Collective efficacy belief, within-group agreement, and performance quality am...

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Abstract

We examined collective efficacy beliefs, including levels of within-group agreement and correlation with performance quality, of instrumental chamber ensembles (70 musicians, representing 18 ensembles). Participants were drawn from collegiate programs and intensive summer music festivals located in the Northwestern and Western regions of the United States. Individuals completed a 5-item survey gauging confidence in their group's performance abilities; each ensemble's aggregated results represented its collective efficacy score. Ensembles provided a video-recorded performance excerpt that was rated by a panel of four string specialists.

Analyses revealed moderately strong levels of collective efficacy belief and uniformly high within-group agreement. There was a significant, moderately strong correlation between collective efficacy belief and within-group agreement ($r_S = .67$, $p < .01$). We found no relationship between collective efficacy belief and performance quality across the total sample, but those factors correlated significantly for festival-based ensembles ($r_S = .82$, $p < .05$). Reliability estimates suggest that our collective efficacy survey may be suitable for use with string chamber ensembles. Correlational findings provide partial support for the theorized link between efficacy belief and performance quality in chamber music settings, suggesting the importance for music educators to ensure that positive efficacy beliefs become well founded through quality instruction.

Keywords

Chamber ensembles, collective efficacy, instrumental performance, within-group agreement, musician confidence

A number of scholars have used Bandura's (1997) theory of efficacy belief to study the relationships between task-based confidence, persistence, and achievement, in an effort to understand the ways in which individuals are motivated to learn and engage in music. As Maehr, Pintrich, and Linnenbrink (2002) have explained, motivation affects learning engagement, and is evident through the learner's behavior, affect, and cognitive processes. Expressions of efficacy belief indicate degrees of confidence people or groups have in their capabilities, relative to specified tasks (Bandura, 1977, 1997). The fluidity of efficacy belief across contexts and over periods of time requires direct measurement as close as possible to any event in question (Bandura, 1997; Bong, 2006; Pajares, 1996). While self-efficacy belief refers to an individual's perception of the ability to achieve a given task, collective efficacy perception operates in a similar way at the group level (Bandura, 1997).

Bandura's theory provides rich theoretical grounding for measuring task-dependent confidence. Accordingly, researchers of efficacy belief have increasingly found a foothold in music scholarship over the last two decades. Self-efficacy belief has been researched in a variety of musical contexts including graded music examinations (McCormick & McPherson, 2003; McPherson & McCormick, 2006); jazz (Watson, 2010; Wehr-Flowers, 2006); instrumental performance (Hendricks, 2014; Hendricks, Smith, & Legutki, 2016; Hewitt, 2015; Miksza, 2015; Miksza & Tan, 2015); higher music education (Ritchie & Williamon, 2010); primary school music (Ritchie and Williamon, 2011); and among older adult music learners (Bugos, Kochar, & Maxfield, 2016). Efficacy information is theorized to stem from four primary sources: enactive mastery experience, vicarious experience, verbal/social persuasion, and physiological and affective states (Bandura, 1997; Hendricks, 2016).

Despite the steady emergence of musical self-efficacy research, far less is currently known about the ways in which collective efficacy belief can function in the learning and performance of musical ensembles. The relative lack of music research in collective efficacy is surprising, given the central role that ensembles play in formal music education (Abril & Gault, 2008), as well as the importance placed upon uniformity among group members in assessing quality ensemble performances (Latimer, Bergee, & Cohen, 2010). An increased understanding of collective efficacy perceptions in musical contexts could be of value to music educators, as a group's shared belief in its capabilities can help explain the goals its members set (as well as the level of challenge inherent in those goals); how the group responds to obstacles or distractions; member-identified reasons for success or failure; and the degree to which members adhere to a sense of group culture and identity (Bandura, 1997; Zaccaro, Blair, Peterson, & Zazanis, 1995).

Defining Collective Efficacy Belief

Bandura (1997) defined perceived collective efficacy as "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (p. 477). Zaccaro et al. (1995) offered a concurrent definition, describing collective efficacy belief as "a sense of collective competence shared among individuals when allocating, coordinating, and integrating their resources in a successful concerted response to specific situational demands" (p. 309).

