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Abstract

This PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) review examines collective flow experiences in music contexts. Articles ($N = 598$) were searched using a publicly available scholarly literature search engine and critically evaluated for inclusion. The result of 20 articles matching the search criteria reveals a scarcity of theoretical and empirical studies that examine collective flow in music contexts. Our meta-analysis indicated that collective flow is an emergent phenomenon and the available studies reiterate the importance of (1) subsuming of individual goals to the collective level, such that “I” becomes “we”, (2) coalescing of individual skills to meet collective challenges, and (3) coordination of the contributions of individuals to a coherent collective performance. The work of R. Keith Sawyer, in particular, was the most salient and frequently cited among scholars studying collective flow in music contexts. We hope that this review provides the groundwork for further research, and for scholars to further examine the prerequisites, characteristics and benefits of collective flow as experienced by musicians through collaborative musical activities.

Keywords: flow, collective flow, ensemble, music, musician.

A PRISMA Review of Collective Flow Experiences in Music Contexts

But it is on the concert stage where the moments of true intimacy occur. When a performance is in progress, all four of us together enter a zone of magic somewhere between our music stands and become conduit, messenger, and missionary. In playing, say, the cavatina of Opus 130, we join hands to enter Beethoven's world, vividly aware of each other and our objective performance responsibilities, and yet, almost like sleepwalkers, we allow ourselves to slip into the music's spiritual realm. It is an experience too personal to talk about and yet it colors every aspect of our relationship, every good-natured musical confrontation, all the professional gossip, the latest viola joke (Steinhardt, 1998, p. 10).

The "zone of magic" that Steinhardt wrote about is not exclusive to musicians, but can also be experienced by improvisational theatre actors, basketball players, competitive team e-sport gamers, and even groups of people collaborating with one another to devise solutions to problems. Csikszentmihalyi (1975) coined the term "flow" to describe a "united flowing from one moment to the next, in which we feel in control of our actions, and in which there is little distinction between self and environment; between stimulus and response; or between past, present and future" (p. 43). In essence, being in the "zone of magic" is a subjective mental state where in the process of becoming fully absorbed in an activity, one seems to forget all the cares of the day, and may even experience a distortion of time.

Individual flow experiences has been extensively theorised by Csikszentmihalyi (1975, 1990, 1992), and applied to sports psychology (e.g., Jackson & Csikszentmihalyi, 1999). Nine defining characteristics of individual flow have also been identified: (1) challenge-skill balance, (2) action-awareness merging, (3) clear goals, (4) unambiguous feedback, (5) concentration on task, (6) sense of control, (7) loss of self-consciousness, (8) transformation of time, and (9) autotelic experience (Jackson & Marsh, 1996).

As pointed out by Hart and Di Blasi (2015), many of the findings related to flow in musical settings place the individual as the primary unit of analysis. Yet, many human activities—work, play, worship, relaxation and more—occur in groups. While there is certainly more interest

in studying aspects of individual flow in musical settings, various studies have come to suggest that musical activities are often inherently collaborative. There is therefore a need for studies to integrate concepts of how deeply collaborative tasks can be collectively completed in musical settings.

Flow in collaborative contexts has been variously termed combined flow (Hart & Di Blasi, 2015), group flow (Armstrong, 2008; Sawyer, 2017), interactive flow (Raettig & Weger, 2018), interpersonal flow (Snow, 2010), social flow (Keeler, Roth, Neuser, Spitsbergen, Waters & Vianney, 2015; Walker, 2010) and team flow (van den Hout, Davis & Walrave, 2016; van den Hout, Davis & Weggeman, 2018; Mosek, 2017). Similar to social processes such as emotional contagion which postulates the tendency of individuals to unconsciously imitate facial expressions, postures and emotions (Hatfield, Cacioppo & Rapson, 1993), Salanova, Rodríguez-Sánchez, Schaufeli and Cifre (2014) note that flow experiences could also be synchronised in a group, spreading from one member of a group to another. The shared belief, or collective efficacy belief, in the collective power of groups to produce desired results (Bandura, 2001) can consequently lead people in groups to encounter flow as a collective social experience (Salanova et al., 2014). The language of collective achievement goal orientations also suggests that a group climate focused on learning and improvement is beneficial to group task strategy effectiveness (van Mierlo & van Hooft, 2015) and flow experiences (Tan & Miksza, 2019). In line with these studies that look toward a “group spirit . . . which renders possible truly collective volition; this in turn renders the actions of the group much more resolute and effective than they (otherwise) could be” (McDougall, 1920, p. 89), we use the term “collective flow” in this article to embody the flow experiences that are shared by two or more people in groups.

