UNIVERSITY OF PADOVA

Department of General Psychology

Bachelor's Degree Course in Psychological Science

Final dissertation

Achievement emotions at school: their importance and measurement via experience sampling

Supervisor
Professor *Lucia Mason*

Candidate: Evgeneia Grigoropoulou
Student ID number: 1222475

Academic Year: 2022-2023

Table of contents

Abstract

Activities, experiences, and interactions in the school environment can have an immediate effect on students' performance and their well-being. In this essay, I will discuss the emotions occurring in the school context; the importance of their proper regulation and control; the most novel and prominent way of measuring them; their predictive value; and their effect on students' performance. Firstly, I will refer to the several types of emotions in an academic environment and further focus on the significance of achievement emotions. Next, I will introduce and explain the control-value theory of achievement emotions, which helps to understand the motivational antecedents of emotions and their predictive value. Finally, I will discuss the more usual method for measuring emotions at school by means of self-reports and the more novel method of experience sampling.

Keywords

Introduction

All individuals experience emotions on a daily basis, while going through various situations and while under several circumstances. In any case, emotions are of importance as they affect an individual's day-to-day functioning and behaviour. This fact is no exception in the academic setting. Students, teachers, and all people involved in the educational environment and educational practices, operate while experiencing, processing, and regulating their emotions. A bad performance in class or a good grade in an important mid-year exam, the stress of popularity or the psychological repercussions of social isolation, are all examples of situations where the desire, anticipation, dread, or experience of either success or failure, will have an important effect on the individual. This effect may or may not be consciously identified and acknowledged, but its effects are not strictly momentary, nonetheless (Pekrun & Stephens, 2012b).

Emotions in education have not always been thoroughly researched; with the exception of the ones experienced by students in an examination setting (referred to as 'test anxiety') (Pekrun et al., 2002). Nevertheless, studies have shown that the emotions experienced in the setting of education vary in a wider range (Pekrun et al., 2002). Luckily, the interest for further research has been steadily increasing in the past decade. More and more evidence now suggests that emotions –not strictly pertaining to test anxiety– are of utter significance, as they highly affect one's schooling experience, as well as their overall well-being on a personal level (psychological health and personality) (Pekrun et al., 2002, 2014).

Emotions in the academic setting could pertain to a variety of situations: the boredom one feels when executing a task, the excitement or enjoyment one

feels during a school activity, the shame over failure or the pride over success, the frustration over encountered obstacles, and the satisfaction over inclusion in the school's social networks (Pekrun et al., 2012b). All these situations serve as examples which show that academic emotions expand over a wide spectrum of experiences and that they occur in the educational setting, as well as play an important role in academic achievement and personal growth (Pekrun et al., 2002, 2012b).

People involved in academia may operate from different positions (e.g. that of a student, or that of a teacher). No matter the position, however, they all have their very own perspective of the events occurring in their environment and they experience the relevant emotions accordingly, with their personal experiences affecting both themselves and the others included in their environment (Meyer & Debra, 2014). Our attention, however, in this discussion will be directed to the emotions experienced by students, and even more specifically to those emotions related to academic achievement. The control-value theory will be discussed and analyzed, as it offers a very useful framework in our attempt to understand the notion and the composition of achievement emotions.

The available methods for measuring emotions, especially in the academic environment, are also, nowadays, an interesting topic to be discussed and will be explored. Interestingly, the nature of the data (qualitative) and the nature of the environment where academic emotions occur (the school setting) has made self-reports the most usual choice of method for researchers. Several other choices have been suggested as possible (Pekrun et al., 2012b), with the means of self-report, however, being the one most widely trusted over the years (Pekrun, 2016).

Notwithstanding, there occurred a shift in the preferred method, trying to address the needs for a more direct, unbiased (or less biased, whatsoever), less distorted, assessment of emotions; a need which would later be fulfilled through the development of the *experience sampling method* (Van Berkel et al., 2017). The experience sampling is now a method extensively used. It preserves the basic, important characteristics of a self-report (individuals still do report their own perception of the situation), combining, however, features that attempt to eliminate characteristics that interfere with the results. Such instrumental abilities include the fact that emotions are measured while the agent is in the academic environment, that is, where they occur in real time. There exist automatic, pre-scheduled reminders for question completion (offering flexibility to both the researcher and the participant), and also there exist more straight-forward questions, reducing the likelihood of the participants' withdrawal from the procedure (Christensen et al., 2003 ; Larson & Csikszentmihalyi, 2014).

Summing up, I will share my final remarks attempting to underscore the importance of achievement emotions, their relevance to students' perception of classroom experiences, and their assessment via the *experience sampling method*.

