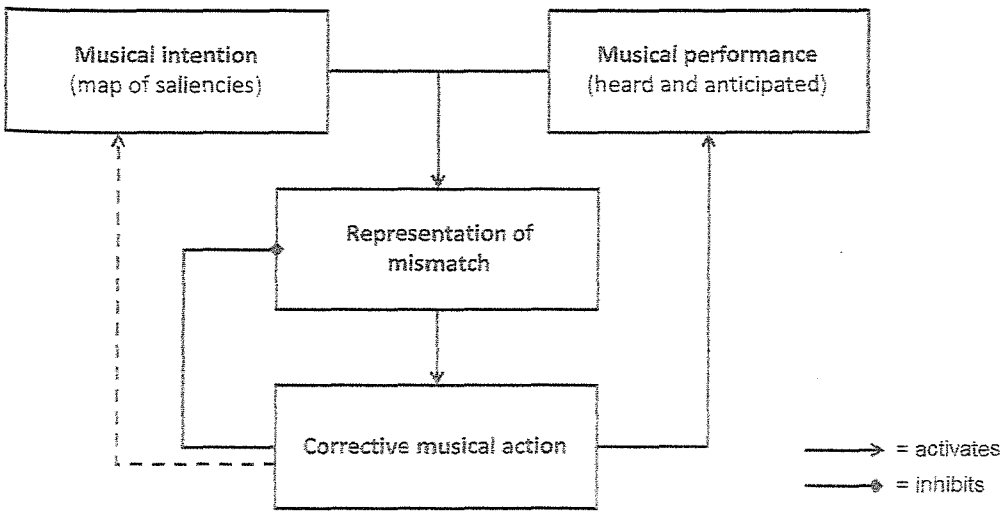

Figure 14.1 A simplified schema of musical performance.

the various components of a musical sound. It is also worth emphasizing that the musician's sense of the performance is not limited to the present moment. The musician monitors the overall progress of the music. She also receives efferent feedback from her bodily actions that to some extent allows her to anticipate how the music is going to sound prior to processing the auditory signal.

Third, *corrective musical action* can be understood as the product of registering the mismatch between the music that is intended and the music that is in fact produced. Intentions directly stimulate action, but the musician must constantly adjust and correct this action as it proceeds. So if the musician hits a wrong note, uses incorrect fingering, or produces an inconsistent expressive effect, she will recognizes this as error. The recognition of errors will stimulate corrective actions that may involve repeating the mistaken passage or adjusting the manner of performance as the music continues. In this way, a key feature of musical action can be construed as a control loop in which the goal of the activity is to *reduce* the mismatch between the music that is intended and the music that is in fact produced (or just about to be produced). The reduction of mismatch is depicted by the diamond-headed arrow in Figure 14.1 (where regular arrows indicate the causal generation of the next stage).

Apart from performance correction, another major feature of regulating mismatch between intention and performance is to form suitable intentions that can in fact be satisfied. This requires a degree of deference toward reality. For instance, musicians are to some extent reliant on the capacities of their instrument and the acoustic properties of the room. They must accordingly defer various aspects of their musical intentions to these features. Thus, the dotted line in the diagram is to indicate that the musicians may also update her musical intentions to reflect such realities. Furthermore, the way the performance is going may present unanticipated opportunities for enhancement. Different styles of music present different degrees of latitude in this regard. However, even classical musicians do not simply stick to rigid plans, but typically react to the live possibilities that seem to be available (cf. Schiavio & Høffding, 2015). For example, if some unanticipated expressive effect is achieved, the mismatch may be regulated by updating one's expressive intentions so as to sustain or develop the novel expressive trajectory. Similarly, in improvised jazz, musicians may smooth over the error of hitting an unanticipated pitch by deliberately incorporating that pitch into their continuing performance.