In contrast to individual flow, collective flow as a distinct construct has been less extensively theorised, especially in the area of music performance, composition or listening. This gap in the literature gives rise to several pertinent issues. First, what is the relationship between the individual and collective flow experience? Studies have typically treated the individual as the focus of analysis, and consequently, analyses have tended to conflate individual experiences with any plausible emergent qualities of collective flow (Nakamura & Csikszentmihalyi, 2002). Secondly, how is the collective flow experience connected to the musical process? In contrast to outer time, which is measured by metronomes and clocks, music occurs in inner time, as in Bergson's notion of *durée* (Bergson, 1946). According to Schütz (1951), musicians must work together to synchronise their ideas of inner and outer time, which he refers to as the "mutual tuning-in relationship" (p. 79). How then do people simultaneously share in the richness of one another's stream of consciousness in the participation of an activity, such that collective flow emerges? Third, how does the literature on collective flow contribute to knowledge when other constructs such as group dynamics (e.g. Lewin, 1947) and social interactions (e.g. Larson & Richards, 1994) similarly study the effective combination of individual inputs to become a coherent collaborative output? If collective flow has not received as much attention in the literature, might it suggest that its study may not generate valuable findings that these other constructs have?

Accordingly, the primary aim of this article was to systematically review and summarise the literature which delineates how researchers in the music context understand collective flow. A secondary aim was to determine if a general consensus on the characteristics of collective flow experience exists. Our research questions were: (a) Which research studies examine collective flow in music contexts, and (b) how do these studies understand this form of flow? Specifically,

how does collective flow differ from individual flow, and how have researchers sought to understand, operationalise, and/or measure this construct?

Method

We used PRISMA, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses, to conduct this systematic literature review and obtain an overview of the current state of research on collective flow in music contexts (Moher, Liberati, Tetzlaff & Altman, 2009). Although PRISMA was developed for use in the medical sciences, it has been used in different subfields of psychology, including positive psychology (Bolier, 2013).

Both theoretical and empirical studies on flow beyond the individual in music contexts were included in this review. We used the term “musical contexts” in a deliberate attempt to be broad so as to exhaust all possible literature on collective flow in musical contexts. We searched for articles in Google Scholar, a publicly available scholarly literature search engine. Google Scholar search results are derived from a crawl of open source publishers and specialised bibliographic databases like WorldCat and PubMed (Vine, 2006). Although Halevi et al. (2017) argued that citation metrics and indexing quality on Google Scholar is less accurate than other curated databases, it is useful for its ability to identify academic papers with no restriction on document types and sources (Martin-Martin et al., 2016). More specifically, Harzing and Alankangas (2015) found that the number of papers in Google Scholar is substantially higher than controlled databases for every academic discipline, particularly in the humanities and social science disciplines, where Google Scholar typically reports 3 to 4 times as many papers as Web of Science and Scopus. The strength of using Google Scholar for an exhaustive literature search was corroborated by Gusenbauer (2019), who found that the large crawler-based nature of Google Scholar made it the most comprehensive academic search engine when compared to 11 other academic search engines and bibliographic databases. Thus, for this systematic literature

review, Google Scholar provided the most exhaustive coverage of available resources for our research questions. We conducted our search online to identify as many relevant sources as possible.

The following terms were used to search the database: “(crowd | cluster | distributed | social | team | group | collective | network* | combin* | interactive | interpersonal | plural | aggregate | shared) flow” AND music* AND Csikszentmihalyi.” We also used “Publish or Perish” (Harzing, 2007) to obtain the raw citations, after which the corresponding abstracts of the articles were searched and consolidated in a spreadsheet for coding. In accordance with the PRISMA method, two stages of evaluating articles were conducted. In the first stage, two authors evaluated the articles on the basis of their title and abstracts. Our inclusion criteria were:

1. The publication is in English;
2. The article is situated in a music context;
3. Flow experiences are studied collectively, such as in a group music activity.

For instance, articles that reference flow experiences in music ensembles were included, while those that were applied to non-music contexts, such as business environments, sports and gaming were excluded. In this first stage, all articles identified as eligible by at least one of the authors would be reassessed at the second stage.

In the second stage, the full-text of the articles identified in the first stage were closely read and evaluated by two authors. Alongside the inclusion criteria set out in the first stage, articles that did not situate collective flow within a music context, such as a one-sentence reference in the literature review of a journal article, were excluded. Other articles that broadly referenced performing arts, without specific discussion on the experiences of musicians, were also excluded. Subsequently, the articles were content analysed independently by the authors (e.g., Hart, 1998; Petticrew & Roberts; 2006) for methodologies employed and how collective

flow was construed by the body of research, paying attention, in particular, to how collective flow differs from individual flow. Results were then cross-checked and verified for consistency and accuracy (Morse, Barrett, Mayan, Olson, & Spiers, 2002). The flowchart in Figure 1 describes the identification, screening and inclusion process for articles that answered the research question.

#insert Figure 1#

Results

Cohen's kappa was run to determine the level of agreement between the two authors who reviewed the articles at the first stage. There was moderate agreement between the judgements of the reviewers: observed agreements = .964, agreements expected by chance = .906, $\kappa = .614$ (95% confidence interval: .466 to .762). Following the second stage, where there was complete agreement between the authors, 20 articles matched our search criteria as outlined in the tables used in this section. Our analysis indicated that of the 20 articles, five were quantitative, 10 were qualitative, three were mixed-methods and two were theoretical. In addition, of the 20 articles, eight were journal articles, four were book chapters, and eight were dissertations.