Emotions and related notions

Looking at the earlier literature, we find that emotions were initially perceived to be disruptive of one's intelligence and behavior. For instance, experienced anxiety causing physical symptoms, may interfere with one's performance if the physical presentation of one's self is required. Further research, later on, presented new perspectives, under which, emotions were actually seen as possibly desirable and helpful. This was supported from an evolutionary perspective; an example would be how avoidance of a prospective unfortunate situation can "save" the individual from a negative experience. Another idea put forth has been that emotions are also highly affected by one's culture (individualistic vs collectivistic) and that they also have components easily understood from an evolutionary point of view (demands for survival in particular environment). Therefore, groups with different social backgrounds may view, experience, and perceive emotions according to the various characteristics their culture entails. Ultimately, emotions are not seen as disruptive of one's function, psychological state, and overall social competence; rather they are examined according to the particular reasons serving as causes and the repercussions they bring about in one's cognitive function and the further influence and impact on their behavior (Shuman et al., 2001).

Schuman et al. (2014) mention that emotions have often been seen as 'episodes' triggered in particular situations, due a multitude of stimuli. 'Episodes' are referred to as the instant experiences of a particular feeling, as a result triggered by stimuli occurring either in the moment of one's experience of that feeling (a negative feedback on a task), or also by a remembered stimulus, that has occurred in the past and is retrieved from one's memory (remembering a negative feedback of a particular task), or an

imagined stimulus, an auto-generated fantasy of an event (such as the idea of receiving negative feedback on a possible task). It is further mentioned that every 'episode' consists of a multitude of components that each explains a different aspect of how each an emotion is experienced. By the term 'components', Schuman et al. (2014) refer to the various elements that make up an emotion and its expression and perception. Such elements would be: 'a subjective feeling component', a 'motor component', a 'physiological component', an 'action tendency component', and an 'appraisal component' (Shuman et al., 2014).

The definition of emotions has also long been discussed, with various attempts to be expressed as accurately as possible; a matter which has been tackled from various perspectives, while trying to create useful and meaningful distinctions. A first attempt to look into the available (until then) literature and gather (in one place) some definitions on the notion of 'emotion' was made by Kleingina and Kleingina (1981). In their article, they outlined 11 categories based on the described emotional phenomena and the theoretical issues that their source literature was focused on. They then evaluated the available definitions and observed patterns and, finally, proposed a "model definition". Ultimately, it was generally concluded that the definition of emotion should remain broad enough to include all its important aspects, but at the same time to draw a differentiation line with other psychological processes (Kleinginna & Kleinginna, 1981). Pekrun and Stephens (2012b) accepted this idea and used it to further share and develop the multidimensionality of emotions.

Emotion as a multi-component process

Emotions are thus far regarded as being multi-component, "coordinated psychological processes", including affective, cognitive, physiological, motivational, and expressive components. Consequently, when an emotion occurs, its manifestation and experience comprises a multitude of aspects. An example often used to further explain those aspects' co-occurrence is test anxiety. In such a situation the following could be involved:

- one's feelings of stress due to the upcoming exam (affective);
- intrusive thoughts of failing (cognitive);
- increased palpitation as a result of anxiousness (physiological);
- procrastination and avoidance tendencies with feelings of urge to escape the feared unpleasant situation (motivational);
- and facial expression showing the stress experienced (expressive) (Pekrun et al., 2012b).

Emotion, mood, and affect

One (slight) distinction made by some authors is that between emotion and mood; often differentiating them according and due to their intensity (Pekrun, 2006 ; Pekrun et al., 2012b ; Beedie et al., 2005 ; Zillmann, 2003). Pekrun (2006) suggests the possibility to merge the two, regarding moods as emotions of lower intensity, based on the fact that the former seem to have similar components and structure as emotions.

Emotions and moods are often being perceived as clearly distinct on the premises of their differences in terms of duration, intensity, and object focus. Pekrun (2006), however, very justly wondered how would affective states,

maintaining characteristics of both what is defined as mood and as emotion, be understood? It may be the case for some authors that emotions are observed as brief, intense, and with a clear focus, and moods are observed as long-lasting, of moderate intensity, and without a clear focus, but there still are affective states combining features of the two categories. For that reason Pekrun (2006) united these two, and referred to moods as 'low-intensity' emotions, leaving space for further variability in terms of duration and focus (Pekrun, 2006).

As far as the notion of 'affect' is concerned, it is thought to comprise both moods and emotions, but mostly used to indicate an individual's appraisal of an emotion, as well as the cognitive processes during regulation (see Pekrun et al., 2012b, for a more detailed account).