So far, we have a schematic picture of the basic cognitive tasks involved in performing music. This schema is admittedly simplified, but it has utility in helping us understand a major aspect of the experience of performing music. To explain: at least some of the musician's experience will be focused on appreciating the sound that is being produced. However, a very significant and perhaps dominant aspect of the experience will be characterized by the experience of the mismatch between intention and product. Moreover, the sense of mismatch will have three results, which tend to undermine flow. First, the musicians will experience the *effort* of corrective action, proportional to the degree of mismatch represented. This directs the musician's attention toward her bodily actions and thus undermines action-awareness merging. Second, the musician may attend more closely to her intention, because the way to correct error often involves clarifying for oneself how the music is supposed to sound and how the action is supposed to be brought about. This will undermine the loss of self-consciousness.

Third, I mentioned previously that musicians also get efferent feedback on the bodily actions they perform when calculating their overall representation of the music. A related consequence of the processing of mismatch is an anticipation of how easily the musician will be able to compensate for mismatch. This is what appraisal theories of emotions call "coping potential" (e.g., Scherer, 2005). It is an important source of whatever confidence or stress musicians may feel while performing. Note in particular that *both* confidence and stress are sources of self-consciousness; one is self-promoting while the other is self-aversive.

Overall, a major factor a musician's experience during performance is a sense of tension between how the music sounds and how she wants it to sound. However, if the musician succeeds in matching intention with performance, the sense of mismatch or error will disappear, and with it, the sense of effort and potentially also the sense of coping potential. This thereby removes a significant source of reflective

self-consciousness and helps explain the heightened task focus in the experience of flow. Moreover, if intention matches performance, then theoretically the representation of performance will *occlude* or camouflage the intention. That is, if the musical intention lacks features that distinguish it from the representation of performance, this undermines the capacity of the musician to distinctively experience that intention. Note that the intention does not disappear here. If there was no intention, performance would not be generated at all. Rather, occlusion should lead to the *illusion* of disappearance.

With the loss of various sources of self-involving content, the musician's attentional resources should be quite dramatically freed up to attend to the more intrinsic values of the music. This helps explain the autotelic nature of the flow experience. Note, however, that the skill-challenge balance must be maintained. If skill exceeds the demands of performance, the musician will probably form more ambitious intentions for the music that allow mismatch to reappear. In contrast, flow experiences tend to be caught up in the more immediate note-to-note momentum of the piece.

Flow in Ensemble Performance

Having characterized the psychological processes by which the flow experience may be generated in individual performance, my goal is now to show that a similar process can occur in ensemble performance. Ensemble performance naturally presents certain additional complexities that must be accommodated. In particular, we must highlight the different roles of musical leadership and musical following. Note that these roles are rarely so clearly attributable to different individuals in real ensemble performance (see, e.g., Goebl & Palmer, 2009). I characterize these roles separately for the sake of clarifying the key psychological elements of ensemble performance.

For any activity, leadership involves three essential characteristics: (1) the leader makes a decision; (2) this decision is communicated to the group; and (3) the group defers to the leader in conforming to this decision. These characteristics maintain the coherence or unity of the group's activities.

We can see that the basic functions of the leader can be fitted into our earlier schema for musical performance. The leader's decision maps onto the intention node, which she compares with a representation of the overall musical output. The leader recognizes a mismatch between her intention and the group's performance, which results in a communicative gesture to the performers (either an explicit instruction or a more evaluative form of feedback such as a scowl or nod). What may seem more complex than the earlier individual case is that, from the perspective of the leader, musical action can now be construed as the combination of the leader's communicative gesture and the performer's deference to the leader's instruction. Accordingly, where a leader detects error or mismatch, she may identify either a failure to communicate effectively or a failure in performer deference. However, this additional complexity actually has an analogue in the individual case. Recall that one of the ways musicians may react to error is by clarifying their performance intentions. So even at the individual level, musical action can involve not just correcting behavior but ensuring that intention is effectively guiding behavior. The clarification of intention in response to mismatch is analogous to the correction of the leader's communicative gestures.