We also used "Pajek" (de Nooy, Mrvar & Batagelj, 2018), a network tool, to visualise the network graph showing the relationships between the various authors in the current body of literature on collective flow in music contexts (see Figure 1 which illustrates the first authors of publications cited). For each of the 20 articles that met the criteria, the bibliography section was screened for authors cited, and if the author cited one of the 19 other authors that met the criteria, they would be connected with an arrow to indicate the bibliometric relationship. For instance, if any of Sawyer's publications was cited by Gaggioli et al. (2017), the relationship would be "Sawyer → Gaggioli." The larger the size of each vertex, or individual circles in the network graph, the more times that author was cited. Finally, "Csikszentmihalyi" was included as a vertex

in the network graph not only because all the articles cited Csikszentmihalyi, but also because individual flow experiences serve as a starting point for the discussion on collective flow.

From the network map generated from the systematic review presented in Figure 2, we observe that of the 20 articles that met the inclusion criteria, 13 of them cited at least one of Sawyer's works. Hart and Di Blasi's work was cited by 6 other authors, MacDonald et al. by 5 others, and Sutton, Hytönen-Ng and Gaggioli by 2 others. All articles referenced Csikszentmihalyi, as understandably, flow experience in individuals has been extensively theorised by Csikszentmihalyi, and the authors would use individual flow experiences as a starting point for their discussion on collective flow.

#Insert Figure 2#

Review of Qualitative Studies

Sawyer (2006) defines group flow as a property of the entire group as a collective unit. For a group in interactional synchrony, everything falls into place naturally, and each of the group members can feel as if they are able to anticipate what their members will do even before they do it. Even though group processes do not always have clearly defined goals, which is essential to individual flow, Sawyer's qualitative study found that an improvisational theatre group, much akin to a jazz ensemble, had no script but was still able to perform at its peak. For Sawyer, group flow can precede individual flow states, and aid individuals in attaining flow.

Similarly, Carter (2014)'s notion of trade flow is a collaboratively emergent phenomenon but with different permutations of flow states between two or more individuals in a group. In collaborative jazz musical dialogue, each individual is collaboratively invested in the process of music making, and trade flow emerges when players take turns responding to musical offerings that function identically to conversation. While Sawyer (2006) writes that a group can be in flow

even when its members are not, Carter argues that trade flow is not contingent on overall group flow.

Hart and Di Blasi (2015) conducted a pilot study on the subjective experience of combined flow in musical jam sessions. They noted that 7 out of the 9 core characteristics of individual flow were present when flow was experienced collectively. Musicians also experienced group jam as a progression through a sequence of distinct stages: (1) finding a niche, (2) breaking on through, (3) finding the group groove, (4) bridging sound to silence, and (5) sharing highs and lows. They also found that emphatic connections between members, such as sharing the blame for mistakes made during a jam session, are an indispensable part of the collective flow experience.

Freer (2009) conducted interviews with boys on their choral music experiences and found that the music making of individuals was inextricably linked to the ensemble. Moreover, the role of the conductor was highlighted as germane to flow experience, especially when the conductor was able to take into consideration the needs of individual singers, and chose authentic and appropriate repertoire. Similarly, Hytönen-Ng (2013) situated collectivity in the creation of flow. Collectivity is overlooked because of the emphasis on creative individuals, yet it is prominent in flow because musicians are connected deeply to each other. Flow for musicians is accordingly a communal experience, and must involve interacting and sharing with others.

Enticott (2000) uses the notion of *communitas*—experience of togetherness felt by those undergoing change together (Turner, 1979)—to examine the relationship between music and words. Flow can induce *communitas* (and vice versa), but in the feeling of *communitas*, the action of “being” together is more important than the “doing.” Enticott found that people are drawn to a church service for various reasons—worship, music, or simply being in the same space

as other people—but they nonetheless collectively enter flow simply by participating. Similarly, Sutton's (2004) exploratory study of transcendent performance in groups found collaborative work among chamber musicians favourable to the feeling of being an integrated part of a greater consciousness. He identified eight emergent themes from the study of three small music groups: (1) ego, (2) diva personalities, (3) friendship, (4) trust, (5) role of audience, (6) music played, (7) preparation, and (8) performance versus rehearsal. There is the notion of blending individual egos to the collective level, but more important here is the idea of a shared consciousness that emanates from the work of an ensemble.

A discourse analysis conducted by Morrow (2013) of a collaboration between the band Boy & Bear and their producer, Joe Chiccarelli, found that the band shared tacit knowledge and comparable skill levels required for group flow. As posited by Sawyer (2017), heterogeneity would have enhanced performance, but because the group studied was potentially too familiar with one another, they may have been subject to groupthink resulting from too much conformity and performed below their peak. Morrow's findings suggest that groupthink and being overly comfortable in a group may be antithetical to collective flow.

Similar to Morrow, Hill, Hill and Walsh (2018) found that the process of making a collaborative instrumental composition was not only marked by instruction, cooperation and collaboration, which were conducive to collective flow, but also conflict. In their autoethnographic work, a band member used abusive language when challenge-skill balance was absent, while another completely stopped playing when he lost concentration and became uncertain of a clear goal. The study found that conflict did not wholly impede collective flow, but instead played a role in the collaborative composition process by acting as a catalyst for focused engagement.