Type of emotions in educational contexts

Another important aspect of emotions is their object focus. The object focus of an emotion refers to where the "weight" of the individual's attention "falls". In other words, it relates to the source of the experienced emotion and the nature of the situation that triggers it. According to Pekrun (2012) this dimension can be further categorized into the following groups:

Achievement Emotions

Achievement emotions relate and pertain to achievement-related activities and outcomes. They relate to different dimensions according to their object focus. They entail both achievement activities and achievement outcomes. Past relevant research commonly only referred to the latter when discussing achievement emotions. More inferences, however, are being made including achievement activities as equally relevant needed to be equally taken into

consideration when talking about achievement emotions. Achievement outcome emotions include all those affective states stemming from one's anticipation or contemplation of a result important for their achievement and performance status. Such affective states, subcategorized into prospective and retrospective, could respectively be, for instance, desire or hope for a successful outcome and worry or fear of failure, and embarrassment, guilt, or pride, depending on the result and feedback (Pekrun et al., 2012b). We will refer to *achievement emotions* a little more extensively in the next section.

Epistemic Emotions

There are several situations and tasks which can cause cognitive incongruity to an individual, when dealing with them. Emotions triggered through such a situation fall under the category of *epistemic emotions*. Such emotions could be: surprise and curiosity, when incongruity doesn't cause anxiety, rather it intrigues the individual; confusion and anxiety when, respectively, incongruity is either not easy to clarify or quite contrary to one's initial beliefs; enjoyment and delight, when congruence is eventually restored, despite the initial incongruity,; and frustration, when the negative situation seems impossible to be resolved (Pekrun et al., 2012b). Pekrun and Stephens (2012b) suggest for these emotions to be called epistemic as they relate to one's knowledge and perception occurring during the execution of a learning task.

Why this is worth mentioning in this essay is because depending on where the agent focuses their attention and the source of the perceived incongruity, a particular emotion experienced could be characterized as either an achievement emotion or an epistemic emotion. For example, students not being able to complete a particular school assignment might experience anger or frustration. However, the source of their emotion depends on what they focus their attention on: it could be the cognitive incongruity stemming from

the inability of completing the assignment itself (epistemic emotion), or it could also be that the students are focusing on their inability on a personal level, perceiving the situation as failure (achievement emotion) (Pekrun et al., 2012b).

Topic Emotions

Topic emotions may not directly relate to the learning processes and the students' relevant skills (as achievement and epistemic emotions do), but they affect, nonetheless, the students' involvement and commitment in the academic activities. Topic emotions could be referred to as those initiated as a reaction result when exposed to particular learning content which triggers emotions of, for example, empathy, aversion, or frustration. An example would be the empathy one feels towards the hero of a novel studied in class, or emotions experienced during a classroom discussion; a discussion which requires one's personal opinion and investment (e.g. discussion about politics) (Pekrun et al., 2012b).

Social Emotions

Social emotions refer to those concerning or triggered by social interactions occurring at or relating to the school environment. Those, for example, could be annoyance towards a schoolmate or appreciativeness towards a teacher. Achievement and social emotions can easily overlap, resulting in the *achievement social emotions* relating to those experienced in relation to other people's educational achievements (Pekrun et al., 2012b).

Achievement emotions

As previously mentioned, *achievement* emotions relate and pertain to achievement-related activities and outcomes, and are thus further subcategorized into *activity emotions* and *outcome emotions* (Pekrun, 2006). Achievement emotions relate to the academic setting and relevant activities mostly because such settings commonly set a competitive ground for the participants, who are typically assessed on the basis of their competence (compared to set standards and their peers) (Pekrun et al., 2012b).

Activity emotions include those emotions experienced while the agent is involved in an ongoing academic activity leading to a sort of achievement (such as studying for an exam or participating in a school lesson). *Outcome emotions* include prospective and retrospective emotions about the result of an achievement activity. *Prospective outcome emotions* refer to those related to anticipating the upcoming result (success or failure in an exam). *Retrospective outcome emotions* refer to those related to the post-result reflection, where the individual remembers and processes past outcomes (such as success or failure in an exam which has been already passed) (Pekrun et al., 2012b).

Even though past research on achievement emotions has mostly focused on outcome emotions (Pekrun, 2006) and how they affect one's achievement endeavours and eventual accomplishments, such unidirectional focus would disregard the significance of activity emotions. Moreover, a skewed perspective like that would neglect the apparent importance of the existing relevance among the students' emotions and their overall learning abilities, academic competence and performance during their school years. For instance, the frustration over difficulty with keeping up with one's studying schedule, or the enthusiasm over a pleasant academic activity, or simply the

weariness and dullness over an uninteresting class session, would all account for activity emotion experiences which would affect the students' overall academic trajectory, development, and, finally, performance (Pekrun et al., 2012b).

