

ENSEMBLE PERFORMANCE SKILL AND COGNITIVE EMPATHY: THE ENHANCEMENT OF MUSIC EDUCATION PRACTICE IN INDONESIA

Oleh :

Indra K. Wardani¹⁾, Andre Marcel Toisuta²⁾

¹⁾ Department of Music Education, Indonesia Institute of the Arts Yogyakarta

²⁾ Institut Agama Kristen Negeri Palangkaraya

¹⁾email: indrakwardani@gmail.com

²⁾email: andremarcel26@gmail.com

Informasi Artikel

Riwayat Artikel :

Submit, 31 Juli 2026

Revisi, 15 September 2026

Diterima, 16 September 2026

Publish, 17 September 2026

Kata Kunci :

Cognitive Empathy,
Ensemble Performance Skills,
Choir.

ABSTRACT

The rising understanding of music's role in enhancing empathy and the role of empathy in optimizing musical interaction increases research in this field. The rising interest in music and empathy is mainly observed in the musical group activity that requires interpersonal interaction. While this research is done, the ensemble performance, especially in a choir, is barely explored in relation to empathic ability. The present study aims to identify the correlation between specific cognitive empathy and the self-perception of ensemble performance skills in a choir. A quantitative survey of choir members in some cities in Indonesia (N=95) found that cognitive empathy statistically correlates to ensemble performance skills at a medium level $r=.506$, $p=.000$. Meanwhile, the dimension of ensemble performance skills that most correlates with cognitive empathy is anticipation $r=.440$ (perspective-taking) and $r=.367$ (online simulation), both statistically significant at the 0.01 level. Linear regression analysis showed that empathic ability accounts for 25.7% variability in ensemble performance skills. Through initial analysis, it is also found that years of experience tend to account for a negligible share of ensemble performance skills compared to cognitive empathy per se. Further investigation is needed to validate a measure of ensemble performance skills that objectively accentuates individual ensemble skills, rather than relying solely on subjective self-report.

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Corresponding Author:

Nama: Indra K. Wardani

Afiliasi: Indonesia Institute of the Arts Yogyakarta

Email: indrakwardani@gmail.com

1. INTRODUCTION

The importance of empathy in human life has been discussed in many studies. Empathy is often seen as a skill that helps people interact and function better in society. The importance of empathy as a skill is also shown in some studies, which claim it is essential for doctor-patient communication (Yüksel PİRGON, 2015) and collaboration with co-workers (Luca et al., 2001). In essence, empathy, which is

generally defined as a skill or ability to understand the feeling and mind of others and respond appropriately, is required to create an emotionally intelligent individual (Ioannidou F, Konstantikaki, 2008) that lead to prosocial behaviour (Williams et al., 2014). The growing recognition of empathy as a prominent socio-emotional skill also increases research on enhancing empathy in individuals. Numerous study has explored the role of musical

training or musical activity in fostering empathy (Elvers et al., 2018; T. C. Rabinowitch et al., 2013; Vuoskoski, 2015; Vuoskoski et al., 2017; Yüksel PİRĞON, 2015). Music and musical activity to become the focus of much research on empathy ranging from exploring the relation of them (Cho, 2021)(Bamford & Davidson, 2019), the utilization of music for empathy enhancement(Babe, 2015; Parsons et al., 2014; T. C. Rabinowitch et al., 2013), the role of empathy in musical activity (Kawase, 2016; Wardani, 2022), and the mechanism between these two intertwined concepts (Greenberg et al., 2015; T. Rabinowitch, 2015).