In the same way, it is completely compatible with the conditions for flow that conductors experience flow when their sense of mismatch between intention and musical sound disappears. When this happens it may well seem to the conductor as if his or her gestures are immediately producing the music. This still counts as a case of individual flow, but it moves us somewhat closer to the group flow case because the conductors take themselves to be shaping the *overall* musical output produced by many musicians simultaneously.

For instance, the following report by conductor Leonard Bernstein sounds like a case of flow to me:

> When it happens in conducting, it happens because you identify so completely with the composer, you've studied him so intently, that it's as though you've written the piece yourself.

> You completely forget who you are or where you are and you write the piece right there. You just make it up as though you never heard it before. Because you become that composer. I always know when such a thing has happened because it takes me so long to come back. It takes four or five minutes to know what city I'm in, who the orchestra is, who are the people making all that noise behind me, who am I? It's a very great experience and it doesn't happen often enough.
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> *(Bernstein in Epstein, 1987, p. 52)*

Strong focus on the total musical product will be an important feature of group flow. Of course, the conductor's actual capacity to shape the overall musical product is quite limited, and this may increase opportunities for mismatch. Yet recall that mismatch can also be reduced by adjusting one's intention to better fit reality, or to be more responsive to the live possibilities of the moment. In general, mismatch calculations should be tailored to a level of regulation that is within the musician's means.

Let us now turn from the leader's point of view to the follower's point of view. Here the deference of intentions becomes particularly marked. Musicians playing a follower role can quite radically draw their musical intentions from the leader's instructions. Even the sense of mismatch may be partially handed over to the scowls of a conductor. Of course, such cases of strong deference rely on the musicians interpreting the meaning of the leader's instructions, so the followers have hardly bypassed their own representational states. However, from the perspective of conscious experience, the followers experience the leader's instructions as indistinguishable from their own intentions; such is the automatic nature of endorsing the leader's instructions in many cases.

We are now in a position to characterize group flow. What is required is that aspects of both a leader's and follower's perspective are incorporated. This is not uncommon in ensemble performance. For example, in a string quartet or jazz ensemble, any of the musicians may be called upon at different times to take on different roles in the maintenance of musical coherence. At some points they may need to take a leadership role by clarifying the pulse or striking out with a certain expressive idea, and at other points they must defer to such leadership activities in the others. Particularly where the ensemble emphasizes the spontaneous adaptation to live possibilities, individual musicians must be constantly ready to take on either role (indeed, Noy, Dekel, & Alon, 2011 also present evidence that improvised interactions are smoother in the absence of strict hierarchical roles).

In being ready to take a leadership role, the individual's sense of responsibility for the entire musical product is maximized. And from this point of view, there is a significantly greater opportunity for experiencing mismatch. The musicians form not just an intention regarding their own individual contribution. They also develop a sense of how the overall musical product is supposed to sound as well as the intentions of other musicians as they take on leadership roles. Thus, the individual's intention can mismatch the individual music product, the group musical product, and the other musicians' intentions. They may also be aware from a follower's point of view of how the intentions of others mismatch the result.

How might group flow be achieved in such apparently inhospitable conditions? First, it looks like the musicians must at least be confident enough in their individual contributions not to be distracted by mistakes on that front. This should free up their attention to concentrate on the other musicians and the overall musical product. Reports of intense interpersonal connection suggest that group flow involves the loss of mismatch between one's own intentions and those of other musicians. However, it is by tussling over the character of the overall musical product that one most clearly experiences the distinct intentions of others, so I suggest that the crucial condition for generating group flow can be reasonably simplified to a loss of mismatch between one's intentions and the overall musical product. Hence, the challenge of achieving group flow is to form intentions for the overall musical product and for those intentions to be completely satisfied, even though one has relatively little control over how the overall music progresses.

This challenge is best met by radical *deference* to the overall musical product. We have already examined how musicians may defer their intentions to the conductor. Here a further step is taken. The musicians draw intentions not from a leader's instruction but from their sense of the momentum of the music—what the music itself seems to be suggesting should come next. In this regard, spontaneous adjustment is key (*cf.* the conditions for optimal ensemble performance identified in Blum, 1986 and Waddington, 2013). Spontaneous adjustment makes it much harder to distinctly attend to how music is supposed to sound, in contrast to how it does sound or how it's about to sound. Spontaneity also makes it harder for skill to exceed the challenges of the task, thus capturing the full attention of the performers.