Pekrun (2006) further refers to achievement emotions as either "momentary occurrences within a given situation at a specified point of time" (referred to as "state achievement emotions") or as "habitual, recurring emotions, typically experienced by an individual in relation to achievement activities and outcomes" (referred to as trait achievement emotions (Pekrun, 2006).

Appraisal antecedents of achievement emotions

Pekrun (2006) states that "self-related and situational appraisals are assumed to be important proximal determinants of human emotions". According to the appraisal theory (Roseman & Smith, 2001 ; Holmstrom, 2015), the notion of 'emotion appraisal' refers to an assessment process through which one's emotions and related reactions can be predicted, while considering an individual's cognitive perception about a prospective situation or event. What is important to note in this theory is, firstly, the term 'appraisal' being linked to how individuals perceive things (so it refers to their cognition), and its importance as an antecedent of experienced emotions and actions related to them. The reason why it is of significance to refer to the theory's value is because it is believed that the understanding of such relations could help foresee negative emotions, possibly intervene, and eventually moderate and prevent them. Holmstrom (2015) mentions a possible intervention aiming to prevent predicted negative emotions, through helping the individual reshaping their appraisals. Individuals shall accomplish that by re-evaluating

their cognitive attitude towards a prospective event; a process Holmstrom (2015) refers to as "re-appraisal" (Holmstrom, 2015).

The main idea is that how one experiences an event depends on the value that this event has for the individual. In this trajectory of the theory, having individuals placing a lot of value on their achievements would mean that their emotions will also vary in content and intensity. Accordingly, as achievement emotions can severely interfere with the students' performance and well-being, one would understand how crucial interventions in the educational setting would be. They would provide the opportunity to support these individuals, promote positive appraisals and emotions, and, thus, help them maximize their potential (Holmstrom, 2015 ; Pekrun, 2006).

Control-value theory of achievement emotions

Pekrun's (2006) control-value theory (CVT) offers a theoretical framework through which we can observe, assess, and analyze the antecedents and consequences of emotions occurring in educational settings and pertaining to achievement-related emotions. According to the CVT, achievement emotions can be subcategorized depending on the following three dimensions:

- *valence*, based on how the individual values an activity or an outcome (positive or negative valence);

- *activation*, which can be either activating (triggering an excitatory emotional state) or deactivating (triggering an emotional state of relaxation);

- *focus*, referring to focusing either on an achievement activity or outcome (prospective or retrospective) (Pekrun & Stephens, 2010 ; Tze et al., 2022).

Emotion appraisals include several dimensions under which they can be analyzed and according to which they can be understood. Those dimensions involve the harmony between valence and one's goals, between what is expected and its probability of occurrence, between one's control over a situation and their potential coping strategies, and between internal and external attributions of causes *(Pekrun*, 2006 ; Roseman & Smith, 2001).

What is of importance in Pekrun's (2006) control-value theory, however, pertains to, mainly, two of the aforementioned groups that stand out as more relevant to achievement emotions: control and valence.

The 'subjective control' refers to one's perceived control over a situation. More in particular in the academic setting, it refers to the student's perceived (in advance) control over an academic (achievement-related) activity and its outcome; for instance, the idea and expectation that persistent diligence over one's academic obligations will result in a great performance and overall success (Pekrun, 2006).

As briefly mentioned before, valence refers to the individuals' subjective value that is applied on educational activities and their outcomes (Pekrun, 2006). How much those are important to students will play a big role in the experienced emotions and the individual's reactions to them (Holmstrom, 2015).

The theory's fundamental assumption is that one's appraisal and perceived control over a situation, as well as the value added, both play a significant role in the arousal of achievement emotions – referring to both activity and outcome related emotions. The theory was firstly circling around the expectancy-value model of anxiety; however, it now incorporates hypotheses from several approaches to assessing emotions. The current, most up-to-date version of the theory combines features from expectancy-value approaches to

emotions, from attributional theories of achievement emotions, from theories of perceived control, and from models involving the effects of emotions on learning and performance (Pekrun, 2006).

The evolution of the Experience Sampling Method

The methods of assessment of one's mental processes and reactions to the several events occurring in their life on a daily basis have changed and evolved significantly through the years. Although the experience sampling method (ESM) is not a completely and independently novel method, it does entail advantages uniquely offered, basing its main structure on its main "forebear", the self-report method.

The self-report method

For many years, one of the predominant methods through which to assess and record reflections on emotions and daily life experiences has been that of self-reports (Pekrun, 2016). In general, self-reports are instruments able to be administered in the form of either questionnaires, or diaries, or even interviews. The content and the phrasing of the questions are predetermined, and the goal is to elicit responses without the interference of the researcher. The responses can be collected in a variety of ways too, such as on a pen-and-paper or digital form, or even orally (over the phone, for instance). Moreover, they can be administered to larger groups of respondents at the same time. It is a highly economical way to conduct research, with its main strength being the ability of the respondent to subjectively report on their own experiences and often at their own pace.