In a novel approach to studying collective flow, James (2017) extrapolated the collective flow experience from physical proximity of musicians to the product of digital collaborative tools and their effect on listeners. Using a text-based survey which was distributed to an online music community, collaborative projects were identified in which the collaborators experienced group flow. Judges were appointed to determine if a finished product compelled them to “move along” to the groove, which was then used as a proxy for group flow.

The qualitative studies reveal that collective flow is understood as a construct distinct from individual flow, though related. Although it shares most characteristics with individual flow, and individual flow experiences can aggregate into an ensemble-level experience, collective flow is not merely the sum of individual flow experiences from which it emerges. Instead, collective flow originates in a kind of collective dynamic in which members first share in feelings of working towards a common goal. Therefore, it is only because individual members that integrate their skills while performing his or her own action that any sort of collective goals can be realised in performance or creating a new piece of music.

Three themes were prominent in our content analysis of these papers: (1) subsuming of individual goals to the collective level, such that “I” becomes “we”, (2) coalescing of individual skills to meet a collective challenge, and (3) coordination of the contributions of individuals to a coherent collective performance. Table 1 lists the type of publication, the conceptualisation of collective flow which relates to the three themes identified, and the participants in each of the qualitative studies identified in our literature search.

#Insert Table 1#

Review of Quantitative Studies

Using a group composition task and experience sampling forms, MacDonald et al. (2006) studied the relationships between creativity, flow and the quality of compositions produced by undergraduate music students (Csikszentmihalyi & Csikszentmihalyi, 1988). External assessors rated the group compositions for their creativity. Although the study was not explicit about measuring collective flow, the authors found that in such a group task, increased levels of flow were found to be related to increased levels of creativity, and thus higher quality group compositions.

In separate studies studying undergraduate musicians in their universities, Neuser (2015) and Keeler et al. (2015) examined the experience of social flow within the context of group music production tasks. Two vocal quartet arrangements of the same piece were created: one for standard performance conditions to be sung as written, and one for improvised performance conditions. Following the performance of each arrangement, the Flow State Scale-2 (FSS-2; Jackson and Eklund, 2002) was administered to each performer and blood tests were administered to measure concentrations of blood plasma oxytocin and adrenocorticotrophic hormone (ACTH). Findings indicated that the participants experienced social flow in both the standard and improvised conditions. Raw scores indicated that flow experience was slightly greater during standard performance than improvised performance (Neuser, 2015). Moreover, ACTH concentrations decreased in both conditions, but significantly so in the pre-composed singing condition, which may have contributed to the social flow experience (Keeler et al., 2015).

Oztop (2017) conducted a comparative study which examined how flow was experienced in large collaborative creativity contexts using a sample of 240 participants from three different art domains—orchestra, dance and music theatre. Findings indicated that the domain of

performance did not make a difference to the level of flow experienced. There were also no differences in flow experience of different cohorts recruited at different times of the year.

Moreover, there was a positive relation between empathy and performance flow factor; this was strongest in dancers, followed by orchestra members, and then by musical theatre members.

Gaggioli et al. (2017) used the networked flow model, a theoretical framework that studies creative collaboration by integrating concepts of group flow and social presence, to investigate group collaboration in 15 amateur musical bands made up of musicians and singers. Flow was measured using the Flow State Scale (FSS; Jackson & Marsh, 1996), social presence using an adapted version of the Networked Minds Social Presence Inventory (NMSPI; Biocca & Harms, 2003; 2011), group structure traced by counting the number of gazes exchanged between members and verbal exchanges, and team performance was measured with self-report evaluations and a team of raters. Findings indicated that group flow was a significant predictor of self-reported performance, but not of expert-evaluated performance. There were also several correlations found between flow, social presence, and patterns of implicit and explicit interpersonal coordination. In particular, flow was positively related to the exchange of gazes during a performance, and negatively associated with the exchange of orders.

Overall, the various quantitative studies used different scales to measure flow experiences in music contexts. Usually, the scales employed measured individual flow, which was then aggregated to a group score which served as a proxy for collective flow. Table 2 lists the type of publication, the participants, and the instrument used to measure flow in each of the quantitative studies identified in our literature search.

#Insert Table 2#

Review of Theoretical and Mixed-Methods Studies

Bishop's (2018) theoretical study situated collaborative musical creativity in the context of embodiment, focusing on musical imagination to facilitate performer flexibility, and the forms of communication likely to support coordination of creative musical output. She argues that ensemble performance is necessarily emergent—the collective output of the group amasses to greater than the sum of individual contributions, and that the group performance cannot be attributed to a single contributor. The relationship between flow states and emergence is, however, still unclear. Nonetheless, group flow can be encouraged by a shared cooperative, rather than competitive mindset.

Mazzola and Cherin (2008) found in their case study on the production of Miles Davis' *Bitches Brew* and Geisser and Mazzola's *Chronotomy* album that group flow can be encapsulated in the term "passion." They wrote:

We had observed that flow generates types of external forces of a comprehensive form that are distributed over all participants, and which seems to impose itself through that most intense hypergestural activity. Musicians are suddenly played by that music, as if their shared efforts would flip into that higher force, which then drives them into a passive role: that force imposes itself, absorbing the hyperactive game [...] One could suspect that this is a paralyzing effect, but all free jazz musicians who know about that effect agree that this dialectic is the most securing effect to demonstrate that both collective ideation and the product of flow have now been achieved. There is a word for such a moment, and the word is passion (p. 118).

