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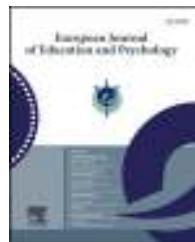
Classroom emotional intelligence and its relationship with school performance

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Abstract Despite the importance of emotions in classrooms, no measurements have been developed to assess group emotional intelligence (EI). The aim of this work was to develop a questionnaire for measuring group EI (G-TMMS) in educational contexts. The psychometric properties of G-TMMS were examined in a sample of 794 participants (47% female; mean age = 16; SD = 1.4), divided into 59 classrooms. The G-TMMS showed a one-factor structure. It also demonstrated to have adequate internal consistency, temporal stability, and convergent validity. Moreover, group EI was associated with higher group school performance. The implications of this new scale in educational contexts are discussed.

Inteligencia emocional del aula y su relación con el desempeño académico

Resumen A pesar de la importancia nuclear de las emociones en el contexto académico no existen medidas de Inteligencia Emocional (IE) grupal aplicadas al aula. El objetivo del presente trabajo consistió en desarrollar un cuestionario para la medida de la IE grupal (G-TMMS) en contextos académicos. Las propiedades psicométricas del G-TMMS fueron examinadas en una muestra de 794 participantes dividida en 59 aulas (47% mujeres; Media$_{edad}$ = 16; DT = 1.4). El G-TMMS mostró una estructura unifactorial, una consistencia interna adecuada, estabilidad

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temporal y validez convergente. Además, la IE grupal del aula se mostró asociada con un mayor desempeño escolar grupal. El trabajo discute las implicaciones de esta nueva escala en el contexto educativo.

Introduction

The study of emotions in classrooms is central to understand motivation and learning patterns among students (Beilock & Ramírez, 2011). Emotional experience is an integral component of all school activities and plays a key role not only in relation to learning but also with respect to achievement over time (Pekrun & Schutz, 2007). In academic contexts, individual self-perceived emotional intelligence (EI) has been shown to be related to better psychological and social adjustment and social adaptation (Balluerka, Aritzeta, Gorostiaga, Gartzia, & Soroa, 2013; Castillo, Salguero, Fernández-Berrocal, & Balluerka, 2013; Pedrosa, Suárez-Álvarez, Lozano, Muñiz, & García-Cueto, 2014) and to school performance (Ferrando et al., 2011; Joseph & Newman, 2010) in adolescence. However, despite these findings and the vast amount of studies about emotions in school contexts (Humphrey et al., 2011; Inglés et al., 2014; Rodríguez et al., 2014) research on collective or group emotions in classrooms is still scarce.

The collective construct of group EI has been widely used and discussed in other fields of Psychology as a fundamental source of variability for a number of variables related to individual and group behaviour; for example, team effectiveness and performance (Härtel, Ashkanasy, & Zerbe, 2009), and a number of measures of group EI have been developed, for instance, the Workgroup Emotional Intelligence Profile (WEIP) of Jordan, Ashkanasy, Härtel, and Hooper (2002) or the Group Emotional Intelligence (GEI) Survey of Druskat and Wolff (2001). However, these measures have been developed to measure ''intact teams'' and they do not meet the specific needs of classrooms.

Therefore, taking into account the relevance of group emotional phenomena for learning and teaching processes (Immordino-Yang & Damasio, 2007; Pekrun & Schutz, 2007) and the need to integrate variables across multiple levels of analysis to provide a more veridical account of educational phenomena (Osterman, 2010), the main goal of this study was to develop a questionnaire aimed at measuring group EI in classrooms. Moreover, in order to add validity evidence for the construct of group EI, we tested specific hypotheses regarding associations of group EI with group school performance, as well as with group gender composition and the class tutor's gender.