The advantage of the ESM

In spite of the aforementioned perception over the self-reports' strongest

characteristics, their ability to provide accurate reflections on one's emotional state has been often questioned. One of the main argumentations on its drawbacks has been the fact that people tend to share inaccurate information on several experiences when they do so retrospectively (Van Berkel et al., 2017). Adding to the phenomenon's effects, when in an "artificial" environment, such as the researcher's laboratory or office (as opposed to the natural environment where an event occurs), the respondents also report distorted descriptions of their experiences, often positively overestimating their remembered experiences and emotions; the so-called "rosy retrospection". The "rosy retrospection" actually refers to the phenomenon of several negative thoughts interfering and affecting one's experience of an event, being, however, quite short-lived. As a result, when an amount of time passes, the individual does not report negatively on the event. Mitchell et al. (1997) investigated participants' anticipated experiences prior to an event, as well as their retrospective recollection of those experiences afterwards. The latter was observed to be misreported, with participants having more positive evaluations of the events (Mitchell et al., 1997).

As relying on people's retrospective memory can be misleading, there emerged the necessity for an approach which would help to lessen this phenomenon and the "noise" in the results. The *experience sampling method* is a research approach aiming to assist, improve, and to add to the advantages of the self-report method (Csikszentmihalyi et al., 2014). Additionally, it aims to enhance the self-reports' "ecological validity"; by offering stronger reports on incidence data resulting from measurements taking place in the individuals' natural habitat (Van Berkel et al., 2017).

The overall aim is to collect data that include an objective feedback corresponding to the situation, and a subjective feedback reflecting the individual's experience of the event in place (Csikszentmihalyi & Larson, 2014).

In order for this to be accomplished, it is required that the individuals' cognitive biases are reduced. This is achieved by reducing the interim time between the occurrence of an experience and the time of receiving relevant feedback (Van Berkel et al., 2017).

General Method/Structure

During the first years of the method being introduced, devices similar to the medical pagers had been used[1]. The individuals would be instructed to carry the pagers with them at all times and to fill out a self-report questionnaire whenever the pagers would signal. The researchers were the ones deciding and controlling when the pagers would ring and they could choose to do so at random times. (Csikszentmihalyi et al., 1977 ; Larson & Csikszentmihalyi, 2014). The questions would check the individual's emotional state in that moment. At this initial stage, the method required the use of both technological means (the pager, or any device) and also the pen-and-paper self-report. Even later in time, when the Personal Digital Assistant (PDA) devices were introduced (which could be use, not only to signal the participants, but to also collect their answers), the previous method (combining device and printed questionnaires) still prevailed, as merely relying on the PDA posed several other occasional obstacles. Some of those obstacles specifically were: the cost of the device (each participant should carry their own), the battery endurance of the device, and even the data storage limitations of the device, which restricted the flexibility of the study (Van Berkel et al., 2017).

---

[1]Berkel at el. (2017) found in their research that one of the earliest studies run using the Experience Sampling Method dates all the way back in 1997 (Csikszentmihalyi et al., 1977) and it was on adolescent activity and experience.

The ESM in the era of the smartphone technology

However useful the combined (pager and pen-and-paper self-report) method had been, there still were several shortcomings to be overcome. For example, as the self-reports were in a paper format, researchers could not really control and check real-time compliance. The respondents had the choice to deviate from the given instructions and choose to fill out the form any preferred time later (different to the signaled one), if they wanted to (Van Berkel et al., 2017).

This has been able to be further controlled by introducing and implementing the ESM while utilising the advancements of the digital technology. A smartphone, for instance, having the self-report installed in the form of a software application, provides researchers with the opportunity to collect data in real-time, seconds after the respondents submit it.

This new practice offers a multitude of advantages: Firstly, compliance is ensured and easily monitored; having also the chance to assist and enhance it when needed. Secondly, the questions can be adjusted according to the particular sequence of previous responses of each individual separately; enriching, in this way, the value of the data collected, and minimizing the participant's burden (by avoiding repetition and unnecessary questions). What's more is that possible errors, malfunctions, or simply response deviations, not in line with the study's demands, can be caught early; offering time for corrections, without jeopardizing the study's planned outline. Lastly, smartphone devices include features and abilities that allow for collecting additional data, other than just what is shared in written form. The devices may often include sensors which can collect data that may signal particular, important information to the researcher, as well as the ability to send visual and auditory content (Van Berkel et al., 2017).