The theoretical underpinnings of collective efficacy are complex because the construct must be simultaneously identified with, and disentangled from, its self-efficacy counterpart. Bandura (1997) has described self- and collective efficacy as being essentially parallel: Both "have similar sources, serve similar functions, and operate through similar processes" (p. 478). Indeed, Bandura appears to have relied on the term "self-efficacy theory" as a convenient

shorthand when discussing concepts germane to both the individual- and group-focused variants, as illustrated by the following statement: "Self-efficacy theory distinguishes between the *source* of the data (i.e., individual) and the *level* of the phenomenon being measured (i.e., personal efficacy or [collective] efficacy)" (2006, p. 317, emphases in the original). Bandura further noted that a group's sense of collective efficacy is tied to the personal efficacy beliefs of its members, explaining that a group comprised of individuals with low self-efficacy will not likely share a high degree of collective efficacy. In music, for example, members of a string orchestra who doubt their individual abilities to play in high positions on the fingerboard would not likely report a high collective efficacy belief for performing repertoire requiring extensive shifting technique throughout the ensemble.

The salient distinctions of collective efficacy as a sub-construct of self-efficacy lie in its socially-situated nature. Social themes feature largely in what Zaccaro et al. (1995) described as the four primary elements of collective efficacy belief: (a) its importance as a shared belief among group members, (b) its emphasis on the coordination of individual members' efforts, (c) the marshalling of collective resources, and (d) the specificity of the task in question. Bandura and others have argued that collective efficacy belief within groups exists only to the extent that those beliefs are in fact shared among group members (Bandura, 1997; Zaccaro et al., 1995).

Central to efficacy theory is a presumed connection between competency perceptions and actual ability. Bandura (1977, 1982, 1997) asserted that higher self-efficacy beliefs lead to greater effort and increased perseverance toward desired aims, and that such effort and persistence ultimately result in increased achievement. Comparable advantages extend to collective efficacy beliefs, Bandura argued, explaining that in addition to increased effort and resilience, highly efficacious groups tend to function in a more coordinated way. Zaccaro et al.

(1995) emphasized group coordination as the factor that makes collective efficacy a distinct phenomenon; social forces necessarily occupy a more central role at the group level than at an individual one. A practical relevance of collective efficacy lies in the usefulness of the construct in understanding various elements of group actions or behaviors.

Relationships between collective efficacy belief and group or team performance have been established across a variety of fields beyond music including hockey, manufacturing, and football (e.g., Feltz & Lirgg, 1998; Little & Madigan, 1997; Myers, Feltz, & Short, 2004). As cited previously, there is also considerable evidence of a connection between self-efficacy belief and performance for individual musicians. However, while several music studies to date have included measures of ensemble collective efficacy (see Matthews & Kitsantas, 2007; 2013; 2016; Schmidt, 2007), we are aware of just one study that has addressed the relationship between efficacy belief and ensemble performance: Matthews and Kitsantas (2013) took an experimental approach in studying how differences in a conductor's goal orientation and gestural language might affect an ensemble's efficacy belief—at the individual and collective levels—as well as performance. These authors found no significant relationship between overall collective efficacy and performance. Performance did correlate with several subscales of collective efficacy (skillful playing, effort, and persistence), but those correlations were interpreted as relatively weak (r ranged from .23, $p < .05$, to .29, $p < .01$). There was no relationship between performance and either of the two remaining collective efficacy subscales (preparation and unity). Matthews and Kitsantas's research suggests that collective efficacy may not always predict performance in musical settings, at least in large conducted ensembles.

Bandura has consistently applied terms such as *belief* or *perception* in discussing self and collective efficacy, highlighting their self-referent nature (see Klassen & Usher, 2010).

Collective efficacy beliefs can be measured as an aggregation of members' perceptions of group competency, but interpretation of collective efficacy as a shared belief relies on the extent to which members agree in their estimations (Bandura, 1997). Therefore, in this study we devote particular attention to the extent to which members of ensembles agree in their assessments of group performance capability, along with relationships between collective efficacy beliefs and ensembles' demonstrated performance quality. In this study, *collective efficacy belief* refers to confidence in a chamber ensemble's performance abilities, based on a combination of the assessments of individual members within the ensemble. *Within-group agreement* refers to the degree of similarity in ensemble members' collective efficacy assessments, while *performance quality* refers to an ensemble's level of demonstrated skill, as assessed by expert evaluators, in performing their chamber music repertoire. Contributions of the present study include examinations of collective efficacy belief among pre-established chamber music ensembles, levels of within-group agreement on efficacy estimations, and the extent of the efficacy-performance relationship.