The primary rationale linking music and empathy in most research is that both employ cognitive and affective processes (Baron-Cohen, 2009; Vuoskoski et al., 2017; Wardani, 2019). The empathy that is seen as both cognitive and affective process can be explained through the concept of empathy modes by Hoffman (Hoffman, 2008) or by the Theory of Mind (Goldstein & Winner, 2012; Shanton & Goldman, 2010b; Zahavi, 2014) as well as by looking through the neuroscientific process of it (Decety, 2011a, 2011b; Decety & Jackson, 2006). One of the primary modes mentioned by Hoffmann (Hoffman, 2008) that ables individuals to empathize is mimicry, the ability and inclination of individuals to mimic a facial expression and body gesture. This ability is supported by the mirror neurons in our brain (Decety & Jackson, 2006). This basic process of empathizing is then prolonged by conditioning, direct association, and the more sophisticated feature of individuals' ability to do verbally-mediated association and perspective-taking to 'put their shoes in another's shoes.' Meanwhile, the idea of a choir as a music ensemble requires many individuals to understand their specific roles related to the other member's roles. In the ensemble concept, the group needs to understand the shared performance goals: to align the expressive variations in performance parameters among musicians (P. Keller, 2013). The performance parameters might vary from tempo, dynamics, articulation, intonation, tone colour, et cetera. That is why the indicators of a good performer in the ensemble context are their musical technique and ability to adjust and adapt.

Another study showed that individuals tend to sing differently in the context of the technique during ensemble performance. Mann (Maxwell Mann & Author, 2014) showed differences in vibrato use among individuals when they sing solo versus in a choir. This attribute is to achieve balance and a better choral sound. The importance of achieving ensemble goals is also why the choir has a conductor. The conductor's gestures and facial expressions can suggest specific musical expressions for the singers to execute (Fuelberth, 2004). Thus, it is essential for the ensemble performer or singer in this context to interpret the conductor's facial expressions and body language. It also resonates with Gonzo's explanation

of vocal teaching on a basis. Gonzo stated (Gonzo, 1977) that vocal teaching is mostly metaphorical since the instrument played (or sung) is invisible. Therefore, the vocal teacher needs to find a way to help the students imagine the vocal-related organ and to do a specific action to optimize the utilization of the organ. Here, the mental process that is more or less similar to mentalizing in the concept of empathy occurs.

The understanding of the previous concept and the relation between empathy and interpersonal process in ensemble performance raises another question, such as, how precisely is the relationship between those two variables: empathy and ensemble skills? Moreover, is there any specific dimension of each variable more related to the other variable? From a music education perspective, how can this relationship be leveraged to optimize both the learning process and outcomes simultaneously? Is it possible to enhance a particular practice in music education, especially choir as an ensemble activity, to achieve better social skills?

Although previous studies have examined empathy in music performance, empirical evidence investigating cognitive empathy as a predictor of ensemble performance skills among Indonesian choir singers remains limited. As one of Indonesia's most performed musical works, the choir's limited research is becoming another concern. Most of the choir research in Indonesia tends to focus on singing technique (Mita, 2021; Sinaga, 2014) or on teaching strategies and choir management (Damara & Milyartini, 2021; Kartika et al., 2019; Sigiyo, 2020), even though it has the potential to serve as a social laboratory. Even though previous studies (Kawase, 2016; Wardani, 2019) stated the importance of empathic ability in a musical group activity, the study on how these two skills correlate, especially in Indonesia.

Based on the explanation in previous paragraphs showing various topics on music ensemble and empathy, as well as the research gaps between Indonesian choir practices and research trends, this research aims to explore and portray the choir as an ensemble performance from the perspective of its relation with empathy as a social skill and an interpersonal skill needed in performance.

Ensemble Performance Skills

Making music as an individual and as a group are two different things. Not only does it include another person, but it also requires them to co-perform, which means coordinating all the musical and extra-musical aspects involved. The prominent role of interpersonal interaction and the skills around this interaction involved the ability to communicate during the performance (Kawase, 2016). Keller (P. Keller, 2013) defined Ensemble Performance Skills as a combination of Cognitive-motor skills, musical knowledge, and familiarity with co-performers, and

socio-physical characteristics of the individuals to ensure the achievement of performance goals. The cognitive-motor skills that Keller emphasizes are the attribution of mental processes that are prolonged into motoric responses in an ensemble context. Keller's conceptualization of cognitive-motor skills resonates with the concept of coordination in Clayton et al. (2020), which they use to differentiate it from motoric synchronization. While motoric synchronization is defined as a motor reflex in individuals lasting 100-200ms, mainly in terms of rhythm, coordination is defined as something more voluntary and conscious. The prerequisite of consciousness and awareness of someone's action is what is articulated more by Keller through the dimension of Cognitive-motor skills, such as Anticipation, Attention, and Adaptation. Anticipation involves mental imagery where individuals predict the next musical event. Attention is more about individuals' ability to notice their own and others' performance. Meanwhile, adaptation is the ability to adjust their performance to their co-performers. In this study, the ensemble performance skills are limited to the cognitive-motor skills.