Utilising the ESM: Academic emotions and performance

Despite the fact that the method has been introduced in over half a decade, the studies utilising it to evaluate academic emotions are still just a few (Goetz et al., 2016). Even though anxiety has been the most extensively studied emotion in the school setting, studies have shown that other emotions (e.g boredom, enjoyment) are actually experienced more frequently (Goetz et al., 2006). In recent times, some researchers have started to rely more on the ESM and have shared some very interesting results on academic emotions.

Goetz et al. (2020) conducted two very interesting studies inquiring into the role of the students' control and value appraisals and how those can shape their academic emotions and their perception of the teaching processes and characteristics in class. To account for the variability of the situations and to ensure a high ecological validity exists, the *experience sampling method* was used to assess the aspects in question. The students in the two groups were given a device each (either a PDA or an iPod Touch), and were asked to respond to the questions shown on screen, whenever the devices would signal them to.

Examples of questions that pertained to the students' emotions were:
- "How much anxiety are you experiencing during this class?", to account for anxiety (negative, activating),
- "How much enjoyment are you experiencing during this class?", to account for enjoyment (positive, activating),
- "How much boredom are you experiencing during this class?", to account for boredom (negative, deactivating),
All items were accompanied by a scale of 1 (not at all) to 5 (very strongly) for the students to share their rating on. In the second study, the wording of the

items changed from questions to statements (e.g. "At the moment, I am happy"), maintaining, nonetheless, the same assessment goal

Examples of questions that pertained to the students' appraisal of control and value were:

-"In this lesson I am doing well in Mathematics (or any subject of interest)", to account for the students' appraisal of control,

- "In this lesson, Mathematics (or any subject of interest) is important to me, irrespective of the grade I get", to account for the students' appraisal of intrinsic value, and

-"In this lesson, it is very important to me that I get a good grade in Mathematics (or any subject of interest)", to account for the students' appraisal of extrinsic value.

All items were accompanied by a scale of 1 (strongly disagree) to 5 (strongly agree) for their students to share their ratings on.

In addition to the evaluation of their emotions, the students had to also report on their perception of the teaching processes, explored through two particular factors: *supportive presentation style*, referring to clarity of content and goals, and to the '"energy" of the delivery of the content by the teacher (item example: "At the moment, I understand the aims and goals of this lesson"), and excessive *lesson demands*, referring to the level of difficulty of the class itself and its pace (item example: "At the moment, the class is too easy/difficult for me").

The findings supported the researchers' initial hypothesis: that teaching perception would affect appraisals, and those, in turn, would affect the students' experienced emotions. In summary, it was found that the teaching situations that had been evaluated (thus perceived) as supportive (factor 1), led to higher levels of control and both of intrinsic and extrinsic value, when compared to the same student's reports of less supportive classes. In turn,

high levels of control and intrinsic value led to reports of higher levels of enjoyment. On the other hand, when students reported to perceive the lesson demands as excessive (factor 2), they also reported lower levels of control and higher levels of extrinsic value, when compared to the same student's reports of less demanding classes. Furthermore, extrinsic value was found to be positively related to levels of anxiety, while control was found to be negatively related to anxiety, and when in high levels, then also high levels of boredom would be reported (Goetz et al., 2020).

This study is one of those demonstrating the way the ESM can be used to explore the way in-classroom experiences can directly or partially affect the students' appraisals, and how their appraisals can, in turn, influence and condition their emotions.

As we have so far shared, the emotional experiences a student has in the classroom can be multifaceted. A student can experience positive emotions, such as enjoyment, hope, pride, or relief, or negative emotions, such as anxiety, anger, shame, frustration, confusion (activating emotions), or boredom and hopelessness (deactivating emotions). However limited, research evidence has so far shown that positive emotions can positively affect students' performance. On the same trajectory, deactivating negative emotions seem to negatively affect students' learning skills and performance, while activating negative emotions, seem to present a more complex synthesis of effects (Pekrun et al., 2012b).

Moeler et al. (2020) conducted a four-week study among high school students with the aim of identifying the emotions experienced more frequently in class. They adopted both open-ended questions and rating-scale methods, and they found negative emotions prevailing in the reports, with fatigue, anxiety, and boredom being the three feelings reported more often (Moeller et al., 2020b). In another study, Goetz et al. (2014) managed to even differentiate among

types of boredom experienced (not just in the academic setting) (Goetz et al., 2014). In yet another study, Goetz et al. (2016) found results that actually showed a possible causal relationship between emotions and performance, sharing how several achievement goals were positive predictors of particular emotions (Goetz et al., 2016 ; Pekrun et al., 2017).

It would be worth to also mention that the available research results have also managed to highlight the importance of academic emotions and their association with academic attainment and performance, and the need for more research on relevant topics. Moreover, studies that have already adopted the ESM have given prominence to the newly-introduced method, with promising results as to its function, suitability, and validity.