Purpose

The purposes of this study were to: (a) identify levels of collective efficacy belief among string chamber ensembles, (b) gauge levels of within-group agreement in individual collective efficacy assessments, and (c) determine the extent to which collective efficacy belief relates to performance quality among the ensembles. We addressed the following research questions:

1. How confident are string chamber ensembles in their own performance competency (collective efficacy belief)?
2. To what extent do ensemble members agree in their collective efficacy assessments?
3. To what extent do these collective efficacy beliefs relate to performance quality?

Method

Participants

Seventy college-age students (comprising 18 pre-established chamber music ensembles) consented to participate in this study. Eligible musicians included students ages 18 and above who were enrolled at one of eight collegiate chamber music program sites (n = 11 ensembles, comprised of 41 students), or three summer intensive music festival sites offering chamber music study (n = 7 ensembles, comprised of 29 students). Of the seven festival ensembles, five came from programs with a specific focus on chamber music, while two participated in an orchestral festival with chamber music as a secondary activity.

Participants were located in the Western (n = 4 ensembles, comprised of 15 musicians) and Northwestern (n = 14 ensembles, comprised of 55 musicians) regions of the United States. Ninety-three musicians (23 ensembles) originally enrolled, but two ensembles were excluded as a result of having at least one member under the age of 18. Three additional ensembles were withdrawn because they did not complete all study activities. Some groups included pianists and wind musicians alongside string players, which was not considered problematic to the purposes of this study because the level of generality of collective efficacy questions (discussed below) was sufficient to include any instrumental performer as well as any range of repertoire (see Bong, 2006; Hendricks, 2009, p. 61).

Procedure

Where possible, one author traveled to program sites (i.e., all three festival sites and two collegiate sites) to complete recruitment efforts and data collection. In cases where a researcher could not be present, we contacted chamber music program faculty to initiate recruitment and to provide participants with surveys and prepared instructions. Participants completed two activities

for this study. First, members of each ensemble independently completed the collective efficacy scale. Second, each ensemble was asked to provide a 3- to 4-minute video recording of a performance excerpt from its own repertoire. Instructions allowed for the use of readily available recording equipment, such as a smartphone.

We asked that the performances occur shortly following survey completion, to ensure valid comparisons between collective efficacy belief and performance as each existed around the same time (see Bandura, 1997; 2006; Hendricks, 2009; McPherson & McCormick, 2006). Allowing ensembles to choose from its own repertoire represented our interest in ecological validity; we intentionally omitted guidelines on style, musical characteristics, or other repertoire criteria to minimize the influence of the study itself upon either efficacy belief or performance. We also did not require any particular level of concert readiness; we reasoned that perceived level of readiness would be reflected in efficacy scores.

Examination of the video recordings indicated that most groups (n = 14) recorded performances in what appeared to be rehearsal spaces, while the others (n = 4) recorded public performances. After the videos were submitted, a panel of four experienced string performers and educators judged each of the videos using the ensemble performance rubric described below. The judges were given directions for completing their scoring, but they were blind to the study's purpose during their review period.

Collective Efficacy Scale

Ensemble members reported their collective efficacy beliefs using a data collection instrument based on a self-efficacy survey developed by Hendricks (2009, 2014). The original scale was used to collect data within a study of self-efficacy belief among high school honor orchestra musicians. The Hendricks survey includes seven items prompting participants to

indicate their level of confidence, from 0% to 100%, in their ability to perform all of their concert repertoire on their instrument, considering technical, expressive, interpretive, and performance challenges; playing to the best of their ability; and impressing an audience.