Cognitive-motor skills, as part of ensemble performance skills, can be explained in detail through mental imagery in music performance (P. E. Keller, 2012). In this article, Keller explained the underlying mechanism of mental imagery that enables performers to achieve their performance goals. Mental imagery in this context is understood as a multimodal process where individuals develop a mental experience of musical features ranging from the auditory and/or visual elements to kinesthetic, preliminary perceptive, and music-related movements that are not present physically. This concept emphasizes individuals' ability to automatically create specific images in their minds as a response or deliberate thought. The underlying mechanism involved the working memory to facilitate the mental representation to generate specific musical information needed during the mental imagery. This process also underlined the two additional mechanisms linked to motor control. The first mechanism is action simulation, which occurs during the association between the sensorimotor brain process and action execution in the absence of tangible movement. The attempt activates action simulation to imagine an action. The second mechanism is internal models that rely on experience-based learning that emphasize the occurrence of bodily states and intermediate events changes during sensorimotor transformation in the brain. In summary, ensemble performance skills in the context of cognitive-motor skills involve mental imagery and visualization of musical action and elements such as intonation, rhythm, dynamics, and articulation (P. E. Keller, 2012).

Cognitive Empathy

Cognitive empathy is often associated with mentalizing when individuals try to understand another's mental state. This concept can be explained by the Theory of Mind and Simulation Theory of Mind. In the Theory of Mind, someone's ability to understand another's mental state is merely rooted in their intellectual ability to evaluate and draw conclusions. Meanwhile, the Simulation Theory of Mind states that the ability to understand someone's mental state arises from individuals simulating the stimuli as if they were happening in their minds; therefore, such understanding is obtained (Goldstein & Winner, 2012; Zahavi, 2010a). As one aspect of empathy, cognitive empathy is more associated with mental than affective processes, and this dimension is separated from other dimensions in the QCAE (Reniers et al., 2011). Cognitive empathy covers a wide array of mental processing involved in mentalizing to empathize. It starts from the stimuli recognition, imitation, visual representation and mental pretention required to internalize another's mental state. Thus, the concept of cognitive empathy in QCAE is the prolonged operationalization of mentalizing. The primary mode of empathy, where individuals mimic and internalize stimuli to be able to guess someone's mind, is accentuated in many forms, such as; the ability to recognize discomfort in others, sensitivity to predict someone's feeling due to visual representation (de Vignemont & Singer, 2006) and those are presented during the whole cognitive-empathy dimension in QCAE. Cognitive empathy in individuals is often differentiated from affective empathy due to its ability to empathize without affection or emotional contagion (Zahavi, 2014). This cognitive empathy specification also explains why certain prolongation of empathy, such as prosocial behaviour, is not included in the QCAE.

2. RESEARCH METHODS

Respondents

The respondents for this current study are 95 choir singers with a singing experience of more than eight years, ranging from 18 to 57 years old. The average singing experience of the respondents is 16.5 ± 7.8 years, while the mean age of the respondents is 32.31 ± 9.2 years old. Sixty-seven point four per cent of the respondents are from independent or community-based choirs, while 32.6% are singers from student choirs in universities. This study used convenience sampling, where respondents were recruited through the broadcast message sent to some choir principals. The principals will offer the study to their singers and invite interested singers to join.

Materials

The Bahasa Indonesia translation of the Cognitive Empathy dimension of the Questionnaire of Cognitive and Affective Empathy (QCAE) (Reniers et al., 2011) measures the respondents' cognitive empathy. This questionnaire was chosen because it has the explicit dimension of cognitive

empathy that is more related to our operationalization of ensemble performance skills, including but not limited to cognitive-motor skills (P. Keller, 2013). The questionnaire consisted of 18 items with a statement such as 'I can easily tell if someone else is interested or bored with what I am saying.' The respondents will rate themselves from 1=totally disagree to agree 4=totally. The bivariate correlation analysis of total items and each item in this questionnaire showed the item discrimination is proper where all $r > .217$ (critical value of $df=84$, $\alpha=.05$) and all p-value to be less than .05. Meanwhile, the reliability test showed Cronbach's alpha for the perspective-taking dimension to be .839 and .8 for the Online-Simulation dimension, which is interpreted as sound. Meanwhile, the overall Cronbach's alpha for the items in this questionnaire is .875.