The classroom emotional intelligence

Many studies in the field of EI have focused on the creation of instruments for assessing individual EI (Extremera, Salguero, Fernández-Berrocal, & Ruíz-Aranda, 2009). One of the most extended theoretical models is the one proposed by Mayer and Salovey (1997), Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) being one of the most widely used instruments to measure perceived EI. The TMMS is a measure of individual's beliefs about the importance of paying attention to one's own emotions and feelings, about the capacity for understanding one's own emotions and about the ability to regulate negative emotional states and prolong positive ones.

If we accept the notion of group emotions (Smith, Seger, & Mackie, 2007), and also take into account that stable classes can be considered as groups (Boekaerts, 2001), then we would expect different classes to show different levels of EI. Psychosocial processes like emotional contagion (Totterdell, Kellet, Teuchmann, & Briner, 1998), vicarious affect processes (Fultz & Nielsen, 1993) and interaction synchrony processes (i.e., the non-conscious mechanism whereby an individual's behaviour is adjusted or modified in order to coordinate or synchronize it with that of another) (Siegman & Reynolds, 1982) support the idea that individual-level affective experiences may combine to form an affective collective construct.

The Classroom EI represents a group-level construct that is based on group members shared, subjective emotional experiences. These shared experiences help to generate a set of norms or expected behaviours that guide emotional experience (Wolff, Druskat, Koman, & Messer, 2006). The group EI examined here is, therefore, a consequence of the type of interaction that occurs between students and generates a group construct different from group members' traits and thus, it can be considered a ''collective construct'' associated with the classroom (Morgeson & Hofmann, 1999). Specifically, and based on Salovey et al. (1995) TMMS, the group EI examined here measures: the level in which students consider that their class (reference group) pays attention to and values the feelings of classmates; whether is clear rather than confused about the emotions felt in the classroom, and uses positive thinking to repair negative moods in the class.

Other collective emotional constructs such as group climate also have been shown to be significantly related to students' adaptive behaviour. Positive and supportive classroom climates have been related to goal-directed behaviour, whereas permanently negative and non-supportive and ambiguous climates (e.g., sometimes supportive and sometimes non-supportive) have been associated with avoidance, disruption and cheating behaviour (Patrick, Turner, Meyer, & Midgley, 2003). Similarly, it has been found that students in high-involvement classrooms (defined by happiness,

motivation to learn and a student discourse reflecting identification with the class) report significantly more experiences of flow (Csikszentmihalyi & Csikszentmihalyi, 1988) than do students belonging to low-involvement classrooms (Pekrun, Frenzel, Goetz, & Perry, 2007).

As we can infer from the arguments above, in learning contexts such as classrooms, students may be especially sensitive to the emotional meanings of their academic experiences, as well as to the experiences of their classmates, who are in such close proximity and are socially relevant (Boekaerts, 2001). Although research has shown that teachers have the strongest and most direct impact on students' psychological experience in the classroom (Osterman, 2010), peer emotional relationships also have an important effect on children's attitude towards both school and themselves. However, to date, we do not have a reliable and valid measure of a collective construct to examine such emotional interaction from the perspective of EI.

Group EI and school performance

In order to add validity to the proposed measure, we will examine its association with school performance. Academic performance would be indirectly affected by a context in which the motivation to engage with the learning process may be increased by the emotional characteristics of the group (Ford, 1992). From this group level perspective, the establishment of a positive, caring and encouraging learning environment in a classroom can transform the patterns of feelings, behaviour, resilience and academic diligence among students (Lovat & Toomey, 2009). This includes not only those feelings associated with success or failure, but also the sense of acceptance or rejection by others in the classroom (Graham, 1991). Since teachers and students co-create positive or negative climates for learning, emotions can be seen as shared and as generative factors in relation to motivational learning processes (Meyer & Turner, 2006). In this sense, a step forward in the research of classroom emotions could be to examine group-level EI and its relation to school performance.