The adapted collective efficacy scale items used in this study are included in Table 1. To suit the purposes of the present study, we reworded the self-efficacy scale items to refer to one's ensemble, rather than to oneself, and to a single musical selection, chosen by ensembles (i.e., "Rate your percentage of confidence RIGHT NOW that your ensemble can perform its piece"). The collective efficacy survey adaptation was piloted by eight college level chamber musicians. This pilot indicated strong scale reliability (Cronbach's $\alpha = .83$), which was consistent with the strong reliability (Cronbach's $\alpha = .91$) found by Hendricks (2009). Further analysis revealed that the five items in the adapted scale contributed to overall item consistency, as removal of almost any item would have reduced Cronbach's α to as low as .77.

Table 1

Instrumental Performance Collective Efficacy Survey Items

Perform the technical difficulties of the piece (e.g., fingerings, rhythm, intonation)

Perform the expressive and interpretive challenges (e.g., dynamics, phrasing, style)

Play to the very best of [the ensemble's] ability

Generally handle the challenges of the performance

Play in a way that will impress the audience

Performance Quality Rubric

The rubric used to measure performance quality was originally developed for the purpose of adjudicating secondary orchestras in the state of Kansas (KSHSAA, 2006; see Latimer et al., 2010). Performance elements in the original rubric include tone, intonation, expression,

technique, rhythmic accuracy, note accuracy, balance, blend, and other. Maximum points available for each element ranged from 3 (other) to 15 (tone, intonation, and expression), for a total possible score of 80 points. In their *ex post facto* validation study, Latimer et al. (2010) found that the rubric had high internal consistency (Cronbach's $\alpha = .88$), and that adjudicators and ensemble directors generally considered the instrument to be a good reflection of how ensembles perform.

Since the KSHSAA (2006) rubric is intended for use with an orchestra, we considered its suitability for use with smaller, unconducted chamber ensembles, with particular attention to the descriptive statements accompanying each of the rating categories across items. We reasoned that the majority of these statements could apply equally to chamber ensembles; several statements were altered slightly to better reflect small ensembles rather than orchestras. The only additional modification was to omit the "other" item, resulting in a revised maximum score of 77. Latimer et al. (2010) found a slight increase in the scale's overall consistency with this item removed, and this item had the lowest item-total correlation.

Latimer et al. (2010) calculated an overall reliability of $W = .80$, with performance item reliabilities ranging from $W = .55$ (rhythm) to $W = .77$ (tone). Estimates in the present study were similar, with an overall reliability of $W = .78$, $p < .001$ among the four judges who scored ensemble performances. Inter-rater reliabilities for each of the eight performance items ranged from $W = .61$ (intonation) to $W = .79$ (rhythmic accuracy). Each item estimate was also significant at the $p < .001$ level.

Data Preparation and Analysis

Raw data included collective efficacy assessments from each participating chamber musician, and performance scores for each ensemble provided by each of the four judges. We

used a spreadsheet to calculate each ensemble's collective efficacy belief as an aggregated score of members' responses. We also used a spreadsheet to calculate each group's performance quality as an aggregate of judges' ratings.

Within-group agreement was calculated using James, Demaree, and Wolf's (1984) $r_{wg(J)}$ statistic. The formula for the statistic is represented here as Equation 1:

$$r_{wg(J)} = \frac{J\left[1-\left(\frac{\overline{s_{xj}^2}}{\sigma_{EU}^2}\right)\right]}{J\left[1-\left(\frac{\overline{s_{xj}^2}}{\sigma_{EU}^2}\right)\right]+\left(\frac{\overline{s_{xj}^2}}{\sigma_{EU}^2}\right)}, \quad (1)$$

where J represents the number of scale items (5 items in this study); $\overline{s_{xJ}^2}$ represents mean item variance across the group, and σ_{EU}^2 represents expected variance, assuming uniform distribution. When calculated using continuous scale data, $\sigma_{EU}^2 = (A - 1)^2/12$, where A represents the upper limit of scale item responses. In this study, participants rated confidence levels of up to 100%; therefore, $\sigma_{EU}^2 = (100\text{-}1)^2/12 = 816.75$. The $r_{wg(J)}$ statistic was not readily available in the IBM SPSS statistical package, so we entered the equation into the collective efficacy spreadsheet described above (this spreadsheet appears as a supplemental file for use by other researchers). The spreadsheet calculates both ensemble-level collective efficacy belief (the mean of individual scores), and $r_{wg(J)}$ for ensembles comprising up to eight musicians.