A questionnaire is developed to examine the self-perception of Ensemble Performance Skills based on the operationalization of Cognitive-Motor Skills (P. Keller, 2013) with three main dimensions: Anticipation, Attention, and Adaptation. The questionnaire consists of 14 items, including a statement such as 'I can guess the tempo of a song by observing the gesture and body sway of the conductors.' The respondents rated themselves as strongly disagree = 1 or strongly agree=5 on a 5-point Likert scale. The bivariate correlation analysis of total items and each item in this questionnaire showed the item discrimination is proper where all $r > .217$ (critical value of $df=84$, $\alpha=.05$) and all p-value be less than .05. The overall Cronbach's alpha for this questionnaire is .826 which is considered to be good. Expert judgement was done to assess the content validity of the developed questionnaire. The items used in this research are those which the I-CVI score is equal or above 0.8. Furthermore, the S-CVI of overall items is 0.88.

Procedure

The respondents completed the online survey via Google Forms by first providing their age, gender, choir experience, and consent to participate in the study. The questionnaire ordering is as follows: Bahasa Indonesia translation of the Cognitive Empathy dimension of QCEA and the Ensemble Performance Skills items.

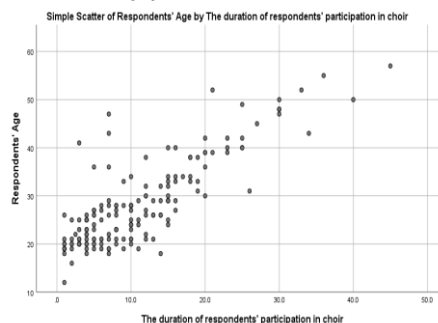
Analytical Strategy

Responses from the Google Form are exported to a CSV file for processing in the Statistical Package for the Social Sciences v. 26.0.0.0, with alpha levels set to .05. The preliminary analysis explored the demographics of the respondents to filter out those who do not meet the minimum years of experience requirement. This case filtration eliminates 108 responses from the previous 203 responses collected. The remaining 95 responses are then analyzed for the study. A bivariate correlation was conducted between all items and the total score for each questionnaire to test the validity of the data. The KMO statistic and its

significance are also obtained to test the sufficiency of the sample size. KMO statistics is .824, $p=.000$, showing the sample size is sufficient for the validity. A correlation analysis was conducted to assess the hypotheses between the total score of the Cognitive Empathy questionnaire and the total score of Ensemble Performance Skills. A linear regression analysis was conducted to identify the relationship between Cognitive Empathy and years of experience as predictor variables and Ensemble Skills as the outcome variable.

3. RESULT AND DISCUSSION

The descriptive statistics from the preliminary analysis showed that 63.2 percent of respondents are members of independent or community-based choirs, and the remaining 36.8 percent are members of student choirs. The following table shows the cross-tabulation of Sex to the Type of choir of the respondents. Of the total of 95 respondents, 51 were male, and 44 were female, with 35 males from the independent choir, 16 males from the student choir, 25 females from the independent choir, and 19 females from the student choir. Regarding the age and experience in choir singing, a Pearson correlation was conducted to gain insight into how these two characteristics relate to each other as a preliminary consideration to put one of them as the predictor in the subsequent regression analysis. The Pearson correlation between age and experience is $r = .870$, significant at the 0.01 level.



Correlation of Cognitive Empathy and Ensemble Performance Skill

The Pearson Correlation between Cognitive Empathy and Ensemble Performance Skill showed a medium correlation on $r = .506$, which is significant at 0.01.