Discussion

The literature suggests that emotions experienced in the academic environment can predict students' engagement (attention, motivation) in several educational activities, their performance at school, as well as indicate the possible state of their overall mental health. Positive emotions, such as enjoyment and pride, have been shown to associate with students' concentration, interest, and attention, which in turn determine their academic performance. Equivalently, negative emotions, such as boredom or frustration, have been found to correlate negatively with their academic achievements (Moeller et al., 2020b). The knowledge of this can be utilised as great power in the hands of professional educators, social workers, and anyone working with children and adolescents in an academic setting. It could help promote more awareness, create educational environments that facilitate more desirable experiences, and moderate teaching procedures and activities.

Although self-reports have been used widely for several years, the *experience sampling method* seems to offer a very promising ground to overcome previous limitations of more usual instruments and methods. Providing students with the opportunity to reflect on their mental processes and their emotional experiences in situ and while an event is still taking place or has just been finished (avoiding retrospective memory errors) has been proved to be valuable in assessing the emotions experienced. Utilising the aid of the digital technology is probably preferable, offering several advantages, with that of immediacy being the most important, without dismissing the possible limitations. The cost of conducting such a study, with the need of several devices to be used simultaneously, should be considered. The software used shall also be taken into account both for its cost but also for its suitability for

the particular needs of each experimental process. Lastly, we shall mention that even though anxiety has been the main emotion largely under the microscope of researchers, further studies on other academic emotions would enrich the literature on the topic, as well as our ability to improve and support the academic practices and the students' overall educational experiences and well-being.

References

Beedie, C., Terry, P. C., & Lane, A. N. (2005).Distinctions between emotion and mood. *Cognition & Emotion*, *19*(6), 847–878. https://doi.org/10.1080/02699930541000057

Christensen, T. C., Barrett, L. F., Bliss-Moreau, E., Lebo, K., & Kaschub, C. (2003). A practical guide to experience-sampling procedures. *Journal of Happiness Studies*, *4*(1), 53–78. https://doi.org/10.1023/a:1023609306024

Csikszentmihalyi, M., & Larson, R. (2014). Validity and reliability of the experience-sampling method. *Flow and the Foundations of Positive Psychology* (pp. 35-54). Springer Dordrecht. https://doi.org/10.1007/978-94-017-9088-8_3

Csikszentmihalyi, M., Larson, R. W., & Prescott, S. (1977). The ecology of adolescent activity and experience. *Journal of Youth and Adolescence*, *6*(3), 281–294. https://doi.org/10.1007/bf02138940

Goetz, T., Bieg, M., & Hall, N. C. (2016). Assessing academic emotions via the experience sampling method. In: Zembylas, M., Schutz, P. (Eds.), *Methodological Advances in Research on Emotion and Education* (pp. 245-258). Springer, Cham. https://doi.org/10.1007/978-3-319-29049-2_19

Goetz, T., Frenzel, A. C., Hall, N. C., Nett, U., Pekrun, R., &Lipnevich, A. A. (2014). Types of boredom: An experience sampling approach. *Motivation and Emotion*, *38(*3), 401–419. https://doi.org/10.1007/s11031-013-9385-y

Goetz, T., Frenzel, A. C., Pekrun, R., & Hall, N. C. (2006). The domain specificity of academic emotional experiences. *Journal of Experimental Education*, *75*(1), 5–29. https://doi.org/10.3200/jexe.75.1.5-29

Goetz, T., Keller, M. M., Lüdtke, O., Nett, U. E., & Lipnevich, A. A. (2020). The dynamics of real-time classroom emotions: Appraisals mediate the relation between students' perceptions of teaching and their emotions. *Journal of Educational Psychology*, *112*(6), 1243-1260. https://doi.org/10.1037/edu0000415

Goetz, T., Sticca, F., Pekrun, R., Murayama, K., &Elliot, A. J. (2016), Intraindividual relations between achievement goals and discrete achievement emotions: An experience sampling approach. *Learning and Instruction, 41*, 115/125. https://doi.org/10.1016/j.learninstruc.2015,10.007

Holmstrom, A. J. (2015). Emotional appraisal/reappraisal in social support. In C.R. Berger, M.E. Roloff, S.R. Wilson, J.P. Dillard, J. Caughlin and D. Solomon (Eds.), *The international encyclopedia of interpersonal communication* (pp. 1-10). https://doi.org/10.1002/9781118540190.wbeic058

Kleinginna, P. R., & Kleinginna, A. M. (1981). A categorized list of emotion definitions, with suggestions for a consensual definition. *Motivation and Emotion*, *5*(4), 345–379. https://doi.org/10.1007/bf00992553

Larson, R. W., & Csikszentmihalyi, M. (2014). The experience sampling method. *Flow and the Foundations of Positive Psychology* (pp. 21-34). Springer Dordrecht. https://doi.org/10.1007/978-94-017-9088-8_2

Meyer, D. K. (2014). Situating emotions in classroom practices. In R. Pekrun & L. Linnenbrink-Garcia (Eds.), *International handbook of emotions in education* (pp. 458–472). Routledge/Taylor & Francis Group.