Results

Collective Efficacy Belief

Ensemble participants tended to report moderately high levels of collective efficacy belief (M = 75.27%, SD = 9.09%). Only one ensemble had a collective efficacy belief level below 60%; three ensembles reported levels between 62% and 65.50%; and 14 ensembles reported levels between 70% and 86.80%. Levels for each item were similar to the overall

collective efficacy mean, ranging from $M = 72.47\%$ for "expressive/interpretive challenges," to $M = 78.06\%$ for "generally handling performance challenges." These data indicate that ensembles were reasonably and reliably confident in their performing abilities, particularly in their competency for coping with challenges that might arise during the performance. Notably, there was an extremely high item-total correlation for the item, "impress the audience" ($r_S = .96$, $p < .001$). An ensemble-level analysis indicated that the collective efficacy instrument maintained strong reliability (Cronbach's $\alpha = .92$). Separate Mann-Whitney *U* tests were used to determine whether ensembles' collective efficacy beliefs varied based on any of three attributes: (a) educational setting (collegiate vs. summer festival), (b) region (Northwest vs. West), and (c) video recording venue (rehearsal space vs. public performance). There were no significant differences based on any of the three attributes.

Within-Group Agreement

There were consistently high levels of agreement across ensembles in this study (mean $r_{wg(J)} = .95$, $SD = .05$; median $r_{wg(J)} = .97$; min = .85, max = .99). A comparison of $r_{wg(J)}$ estimates to population-based (ensemble members) standard deviations computed for each ensemble revealed a strong negative correlation between the two agreement indices ($r_S = -.85$, $p < .001$). This finding indicates a level of consistency between the two statistics, as higher levels of $r_{wg(J)}$ corresponded with lower levels of variance among ensemble members' reported efficacy beliefs. There was a moderately strong correlation between overall collective efficacy belief and within-group agreement ($r_S = .67$, $p < .01$), indicating that members of more confident groups tended to register similar independent competency appraisals.

Performance Scores and Relationship to Collective Efficacy Belief

Ensemble performance scores tended to be moderately high ($M = 57.11$, $SD = 10.28$).

The relatively high standard deviation may be explained by two especially low scores, each under 40; and two especially high scores, each over 70. The remaining 16 scores ranged from 45 points to 68 points. The inter-rater reliability estimate of $W = .78$ ($p < .001$) aligns with findings from Latimer et al. (2010), who found a reliability estimate of $W = .80$ for orchestra performance scores. Accordingly, the data in the present study suggest that judges were somewhat consistent in their performance ratings, and that those performances were fairly strong for most ensembles.

As with the first research question, we conducted separate Mann-Whitney *U* tests for differences between performance scores based on (a) educational setting, (b) region, and (c) video recording venue. While there were no significant differences based on either region or recording venue, there was a significant difference based on educational setting: Ensembles in festival settings received higher performance ratings ($M = 65.93$) than did ensembles in collegiate settings ($M = 51.50$) ($U = 9.50$, $p < .002$). This suggests that musicians participating in festival-based programs were more likely than those in college music settings to perform chamber music at higher levels.

There was no statistically significant relationship between collective efficacy belief and any measure of performance quality for the total sample. The correlation coefficient between collective efficacy and overall performance was .38, but a sample size of at least 27 ensembles would be necessary for this correlation to be significant at the .05 level (Ramsey, 1989). Because we found a significant difference in performance scores based on educational setting (collegiate vs. festival), we ran separate correlational analyses for each setting. The relationship was not significant among the 11 college-based ensembles; however, we found a strong, positive correlation between collective efficacy scores and performance quality among the seven festival-based ensembles ($r_S = .82$, $p < .05$).

Discussion

Research has shown that strong musical performance is predicated on gains made through both independent practice and combined rehearsals (Ericsson, Krampe, & Tesch-Römer, 1993; Sloboda, Davidson, Howe, & Moore, 1996; Davidson & King, 2004). Accordingly, high levels of collective efficacy belief may reflect faith musicians gain in the progress made over the course of preparation. This interpretation is consistent with the role enactive mastery experience plays in the development of efficacy perceptions (Bandura, 1997).