Among the mixed methods studies, Southworth (2008) investigated the impact of band room jam sessions on students as a way to understand how flow theory explains the continued participation of these students. All the jammers were found to be pursuing self-developed goals, and practiced because they enjoyed it. Students with a wide spectrum of skill levels reported an overall feeling of balance during challenges of a jam. Through mentoring or scaffolding, less skilled players were encouraged to be involved with more skilled players, allowing them to also

experience flow. Individuals, especially those of higher skill levels, adjusted their expectations for the jam and thus also increased the likelihood of flow to occur.

Paisley and Cassidy (2016) traced opportunities and outcomes from music games in classrooms, and investigated the flow experience in music-game participation. In a primary school class where Rock Band 3 was incorporated into the curriculum of a music class, one band made up of 2 males and 3 females was closely studied. Findings indicated high levels of enjoyment and engagement throughout the session, especially in self-esteem and motivation dimensions. Qualitative interviews also revealed the self-discovery of focus and concentration to do well in the game, which supports benefits of music-game participation to inspire, engage and resonate with young learners.

Kang (2017) investigated individual and external factors related to amateur orchestra participation that influence the subjective well-being of individuals. The author contacted the leaders of amateur orchestras, and administered the quantitative survey using Perceived Values of the Amateur Orchestra Members (PVAOM), the Basic Psychological Needs Scales (BPNS), Individual and Collectivism Scale (INS-COL), and Satisfaction with the Life Scale (SWLS). Following collection of completed surveys, interviews were conducted with participants who volunteered in the qualitative interview. The participants reported a sense of togetherness, including unity, belonging, and harmony while playing in the orchestra, and felt more stable and comfortable than playing alone. They were also willing to serve and dedicate their energy to the orchestra and collectively wanted to contribute to a good performance by the orchestra on stage.

Similar to what we observed in the qualitative and quantitative studies, the theoretical and mixed-methods studies emphasise that collective flow emanates from the contributions of individual musicians. Rather than individual goals, the objectives of the group took precedence,

such that the resultant output can no longer be traced to a single contributor. Even among individuals with different skill levels, collective flow could be attained when members with higher skill levels temper their expectations, and lend aid to other members with lower abilities. Table 3 lists the type of publication, the conceptualisation of collective flow which relates to the three themes identified in each of the theoretical and mixed methods studies identified in our literature search. The participants and the instrument used to measure flow are also included for the mixed methods studies.

#Insert Table 3#

Discussion

The primary purpose of this study was to systematically review the literature on collective flow in music contexts. A secondary aim was to determine if a general consensus on the characteristics of collective flow experience exists. In particular, we sought to understand how collective flow differs from individual flow, and how researchers understood, operationalised, and/or measured this construct. We hope that the review will highlight the current status of research in this area, especially in musical contexts, and chart further directions for flow research in music contexts. Our findings indicated that collective flow is an emergent phenomenon and the available studies, particularly the qualitative and mixed methods studies, reiterate the importance of (1) subsuming of individual goals to the collective level, such that “I” becomes “we”, (2) coalescing of individual skills to meet collective challenges, and (3) coordination of the contributions of individuals to a coherent collective performance. These three elements, though not the only means of defining collective flow, can help us to distinguish collective flow from the individual flow experience in music contexts.

First, for flow to take place, clear and well-defined goals are necessary, such that the individual knows what he or she needs to achieve. In the case of ensembles, members present can spend time together to chart their rehearsal and performance goals. Miksza (2011) found that individuals that rehearsed using goal-directed strategies, such as using a metronome, and breaking up a large work into smaller fragments, have been able to augment performance achievement. Similar strategies are applicable not only to the individual musician, but also to ensembles, with the reasons for collaborating, the values of the ensemble and the steps to achieving the collective goal needing to be negotiated and agreed upon. When “I” becomes “we”, a shared sense of identity emerges, such that everyone feels that they have a stake in meeting the collective goals, which can in turn reinforce positive feelings about the *raison d'être* of the group.

Second, flow theory emphasises the importance of the individual perceiving challenge and skills as balanced before flow can be experienced (Csikszentmihalyi, 1990). This maps on directly to the work of groups, because a key reason groups exists to complete a task is because the said task is too complex for a single person to complete it. For instance, singers that make up a choir are typically assigned a voice part, and it would be difficult, if not almost unreasonable, to demand a soprano to sing in the same register as a bass profundo. By bringing together the competencies of different individuals, coalescing their complementary skills, and matching challenges to the abilities of each member's specialisation, a group can rise to the collective challenge and perform the collective task ahead of them.

Third, flow takes place when action and awareness merge, that is, the individual's mind is wholly focussed on the activity. At the collective level, this means that the contributions, and even consciousness, of the individual is united with those of the group. Sawyer (2017) terms this

the blending of egos, where musicians balance their own voices with deep listening. The result is a collective performance where the individual contributions become part of a greater, synergistic whole, and the resultant performance, or its success, cannot be traced to the work of a diva personality. The work of one person can be built upon by another, and it is in contributing jointly where a team can say that “we did this together”.