We already know that positive affective experiences in classrooms have been associated with more cognitive activity during lessons, which, in turn, predicted achievement. A follow-up analysis showed an indirect effect of positive affective experiences on achievement, which was mediated by cognitive activity and expectancy of success (Buff, Reusser, & Rakoczy, 2011). Research has also shown that psychological experience in the classroom strongly influences adolescents' attitude towards school, contributing favourably or negatively to a range of attitudinal and behavioural outcomes that enhance or impede learning (Osterman, 2010; Sutton & Wheatley, 2003). For example, students who experience school belonging have higher levels of intrinsic motivation and more positive attitudes towards themselves, school, adults, and peers. Conversely, the experience of rejection and isolation is consistently associated with behavioural problems in the classroom, lower interest in school, lower achievement, dropout, and various forms of emotional distress (Osterman, 2000). The aforementioned arguments lead us to predict that there will be a positive association between group EI

and group academic performance as, by definition, group EI is conceptually related to positive emotional experiences.

In a meta-analysis of 69 independent studies Van Rooy and Viswesvaran (2004) found a positive association between perceived EI and a variety of performance outcomes suggesting that the relationship merits further exploration. More recently, an integrative meta-analysis of emotional intelligence produced findings coherent with this view in relation to performance-based measures of EI (Joseph & Newman, 2010).

Thus, we hypothesized that in classes where, on average, students achieved high academic grades, perceived group EI would be higher (Hypothesis 1).

Method

Development of the group EI measure

As previously mentioned, the group EI measure is based on the Trait Meta-Mood Scale (TMMS; Salovey et al., 1995), which is a measure of perceived emotional intelligence. The TMMS was designed to assess how people reflect upon their moods. As the TMMS is a self-perceived measure, it reflects not real abilities in themselves but rather the subjective perception of traits associated with attending to emotions, understanding them and repairing negative emotional states.

The original TMMS was adapted to Spanish by Fernández-Berrocal, Extremera, and Ramos (2004), who produced an abridged version containing 24 items. The TMMS-23, a version for the adolescent and young population, has also been developed (Salguero, Fernández-Berrocal, Balluerka, & Aritzeta, 2010), followed by a Basque version (Gorostiaga, Balluerka, Aritzeta, Haranburu & Alonso-Arbiol, 2011), which was the one used here to derive the items for assessing the group EI and thus the new measure was called G-TMMS.

In creating the G-TMMS we followed Chan's (1998) theory of group-level composition models. We used the consensus-based change-of-reference strategy, which states that a group-level characteristic can be measured by changing the reference framework of the tapped characteristic from the individual to the group level, and ensuring within-group agreement by means of the James inter-coder reliability index (James, Demaree, & Wolf, 1993).

Specifically, the reference framework for responding to the items was changed from individual self-perception (i.e., ''I pay a great deal of attention to my feelings'') to the perception of group emotional experience (i.e., ''In this class we pay a great deal of attention to our feelings''). The reference framework of the items was modified independently by three fluent Basque-speaking psychologists who were specialized in groups and emotions. They were all familiar with the basic psychometric features of item construction. The three versions were then compared and subjected to discussion among a group of five experts, comprising the previous three psychologists and two others with experience in educational psychology and adolescent emotions. Each item of each version was examined until an agreement was reached for all items, with special attention being paid to the class as the reference for the group.

The preliminary version of the instrument was administered to a sample of 132 adolescents (56 boys and 76 girls) aged between 13 and 19 years (M_{age} = 16; SD = 1.4). The data collected in this pilot study were used to calculate mean scores and standard deviations for the items. All of them showed an average score that was close to the overall mean (a symmetry value close to zero) and a standard deviation higher than 1, thereby maximizing the variance of the test (Nunnally & Bernstein, 1994). However, a few items were changed following the suggestions of participants, who noted the difficulty of understanding some of the words used or the overall meaning of the item. The preliminary version of the G-TMMS comprised 23 items to be answered on a 5-point Likert scale, with options ranging from ''Strongly disagree'' to ''Strongly agree''. These items, as was previously defined, assess the extent to which, on average, students belonging to a stable class perceive that their group attends to and values feelings, feels clear rather than confused about such feelings and uses positive thinking to repair negative group moods.