The high levels of reported collective efficacy belief among chamber ensembles in this study are consistent with previous research on large ensembles, whether the construct was gauged as levels of confidence (Matthews & Kitsantas, 2013), or with Likert-type agreement indices (Matthews & Kitsantas, 2007, 2016; Schmidt, 2007). Secondly, participants in this study tended to agree within their respective ensembles in their independent collective efficacy assessments. The within-group agreement provides evidence suggesting that collective efficacy belief operated as a group-level construct.

These agreement results are consistent with interdisciplinary research utilizing the r_{wg} statistic, in which mean agreement indices across groups were usually .90 or higher. For example, Feltz and Lirgg (1998) found a range of r_{wg} between .93 and .96 for collective efficacy belief among hockey teams, while Hardin, Fuller, and Valacich (2006) found a mean r_{wg} of .94 among virtual teams of project management course students. In a notable exception, Little and Madigan (1997) found a mean r_{wg} of .78 among manufacturing teams who worked in alternating shifts. Higher within-group agreement levels may, therefore, be more likely among groups whose coordinated actions occur contemporaneously, as would be the case in sports as well as music.

The moderately strong correlation between collective efficacy and within-group agreement ($r_S = .67$, $p < .01$) indicates that ensembles reflecting higher efficacy beliefs tended to share similar collective efficacy assessments, while less agreement occurred among members of ensembles with lower efficacy beliefs. This result could shed light on the influence of social dynamics at play within ensembles, whereby collective efficacy is influenced by factors of ensemble cohesion (see Matthews & Kitsantas, 2007; 2016). Davidson and Good (2002) and Davidson and King (2004) have discussed cohesion-related elements that include the nature of communication among ensemble members, such as agreed-upon rehearsal norms, mutually understood non-verbal cues, and equal voice in discussions among members. These elements bear the hallmarks of verbal (and non-verbally signaled) persuasion as a source of efficacy beliefs (Bandura, 1997).

The positive correlation between collective efficacy scores and performance quality among festival-based ensembles aligns with much prior research in which investigators have identified associations between self-efficacy belief and performance for individual musicians (e.g., Ciorba, 2006; Clark, 2010; Hewitt, 2015; McCormick & McPherson, 2003; McPherson & McCormick, 2006; Ritchie & Williamon, 2012), and between collective efficacy and performance among groups or teams in non-musical domains (Feltz & Lirgg, 1998; Little & Madigan, 1997; Myers et al., 2004). On the other hand, the non-significant relationship found across the entire sample, and for the collegiate subgroup, provides at least partial corroboration with other music research: Matthews and Kitsantas (2013) found no significant correlation between overall collective efficacy perceptions and performance among large ensembles. Several collective efficacy elements did correlate with performance, but those correlations were weak, ranging from .23 to .29. Watson (2010) also found that relationships between self-efficacy and

performance for jazz improvisation remained non-significant, even after focused instruction.

The efficacy-performance correlation we found for the festival subgroup, which we did not detect for the collegiate subgroup, could be explained by either (a) a true setting-based difference in the predictive value of collective efficacy belief; or (b) an influence of the presence, or non-presence, of the researcher during study administration. Because one researcher collected data in person for all of the festival groups, while all but two of the collegiate groups completed the study remotely, we cannot exclude either possibility based on available data. A setting-based explanation may indicate a salient difference in the accuracy with which chamber music students are able to gauge their capabilities in either setting. The level of chamber music motivation may vary more in the college setting, in which chamber music participants represent a variety of academic foci both within and beyond music.

Alternatively, a researcher presence-based difference could have important methodological implications. Although written instructions were provided to all participants, those who completed the study apart from the researcher did not have the chance to ask clarifying questions about the process. For example, some participants may hypothetically not have been clear on the need to complete the survey with the group's chosen piece in mind, at its current level of preparation. In such a case, the efficacy assessment could have been more general in nature. Further, where in-person visits did occur, the researcher was able to personally ensure that the efficacy measurement and performance episode occurred in the preferred order, and in close temporal proximity. Temporal proximity is especially important in maintaining valid comparability between efficacy belief and performance (Bandura, 2006; Bong, 2006).