Our systematic review reveals that collective flow experiences in music is relatively understudied in all fronts—theoretical and empirical. In particular, among quantitative and mixed methods studies, participants were drawn from amateur and student groups; no professional groups have been involved. Authors who employed quantitative methods often used individual flow state scales, such as the 36-item Flow State Scale (FSS). Although an aggregation of individual flow experiences can produce useful findings, this may not be the ideal way to study collective flow. For Sawyer (2006), group flow is an emergent group property and is not analogous to the psychological state of flow. In the study of groups, “the whole is *something else* [emphasis added] than the sum of the parts” (Koffka, 1935, p. 176). A group is a Gestalt—because of the way members interact with one another to create a unified system with emergent properties, it cannot be understood through a principle of addition. Groups of all kinds, whether orchestras, choirs, or experimental music ensembles, are a new product itself and have to be the object of the study, and not the individuals that make up the group.

Consequently, our recommendation for quantitative music studies on collective flow is twofold. First, as the absence of collective flow scales validated in music contexts has led authors to use individual scales to conduct their research, scales specifically to measure collective flow scales may be created or adapted from other disciplines and validated in music contexts. For instance, a group task absorption scale and group task enjoyment task employed by

Salanova et. al. (2014) could be adapted for participant self-report in musical contexts. Second, authors who draw their work on the extant limited theoretical or qualitative collective flow literature and use individual flow scales may integrate other scales or forms of analysis to supplement research into the interactions between musicians, such as the Empathy Quotient Scale (Oztop, 2017), social network analysis (Gaggioli et al., 2017), and introducing external assessors (Macdonald et al., 2006; James, 2017).

On the qualitative front, authors generally agree that collective flow is an emergent phenomenon. There is the notion of submerging individual personalities to the ensemble level, such that divas are on the same page with the rest of the group (Sutton, 2004), egos are blended (Sawyer, 2006), members feel empathy with one another (Hart & Di Blasi, 2015), and feel a greater sense of community (Enticott, 2000). The conductor of a large ensemble can be in a position to foster collective flow, such as paying attention to individual needs (Freer, 2009) and perhaps help newer members feel at ease with the ensemble.

The complexity of ensemble performance, in contrast to solo acts, demands different roles and instruments which necessitate interdependence, and as such, the collective desire and involvement of its members is crucial for peak performance (Carter, 2014). The type of communication between members is also essential to collective flow, with Morrow (2013) and Hill et al. (2018) positing the destabilising effect of conflict and abusive language on an ensemble.

The key limitation in our method of search is that individual flow literature is used as a starting point, and accordingly, studies that discuss similar material to collective flow but not in the lingo set out by Csikszentmihalyi would not have appeared in our review. For instance, ideas of group groove and ensemble experiences would not have appeared in the Google Scholar

search. We acknowledge that there were pre-flow theories that examine intrinsic motivation in the first place (Kristjansson, 2012). For instance, if the ordinary-language concept of “engagement” is sufficient to examine intrinsic motivation, is the enterprise of flow research simply the clothing of old material in new lingo?

We believe that studying collective flow can yield meaningful perspectives that resonate strongly with the work of musicians. Searle’s (2010) notion of “collective intentionality” appears particularly insightful: intentionality is collective because each individual has to assume that other members of a group, who share the same goals, are doing their own part. Each person can only perform his or her own action, but it is only together that any collective goals can be realised. For example, the successful staging of an opera can only take place when the music director can take for granted that the other individuals that make up the orchestra, chorus and cast will fulfil their designated roles. However, the creative license to phrase each line written by the composer, or ‘individual intentionality’, remains the prerogative of each musician. When the musicians listen across the orchestra and respond to the creative intentions of the director and one another, their individual performances serve as their contribution to the total collective performance, or the collective intentionality. Collective flow in turn improves ensemble performance, whilst also providing individuals with a satisfying experience in an activity that cannot be achieved alone.

Conclusion

To assist scholars and practitioners in their study of collective flow experiences in music contexts, we hope that this literature review provides the groundwork for further research. While the number of theoretical and empirical studies appears scant, our review has been able to identify influential articles that could be the basis for future works. Sawyer (2017) writes that group flow emerges in contexts where a slightly different set of conditions from individual flow

are present: (1) the group's goal, (2) close listening, (3) complete concentration, (4) being in control, (5) blending egos, (6) equal participation, (7) familiarity, (8) communication, (9) moving it forward, and (10) the potential for failure. Although these ten flow-enabling conditions have been verified in the qualitative studies we identified, they have yet to be validated quantitatively. The pilot study by Hart and Di Blasi (2015) also provided insight to the collective flow dynamics of music ensembles and could be valuable to other scholars. In closing, we encourage researchers to further examine the prerequisites, characteristics and benefits of collective flow as experienced by musicians and in musical activity, find new ways to enable higher levels of ensemble performance, and enter, as Steinhardt (1998) might call it, the "zone of magic" (p. 10).