Participants

The study sample comprised 794 adolescents (375 female and 419 male students divided into 59 classes) aged between 13 and 19 years (M_{age} = 15.63; SD = 1.25), all of whom were attending secondary schools in the Basque Country (northern Spain). Data were collected in classrooms by two researchers. It should be mentioned that in the educational system of the Basque Country, students stay with the same classmates from pre-school until high school. Furthermore, in high school adolescents have few class changes and share more than 70% of the time with the same classmates making the class a fundamental group of reference.

Other instruments used for the validation of the G-TMMS

Workgroup Emotional Intelligence Profile (WEIP-3)

The WEIP-3 (Jordan et al., 2002) was used to obtain evidence of convergent validity for the G-TMMS. We found no measures examining similar or parallel dimensions to those of the G-TMMS in the educational context. The WEIP-3 was therefore selected because it is based on Salovey and Mayer's (1990) original construct of EI, which stems from the same theoretical model as the TMMS. The WEIP-3 was designed to examine perceived EI in workgroups, but, for this study, the reference framework for answering the items was changed from workgroup to the perception of group emotional experience within the class. The instrument consists of 27 items, responded to on a 7-point Likert scale, and it measures seven facets that are organized into two broad dimensions: (a) ability to deal with one's own emotions; and (b) ability to deal with the emotions of others. Three of the seven facets were used for this study: (a) awareness of emotions (e.g., ''I am aware of my feelings when working with my classmates''); (b) ability to discuss/articulate emotions (e.g., ''I can explain the emotions I feel to my classmates''); and (c) ability to use one's own emotions to facilitate thinking (e.g., ''When I am angry with a member of my class I can overcome

that emotion quickly''). The scale has shown good reliability and validity (Jordan et al., 2002).

The Classroom Environment Scale (CES)

The CES (Moos & Trickett, 1974) is a 90-item, true-false questionnaire measuring four dimensions and nine sub-dimensions of classroom climate. For this study we used the sub-dimension of 'classroom affiliation' that is included in the dimension 'Relations'. This sub-dimension measures the extent to which peers know each other and how they feel with their classmates (e.g., ''In this classroom we got to know each other really well''). Adequate psychometric properties of the original questionnaire have been reported (Moos & Trickett, 1987), and its Spanish version has also shown adequate reliability and validity (Fernández-Ballesteros & Sierra, 1995).

Data analysis

The dimensionality of the instrument was examined by means of a principal component analysis. The reliability of the G-TMMS was analyzed in terms of internal consistency and temporal stability. Evidence about convergent validity was also obtained. Finally, relationships between the scores obtained on the G-TMMS and the percentage of students with good grades, the percentage of female students in the class and the class tutor's gender were examined in order to test specific hypotheses about associations between group EI and these variables.

Results

Principal component analysis

The dimensionality of the G-TMMS was examined by means of a principal component analysis over its 23 items. The value of the Kaiser–Meyer–Olkin index measure of sample adequacy (=.86) and a statistically significant (p = .0001) Bartlett's test of sphericity confirmed the suitability of component analysis.

Velicer's minimum average partial (MAP) test, one of the most accurate factor retention methods in simulation studies (Peres-Neto, Jackson, & Somers, 2005; Velicer, Eaton, & Fava, 2000; Zwick & Velicer, 1986), suggested keeping only one dimension. Thus, the factor loadings of the items were calculated in order to select those indicators that best defined this dimension (i.e., the underlying construct). Taking as the selection criterion a factor loading equal to or higher than .45, the final version of the G-TMMS included 16 items that explained 29.73% of the overall variance. The items retained and their factor loadings are shown in Table 1.

Reliability

Internal consistency of the scale was estimated by means of Cronbach's alpha coefficient. The obtained value of .84 indicates high internal consistency, exceeding the cut-off point of .75 generally accepted for instruments in the area of health sciences (Streiner & Norman, 1989).