Limitations of this study include a narrowly defined music population (college-aged participants, string-dominant ensembles, chamber musicians), as well as a fairly modest

ensemble sample size, especially with respect to subgroups which appeared to differ based on whether ensembles were from college-based (n = 11) or festival-based (n = 7) programs. Collective efficacy belief, within-group agreement, performance quality, and the relationships among these factors could vary for other music ensemble populations. Such variations could hinge on musician experience (pre-collegiate, professional, community/avocational ensembles), instrumental or vocal medium, or ensemble type (e.g., large, conducted ensembles). Studies employing larger samples may be better able to detect whether more moderate correlations exist among efficacy belief, within-group agreement, and/or performance quality. Scholars seeking to further compare educational setting subgroups (e.g., collegiate vs. festival) should strive for consistency in researcher availability between subgroups, to better clarify appropriate attribution of any detected differences.

In this study, we sought to lay new empirical groundwork for collective efficacy research among intact ensembles. Accordingly, we excluded consideration of descriptive factors that may provide highly relevant context in future ensemble-related efficacy studies. Collective efficacy and within-group agreement could vary, for example, based on how long a particular group has worked together, the experience of each group member, and whether student ensembles were self-selected or faculty-assigned. Other potentially influential factors include degree programs of college-age participants, gender, instrument or voice type, year in program, etc.

Observations of ensemble rehearsals and interviews with members could inform our understanding of the social contexts in which collective efficacy beliefs form and evolve. These observations could allow analyses of non-verbal cues and gestures, revealing a potential persuasive impact upon efficacy beliefs as well as group cohesion. Longitudinal studies could reveal changes in both collective efficacy and within-group agreement that may occur over a

period of sustained engagement. Such research could include examinations of the influence of persuasive interaction upon collective efficacy belief, while also continuing to shed light on the evolution of any relationship between collective efficacy belief and performance.

Implications for Teaching and Learning

Music teachers and ensemble coaches could reference this research as a model in exploring the strength of their own groups' collective efficacy beliefs. One implication for music educators involves the importance of verifying students' reports of their collective ability with their actual performance-related preparation. It may be too easy, for example, for a chamber music coach to simply take a group's word that a certain section of music is performance-ready; however, collective efficacy levels—even with high within-group agreement—may not necessarily translate into quality performance.

Implications from this study suggest that collaborative group learning exercises may only be effective to the extent that group members share an understanding of quality performance standards. Because of the amount of time that chamber ensembles rehearse autonomously, teachers may need to coach students on effective peer-mentoring activities and instruct them on ways that they may simultaneously encourage one another while also motivating them to reach for continually higher performance goals. In the case of chamber ensembles, rotation of group members with one faculty member who rehearses as a member of the group from time to time might help to break up any potential "echo chamber" effect.

In any case, because collective efficacy belief can lead to persistence against setbacks (Bandura, 1997), educators may consider efforts to explore collective efficacy belief worthwhile when considering motivational factors in their students. An awareness of the sources of efficacy information might enable teachers to choose teaching strategies that help students learn how to

collectively target proximal goals, regulate practice activities, and provide specific feedback to one another in group rehearsals. Teachers might consider embedding these suggestions into instruction targeting musical development, which in turn could substantiate high degrees of efficacy for music making.

Teachers can often gauge students' efficacy beliefs through conversations or by intuitive observations. In some cases, however, educators may find use for quantifiable measures of efficacy belief, such as those used in this study, in conjunction with more subjective methods. The spreadsheet formulas (supplemental file) can be copied to expedite individual score aggregation, and within-group agreement calculations. Such measures might be used to track changes in efficacy levels over the course of a concert preparation cycle, compare musicians' efficacy beliefs to practice assignment scores, or quantify collective efficacy as a measure of classroom climate for use with administrators or professional development activities.

Conclusion

The results of this study suggest that the existence of a relationship between collective efficacy belief and performance quality is contextually dependent for chamber ensembles. While those involved in teaching chamber musicians should not expect any guarantee of such a relationship, they may more readily rely upon our more consistent findings that ensembles tend to be fairly confident in their abilities—and that members of a group tend to agree in their appraisals. Any correlation with performance notwithstanding, strong efficacy beliefs could help strengthen ensembles' motivation to undertake musical challenges, and to sustain their efforts toward musical fulfillment even as difficulties arise (see Bandura, 1997). Teachers could use this study's results to spur their efforts toward ensuring that positive efficacy beliefs become well founded through high quality instruction.

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