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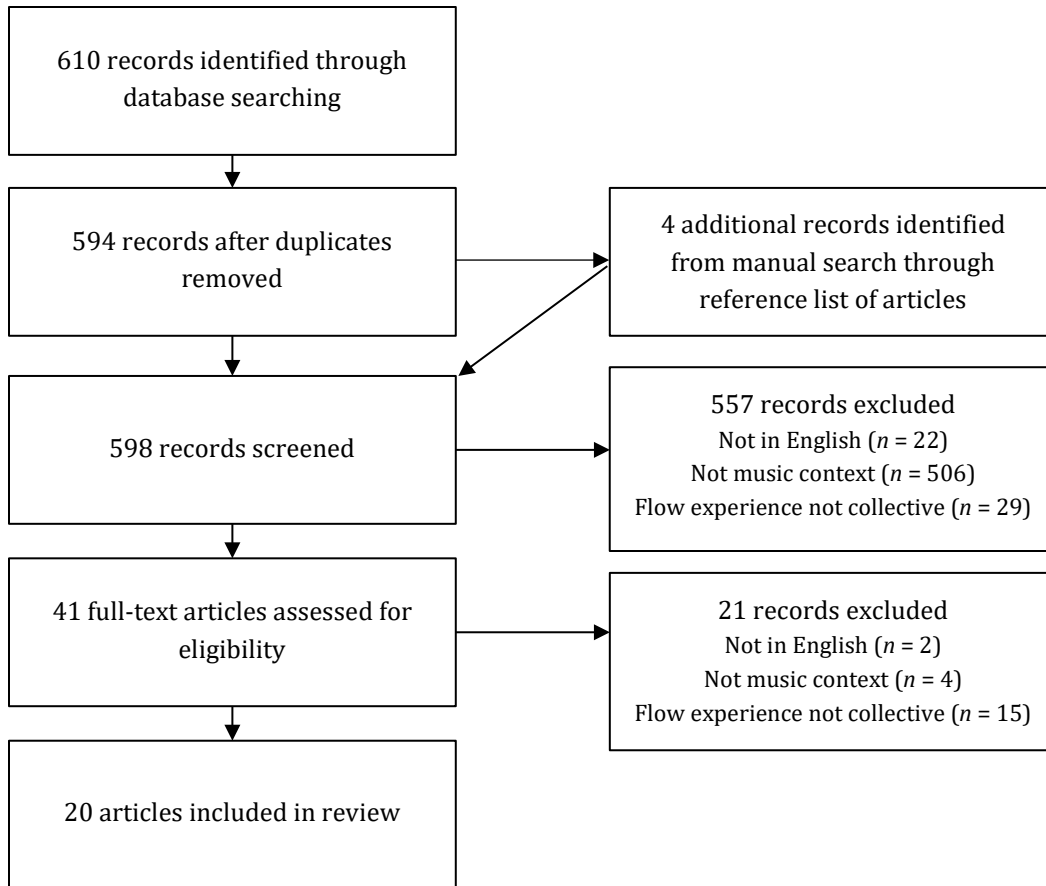