Table 1 G-TMMS items and their loadings.

Items	Loadings
1. In this class we pay a lot of attention to our feelings	.617
2. In our class we usually care about what other students feel	.660
3. In this class we usually spend time thinking about our emotions	.478
4. In this class we think that it is worth paying attention to students' emotions and moods	.576
5. In this class we often think about the feelings students may have	.573
6. In this class we pay a great deal of attention to our feelings	.583
7. In this class we are often able to describe our feelings	.452
8. In this class we are usually aware of the feelings we may have in different situations	.471
9. In this class we are sometimes able to say what our feelings are	.452
10. In this class we can understand our feelings	.609
11. Although we sometimes feel sad, there is an optimistic atmosphere in this class	.498
12. Despite feeling bad, we try to think of nice things in this class	.610
13. Although in this class we sometimes feel sad, we usually have an optimistic outlook	.511
14. All classmates try to have positive feelings, despite feeling bad	.540
15. We try to have a good mood in class	.477
16. When we feel happy in class, we try to stay with that emotion as much as possible	.461

Note: English-wording of the items have been translated from the administered Basque-version. Original Basque wording is available from the authors.

The temporal stability of the G-TMMS was evaluated using the test–retest procedure, with the instrument being re-administered to a smaller sample (94 female and 77 male students) 4 weeks after the initial data collection. The value of the correlation index between mean class scores at the two assessment points was .87. In order to ensure that these mean scores adequately represented emotional intelligence at the class level (e.g., group emotional intelligence), James indices of inter-coder reliability (James et al., 1993) were calculated previously for the total sample of classes. The values for this index ranged between .83 and .97, suggesting that students belonging to each group had quite similar perceptions about the construct that the instrument sought to measure.

Convergent validity

In order to obtain evidence of the instrument's convergent validity, Pearson correlation coefficients were calculated between mean class scores on the G-TMMS, the WEIP subscales and the CES affiliation subscale (see Table 2). As before, James indices of inter-coder reliability were calculated for the WEIP subscales and CES affiliation subscale before estimating the correlation coefficients. For the WEIP, values of the James index ranged between .76 and .89 on the 'awareness of emotions' subscale, between .83 and .96 on the 'ability to discuss/articulate emotions' subscale and between .80 and .93 on the 'ability to use emotions to facilitate thinking' subscale. For the CES affiliation subscale (a measure of students' classroom relationships) the values of the James index ranged between .82 and .97. As expected, the group EI construct was positively correlated with two of the WEIP subscales and with the CES classroom relationship subscale. However, the correlation with the Awareness subscale of the WEIP was low.

Relationship of group trait EI with school performance

We examined the relationships between group EI and good (on average) school performance by students in a class as well as the percentage of girls in the class and the class tutor's gender. Prior to conducting these analyses we calculated the following descriptive statistics for the G-TMMS in the 59 classes: Mean = 52.84, *SD* = 4.68, minimum score = 41.26, and maximum score = 61.45.

We compared the level of group EI according to the percentage of class students with good grades (i.e., those whose average mark was superior to 7, on a scale of 0–10). The results obtained from the Mann–Whitney *U* test showed no statistically significant differences between classes in which 30% or fewer students had good grades (*n* = 10 classes; mean range = 7.30) and those in which at least 70% of students had good grades (*n* = 7 classes; mean range = 11.43). However, due to the small number of classes used for the analysis and the low statistical power linked to the test, we decided to calculate the corresponding effect size (Balluerka, Gómez, & Hidalgo, 2005). The effect size ($\eta^2 = .17$) associated with this predictive variable was large (Morse, 1999). Therefore, Hypothesis 1 was supported.