In reference to this, it is worth noting that Hart and Di Blasi (2015) claim that because spontaneous ensemble performance lacks clear goals and feedback, group flow does not display all nine of the characteristics definitive of individual flow. Yet these authors seem too caught up with verbalized goals and feedback. Improvising ensemble musicians have an immediate goal to maintain the intrinsically rewarding characteristics of the music, and feedback is immediate in perceiving the error or success in achieving this. Thus, there is a complete parallel to individual flow.

Overall, I have suggested that group flow is essentially an experience in which the individual does not experience a mismatch between what she is intending and what the others are intending by means of radically deferring her intentions to the overall musical product. This happens when the musician is highly responsive to the possibilities of the moment and is not distracted by performance errors. This is what makes best sense of musicians' reports that the music itself seems to be taking over. As in standard accounts of flow, this should also be something that the individual musician is only just capable of doing. Indeed, it is quite feasible that responding spontaneously to the constantly changing nuances of the total musical product demands one's full attentional resources.

Embodied Musical Cognition

The final question we should have about this account of group flow is the extent to which it counts as a case of embodied cognition. The reader will note that I described how an *individual* may experience a sense of group flow. Thus, I have not suggested that a single conscious experience is literally distributed across several people. Indeed, if the individual musicians come to experience no distinction between their intention and the intention of others, it would be fair to say that group flow is a kind of illusion stimulated by the loss of mismatch. Mismatch is how we track the distinction between self and reality, or between self and others (*cf.* Lamm & Silani, 2014). Loss of mismatch only entails that the *awareness* of distinction is lost, not that there is in fact no such distinction.

However, it does seem fair to say that there is a genuinely group-level phenomenon to be found in group flow. Not only is it quite possible for multiple musicians to simultaneously defer to the total musical product, but it is conducive to the individual's experience of group flow that everyone does so. Strong reciprocity within the group allows the musicians' contributions to significantly influence the overall musical output, and thereby support their sense of match between intention and outcome. Moreover, it is when everybody seems to simultaneously adjust or change direction that one feels caught up in the flow—as if the music is taking over.

More than this, I suggest that in responding to the live possibilities of the entire musical output, the musicians' formation of their intentions becomes a *cognitively distributed task*. To explain: The individual's sense of how the music is supposed to sound is now largely determined by how she understands the actual progress of the music, but the actual progress of the music is fixed not just by the individual's contribution but by all of the musicians simultaneously. Thus, the individual's intention is fixed by the contributions of many musicians.

In effect, each musician's state of mind is something like "I intend *that*" where *that* is the actual musical sound, and so fixed by something external to the musician's brain. Of course, what "that" is

depends on the musician's individual capacity to understand what she is hearing, but the role played by understanding here does not undermine the deference in content. To make an analogy, the perception of a tree depends on one's possession of the tree concept, but the specific content of the perceptual state defers to what the actual tree is like. Unlike imaginative states, in perceptual states the thing in the world supports and sustains the experience; it fixes its content. So similarly in the case of deferred intentions, the external object fixes the content of the intention—and can moreover do this for several people simultaneously. But unlike the perception of the tree, the musicians are actively forming that content. Thus, it is fair to say that the musicians' *cognitive task* of forming intentions is literally shared since they all rely on each other to fix the factual musical product, and thereby to fix the content of each of their intentions.

Conclusion

I have described how the matching of intentions and performance can help explain the radical loss of self-consciousness and sense of action-awareness merging that characterizes experiences of flow. This model has largely worked with a representationalist model of mind (or at least conscious experience) but has gone beyond internal computational representations in supposing there to be a cognitive task distributed with the physical group interactions. Thus, there is a sense in which it is true that the music can take over, or speak through you.

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