Figure 1: PRISMA flow chart for selection of articles for review

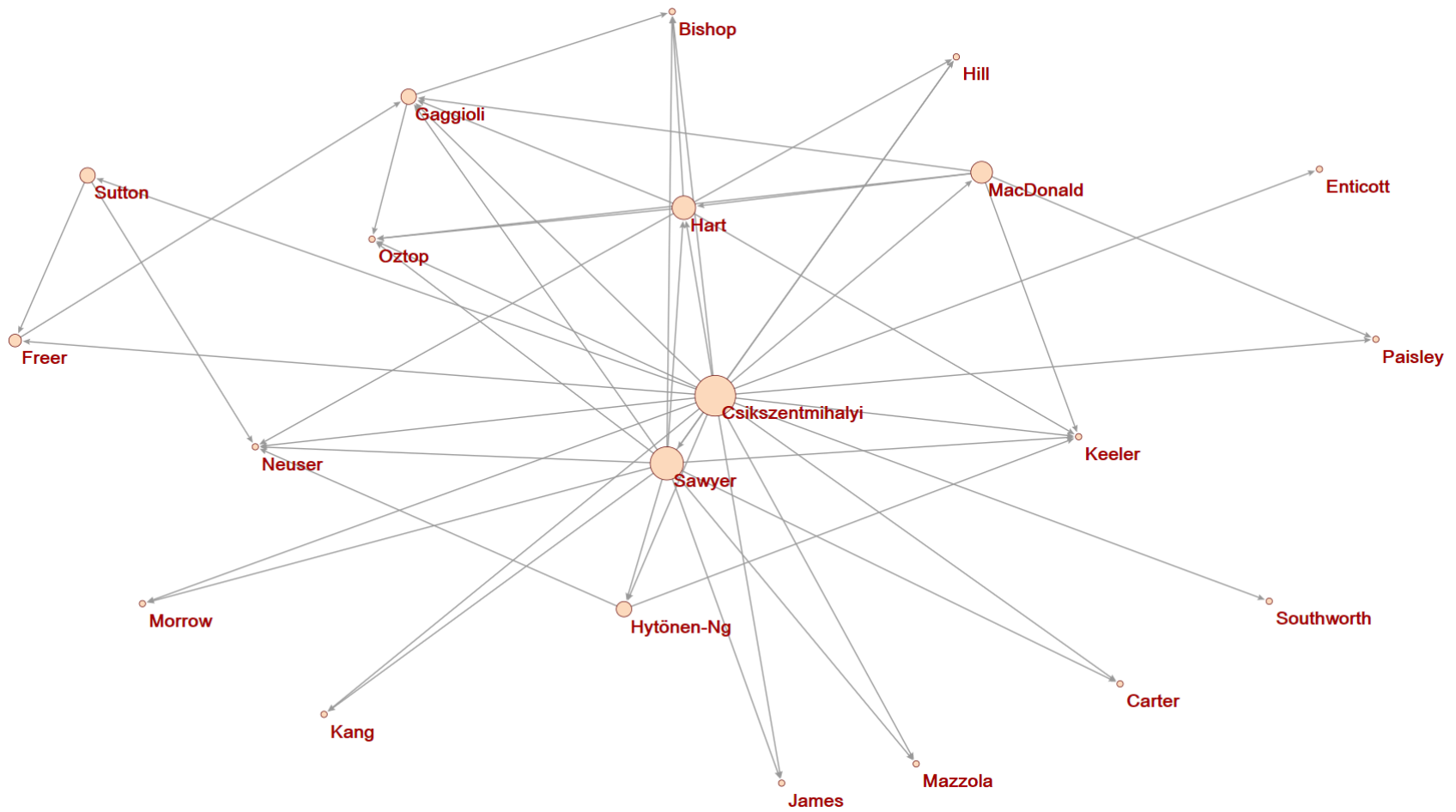


Figure 2: Network graph of scholars studying collective flow in music contexts.

Reference	Publication Type	Conceptualisation of Collective Flow	Participants
Carter (2014)	Dissertation	[1] [2] and [3]	Masterclass led by professional jazz trio with students and faculty member
Enticott (2000)	Dissertation	[1] [3]	Ordinary churchgoers attending Church of England services
Freer (2009)	Journal Article	[1] [3]	Boys interviewed for their experiences in school choral music
Hart and Di Blasi (2015)	Journal Article	[1] [2] and [3]	Musicians with extensive experience with group jam sessions
Hill, Hill and Walsh (2018)	Journal Article	[1] [2] [3]	Professional band members working on collaborative compositions
Hytönen-Ng (2013)	Book Chapter	[1] [3]	Professional jazz musicians from various countries
James (2017)	Dissertation	[1] [3]	Members of an online collaborative music composition community
Morrow (2013)	Book Chapter	[2] [3]	Professional boy band and their record producer
Sawyer (2006)	Journal Article	[1] and [3]	Various professional music and theatre groups
Sutton (2004)	Dissertation	[1] [3]	Undergraduate student-led saxophone quartet, professional baroque chamber music ensemble, and professional string quartet

Table 1: List of qualitative studies identified

Reference	Publication Type	Participants	Instruments used
Gaggioli, Chirico, Mazzoni, Milani and Riva (2017)	Journal Article	15 amateur musical bands	Flow State Scale (FSS; Jackson & Marsh, 1996) Networked Minds Social Presence Inventory (NMSPI; Biocca & Harms, 2003; 2011), Group structure traced by counting the number of gazes exchanged between members and verbal exchanges, and team performance was measured with self-report evaluations and a team of raters
Keeler, Roth, Neuser Spitsbergen, Waters and Vianney (2015)	Journal Article	Undergraduate Vocal Ensemble	Flow State Scale-2 (FSS-2; Jackson and Eklund, 2002)
MacDonald, Byrne and Carlton (2006)	Journal Article	Undergraduate Composition Students	Experience sampling forms (Csikszentmihalyi & Csikszentmihalyi, 1988)
Neuser (2015)	Dissertation	Undergraduate Vocal Ensemble	Blood tests administered to measure concentrations of blood plasma oxytocin and adrenocorticotrophic hormone (ACTH)
Oztop (2017)	Dissertation	University Orchestral Society, Theatre Society and dancers from a dance module	Sports Motivation Scale (SMS-II) Empathy Quotient Scale (EQ) FSS-2

Table 2: List of quantitative studies identified

Reference	Publication Type	Conceptualisation of Collective Flow	Participants	Instruments used
Bishop (2018)	Journal Article	[1] [3]	-	-
Mazzola and Cherin (2008)	Book Chapter	[3]	-	-
Kang (2017)	Dissertation	[1] [2] [3]	Amateur South Korean Orchestra	Perceived Values of the Amateur Orchestra Members (PVAOM), the Basic Psychological Needs Scales (BPNS), Individual and Collectivism Scale (INS-COL), and Satisfaction with the Life Scale (SWLS)
Paisley and Cassidy (2016)	Book Chapter	[3]	Primary school music class	A questionnaire adapted from MacDonald et al. (2006) and Sweetser and Wyeth (2005)
Southworth (2008)	Dissertation	[2] [3]	High school band room jammers and non-jammers	Advanced Measures of Music Audiation (AMMA), Tests of Melodic Ear-to-Hand Coordination (TMEHC), and an author-developed test of ear-to hand coordination (SOR)

Table 3: List of Theoretical and Mixed-Methods Studies