Table 1 Correlation between Cognitive Empathy and Ensemble Performance Skills

		Cognitive Empathy	Ensemble Skill
Cognitive Ability	Pearson Correlation	1	.506**
	Sig. (2-tailed)		.000
	N	95	9
Ensemble Skill	Pearson Correlation	.506**	1
	Sig. (2-tailed)	.000	
	N	95	9

**, Correlation is significant at the 0.01 level (2-tailed).

The detailed correlation analysis of the dimensions of each variable is shown in the table below, where anticipation correlates on $r = .877$, attention $r = .794$, and adaptation $r = .718$ to Ensemble Skills. All of these statistics are significant at the 0.01 level. For the Cognitive Empathy variable, the dimension Perspective-taking correlates at $r = .889$, and online simulation correlates at $r = .830$, where all are significant at the 0.01 level.

A linear regression of perspective-taking and online simulation to Ensemble Skills was conducted to fit the model of regression $y = a + b_1X_1 + b_2X_2$ to gain insight into how the dimension of cognitive empathy simultaneously correlates to ensemble skills. The dimension of perspective-taking correlates with Ensemble Skills on $r = .461$, and online simulation correlates with Ensemble Skills on $r = .407$, both significant at the 0.01 level. Meanwhile, the regression analysis generates the model as follows:

$$\text{Ensemble Skills} = 38.686 + 0.487 (\text{Perspective Taking}) + 0.417 (\text{Online simulation})$$

The model summary generates $R = .461$ when perspective-taking is the only predictor with $R^2 = .212$, $p = .000$. Meanwhile, when both perspective-taking and online simulation take the role as the predictor of the outcome variable Ensemble Skills, the $R = .507$, $R^2 = .257$, $p = .021$. It is shown that the model is better at explaining the outcome variable when perspective taking and online simulation are combined as predictors instead of just perspective taking as the only predictor. Even so, the R^2 showed that the predictor only accounted for about 25.7% of variances in the outcome variable, which is minimum.

The addition of years of experience to the model

From the regression analysis, it is shown that the correlation between Empathic Ability and Ensemble Skills is $r = .506$, significant at the 0,01 level, and the correlation between years of experience and Ensemble Skills is $r = .079$, $p = .499$ that is insignificant statistically. Further linear regression of these predictors is conducted, and generate the model as follows:

$$\text{Ensemble Skills} = 33.069 + 0.457 (\text{Empathic Ability}) + 0.071 (\text{Years of Experience})$$

The model summary generates the $R = .506$ for the first predictor and $R = .513$ for both predictors in the model. The $R^2 = .256$ for the first predictor and $R^2 = .263$ for both predictors. It is seen from the correlation and regression analysis that years of experience account for a tiny percentage of the Ensemble Skills, around 0.6%, compared to Empathic Ability, which accounts for 25.6% in the variance of Ensemble Skills.

Correlation of Empathic Ability Dimensions to Ensemble Performance Skill Dimension

The Pearson correlation analysis of each dimension was conducted To gain more insight into

how each dimension correlates between the two variables. The result is shown as follows:

Table 2 Correlation between Empathic ability dimensions and ensemble performance skills dimensions

Perspect ive Taking (1)	r	1	.483*	.440*	.289*	.365*
	Sig. (2- tailed)		.000	.000	.004	.000
Online Simulati on (2)	r	.483*	1	.367*	.287*	.325*
	Sig. (2- tailed)	.000		.000	.005	.001
Anticipa tion (A)	r	.440*	.367*	1	.489*	.567*
	Sig. (2- tailed)	.000	.000		.000	.000
Attentio n (B)	r	.289*	.287*	.489*	1	.421*
	Sig. (2- tailed)	.004	.005	.000		.000
Adaptati on (C)	r	.365*	.325*	.567*	.421*	1
	Sig. (2- tailed)	.000	.001	.000	.000	

**, Correlation is significant at the 0.01 level (2-tailed).

From the table, we can observe the Anticipation as the dimension of Ensemble Skill most correlated to perspective-taking $r = .440$ and online simulation $r = .367$ compared to other dimensions.