Discussion

One of the aims of the present study was to develop a valid and reliable questionnaire to measure perceived group EI in classroom contexts, there being no such measure to date. The G-TMMS has been shown to have adequate psychometric properties. Regarding dimensionality, the instrument was found to have a one-factor structure, consisting of a single, group EI construct. Interpersonal interactions happening in classrooms are not as continuous and homogeneous as those happening in small intact teams. In classroom contexts EI abilities may be seen globally making it difficult to differentiate the levels of attention, clarity and emotional regulation. The intrapersonal knowledge of EI abilities loses strictness when evaluating ones own groups of reference and loses accuracy when the group is not intact. These arguments might explain the unidimensionality of the questionnaire.

The G-TMMS proved to be reliable in terms of its internal consistency and temporal stability indexes. Moreover, the correlation patterns observed between scores on the G-TMMS and those on the WEIP and CES subscales provided

Table 2 Pearson correlation coefficients between the G-TMMS, WEIP subscales and the CES Affiliation Scale.

	G-TMMS	WEIP1-Awareness	WEIP2-Articulate	WEIP3-Facilitate	CES-Relationship
G-TMMS	–	.212	.589[**]	.369[**]	.493[**]
WEIP1-Awareness		–	.318[*]	.390[**]	.171
WEIP2-Articulate			–	.386[**]	.419[**]
WEIP3-Facilitate				–	.504[**]
CES-Relationship					–

[*] $p < .05$.
[**] $p < .01$.

evidence about the convergent validity of the instrument. The only exception was the low correlation between the G-TMMS and the Awareness subscale of the WEIP. While the articulate and the facilitate dimensions examine individual emotional behaviour when interacting with groups, the Awareness dimension focuses on the emotional consciousness when interacting with the classroom which becomes more complicated than evaluating behaviour. This could be one possible reason to explain the observed low correlation.

Regarding the relationships between the G-TMMS and the percentage of class students with good grades, our findings indicate that high levels of group EI are related to greater academic performance. These results parallel others showing that positive affective experiences in the classroom are related to academic achievement (Ruthig et al., 2008), and that a positive classroom climate is more conducive to learning, promoting positive developmental outcomes among students (Jennings & Greenberg, 2009).

The classroom setting involves a complex combination of information processing and emotional responding that might influence students' learning processes (Meyer & Turner, 2006). Indeed, the same student may, in two different classes, receive different emotional responses to a dramatic situation, and these responses might influence that student's perceptions of the class's EI. For example, imagine that class A has been informed that ''Mike'''s parents have died in a car accident. When he returns to school one week later the first thing he notices when entering the classroom is that everybody is in silence. Some classmates receive him with warm hugs and ask him about his feelings, showing concern and expressing sadness and empathy with the situation. After a reasonable period of time this class may try to create positive feelings by inviting Mike to join in with social activities and by trying to make him have positive emotions. In classroom B, by contrast, the same situation is responded to in a very different way and no one asks Mike about his feelings or shows empathy with his situation. It is likely, therefore, that both Mike and his classmates from classes A and B would respond differently to items of an instrument for measuring group EI.

Conceptualizing students' emotions, cognitions and motivations as an integrated whole that evolves from their interactions within an affective context might help us to explain and predict classroom experiences in more compelling ways. In this context, the G-TMMS can be considered a useful instrument for the assessment of group emotional processes, and its application could help to highlight the importance of classroom relationships for the development of emotional wellbeing among young people. Indeed, schools that implement social and emotional learning programs report an increase in academic success, better quality relationships between teachers and students, and a decrease in problematic behaviours such as drug use, aggressiveness and bullying (Castillo et al., 2013; for a meta-analysis, see, Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).

The availability of the G-TMMS can help to provide a better explanation of differences in adolescents' psychosocial adjustment within one of the most important contexts of reference for this population: the classroom. It may not only constitute an important addition to ability measures of EI, but should also enable researchers and practitioners to assess whether the emotional context is likely to promote or impede an individual's awareness of his or her emotional abilities and behaviour. Furthermore, the G-TMMS offers a way of examining inter-group differences in EI, which would be useful for the design of programs whose aim is to increase group emotional climate.

Conflict of interest

The authors of this article declare no conflict of interest.

Acknowledgements

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