Mitchell, T. R., Thompson, L., Peterson, E., & Cronk, R. L. (1997). Temporal adjustments in the evaluation of events: The "Rosy View." *Journal of Experimental Social Psychology*, *33*(4), 421–448. https://doi.org/10.1006/jesp.1997.1333

Moeller, J., Brackett, M. A., Ivcevic, Z., & White, A. E. (2020b). High school students' feelings: Discoveries from a large national survey and an experience sampling study. *Learning and Instruction*, *66*, 101301. https://doi.org/10.1016/j.learninstruc.2019.101301

Nett, U., Goetz, T., & Hall, N. C. (2011). Coping with boredom in school: An experience sampling perspective. *Contemporary Educational Psychology*, *36*(1), 49–59. https://doi.org/10.1016/j.cedpsych.2010.10.003

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational psychology review*, *18*, 315-341. https://doi.org/10.1007/s10648-006-9029-9

Pekrun, R. (2016). Using self-report to assess emotions in education. In: Zembylas, M., Schutz, P. (Eds.), *Methodological Advances in Research on Emotion and Education* (pp. 43-54). Springer, Cham. https://doi.org/10.1007/978-3-319-29049-2_4

Pekrun, R., & Linnenbrink-Garcia, L. (2014). Introduction to emotions in education, In R. Pekrun & L. Linnenbrink-Garcia (Eds.), *International handbook of emotions in education* (pp. 1–10). Routledge/Taylor & Francis Group.

Pekrun, R., & Stephens, E. H. (2010). Achievement emotions: a control-value approach. *Social and Personality Psychology Compass*, *4*(4), 238–255. https://doi.org/10.1111/j.1751-9004.2010.00259.x

Pekrun, R., & Stephens, E. H. (2012b). Academic emotions. In K. R. Harris, S. Graham, T. Urdan, S. Graham, J. M. Royer, & M. Zeidner (Eds.), *APA educational psychology handbook, Vol. 2. Individual differences and cultural and contextual factors* (pp. 3–31). American Psychological Association. https://doi.org/10.1037/13274-001.

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: the achievement emotions questionnaire (AEQ). *Contemporary Educational Psychology*, *36*(1), 36–48. https://doi.org/10.1016/j.cedpsych.2010.10.002

Pekrun, R., Goetz, T., Titz, W., & Perry, R. P. (2002). Academic emotions in students' self-regulated learning and achievement: a program of qualitative and quantitative research. *Educational Psychologist*, *37*(2), 91–105. https://doi.org/10.1207/s15326985ep3702_4

Pekrun, R., Lichtenfeld, S., Marsh, H. W., Murayama, K., & Goetz, T. (2017). Achievement emotions and academic performance: longitudinal models of reciprocal effects. *Child Development*, *88*(5), 1653–1670. https://doi.org/10.1111/cdev.12704

Roseman, J. I., &Smith, A. C. (2001). Appraisal theory: overview, assumptions, varieties, controversies. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal processes in emotion: Theory, methods, research* (pp. 3–19). Oxford University Press.

Scherer, K. R. (2001). Appraisal considered as a process of multilevel sequential checking. In K. R. Scherer, A. Schorr, & T. Johnstone (Eds.), *Appraisal processes in emotion: Theory, methods, research* (pp. 92-120). Oxford University Press.

Shuman, V., & Scherer, K. R. (2014). Concepts and structures of emotions. In R. Pekrun & L. Linnenbrink-Garcia (Eds.), *International handbook of emotions in education* (pp. 13-35). Routledge/Taylor & Francis Group.

Tze, V., Parker, P., & Sukovieff, A. (2022). Control-value theory of achievement emotions and its relevance to school psychology. *Canadian Journal of School Psychology*, *37*(1), 23–39.

Van Berkel, N., Ferreira, D., & Kostakos, V. (2017). The experience sampling method on mobile devices. *ACM Computing Surveys*, *50*(6), 1–40. https://doi.org/10.1145/3123988

Zillmann, D. (2003). Theory of affective dynamics: emotions and moods. In J. Bryant, D. Roskos-Ewoldsen, & J. Cantor (Eds.), *Communication and emotion: Essays in honor of Dolf Zillmann* (pp. 533–567). Lawrence Erlbaum Associates Publishers. https://doi.org/10.4324/9781410607584-32