Discussion

The analysis showed essential insights into how the particular dimension might contribute to the variables. We can see that empathic ability tends to correlate at a medium level to ensemble skills. The first assumption is the compatibility of both questionnaires to measure similar cognitive processes in empathy and ensemble performance. The adaptation of the Cognitive Empathy dimension of QCEA tends to focus on extending the cognitive process of empathizing. For example, mimicry is the basic principle of cognitive empathy on how individuals can mimic specific facial expression to the extent that they can imagine what happen behind the facial expression in the mind of others prolonged into the further action in the concept of mentalizing such as the ability to read someone's mental state. The sophistication level of cognitive-empathy measurement in QCEA might be less compatible with the dimension of cognitive-motor, which assesses individuals' ability to predict musical elements of certain body gestures. Predicting someone's mental state is more abstract than predicting subsequent musical elements such as tempo or phrasing. We think that is one of the reasons why it is difficult for individuals to assess their ability to empathize compared to their ability to perform ensemble.

Nevertheless, the medium correlation between Empathic Ability and Ensemble Performance Skills still articulates the intertwined relation between those skills. Previous research by Rabinowitch (T. C. Rabinowitch et al., 2013) that stated the effects of Musical Group Activity on enhancing empathy in

children might also be extended by this study through the result generated. Referring to the result of the present study and previous study, enhancing empathic ability by the involvement of individuals in a musical group activity or enhancing the empathic ability for the better achievement of ensemble performance might potentially be done. In the context of a choir, it is also emphasized that interpersonal interaction is vital to accommodate the empathic enhancement process. Wardani [14] stated that the absence of this interaction might eliminate the potency of a choir in promoting empathy. To ensure that these Ensemble Performance Skills are mainly attributed to Cognitive Empathy, the correlation analysis between Ensemble Performance Skills and years of experience is conducted. Here we can see that those years of experience account for a very tiny effect on Ensemble Performance skills, which can erase the present study's bias to focus on Cognitive Empathy as the predictor of Ensemble Performance Skills.

Further analysis of what dimension of Ensemble Performance Skills is most correlated with the dimension of Cognitive Empathy showed that Anticipation tends to be the most correlated dimension. The basic concept of Anticipation in Keller (P. Keller, 2013) is the ability of a musician that involves mental imagery to predict the action of co-performers. This concept of anticipation is considered the most relevant to the primary mode of empathy in Hoffman's [19] explanation of mimicry, conditioning, and direct association involving the presence of stimuli and direct observation. Anticipation needs the ability of the performers to observe bodily gestures and facial expressions as well as any other physical movement to imagine and predict subsequent musical events. Borrowing the concept of mentalizing [12][13], there is this specific process in individuals when they absorb certain visual information and internalize it in their mind, comparing it to their memory bank and sometimes making a simulation inside their mind to understand the motivation of particular expression or gesture generated by other individuals. Now, in the essence of an ensemble, individuals can observe and respond well, ensuring they can synchronize the performance. However, the relatively low correlation between attention and adaptation dimension of Ensemble Performance Skill and Cognitive Empathy still needs more Inquiry. The operationalization of these two dimensions might not be well represented in the questionnaire, nor are the respondents' difficulties in self-rate their ability in these two dimensions. Articulating more about the importance of ensemble performance skills in achieving performance goals, individuals need to foster their empathic ability since it correlates positively to ensemble performance skills. In order to achieve performance goals, some approaches might be executed, such as the adjustment of the singing technique (Maxwell Mann

& Author, 2014; Sublett, 2009), spacing and position arrangement in the context of acoustical attributes (Daugherty, n.d., 2003; Ekholm, 2000), as well as interpersonal-related ability viz ensemble performance skills and empathic ability.

4. CONCLUSION

In concluding the relation between empathy and ensemble skills in choir singers, it is statistically significant that those two variables are correlated on a medium level. The findings in this present study contribute to the research field on empathy and music to ensure that musical group activity involving interpersonal interaction is the potential to promote empathy. Otherwise, the empathic ability might be required for individuals hoping to perform better as ensemble performers. This study has also widened the research field of choirs in Indonesia to investigate more aspects that might be correlated with musical activity. Lastly, this study needs improvements, such as the samples' homogeneity, a better instrument to measure the variables, and more scrutiny analysis to gain better data results. Further research might want to build a better theoretical framework on Cognitive Empathy and Ensemble Performance Skills and operationalize it more sophisticatedly and reliably.

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