

Handbook of Human and Social Conditions in Assessment

The *Handbook of Human and Social Conditions in Assessment* is the first book to explore assessment issues and opportunities occurring due to the real world of human, cultural, historical, and societal influences upon assessment practices, policies, and statistical modeling. With chapters written by experts in the field, this book engages with numerous forms of assessment: from classroom-level formative assessment practices to national accountability and international comparative testing practices, all of which are significantly influenced by social and cultural conditions. A unique and timely contribution to the field of educational psychology, the *Handbook of Human and Social Conditions in Assessment* is written for researchers, educators, and policymakers interested in how social and human complexity affect assessment at all levels of learning.

Organized into four sections, this volume examines assessment in relation to teachers, students, classroom conditions, and cultural factors. Each section is comprised of a series of chapters, followed by a discussant chapter that synthesizes key ideas and offers directions for future research. Taken together, the chapters in this volume demonstrate that teachers, test creators, and policymakers must account for the human and social conditions that shape assessment if they are to implement successful assessment practices which accomplish their intended outcomes.

Gavin T. L. Brown is Professor and Director of the Quantitative Data Analysis and Research Unit in the Faculty of Education and Social Work at the University of Auckland, New Zealand.

Lois R. Harris is a Senior Post-doctoral Research Fellow within the School of Education and the Arts at Central Queensland University, Australia.

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Gavin T. L. Brown and Lois R. Harris**

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CONTENTS

Foreword	ix
JOHN HATTIE	
Acknowledgments	xv
Chapter 1	Volume Introduction: The Human and Social Experience of Assessment: Valuing the Person and Context
	1
	LOIS R. HARRIS AND GAVIN T. L. BROWN
Section 1	TEACHERS AND ASSESSMENT
	19
Chapter 2	Teachers' Perceptions About Assessment: Competing Narratives
	21
	SARAH M. BONNER
Chapter 3	Accountability Assessment's Effects on Teachers and Schools
	40
	SHARON L. NICHOLS AND LOIS R. HARRIS
Chapter 4	Moving From Student to Teacher: Changing Perspectives About Assessment Through Teacher Education
	57
	MARY F. HILL AND GAYLE E. EYERS
Chapter 5	In-service Teacher Professional Learning: Use of Assessment in Data-based Decision-making
	77
	MEI KUIN LAI AND KIM SCHILDKAMP
Chapter 6	Section Discussion: Teachers and Assessment: Enhancing Assessment Capability
	95
	JUDY M. PARR AND HELEN S. TIMPERLEY

Section 2	STUDENTS AND ASSESSMENT	109
Chapter 7	Emotions That Matter to Achievement: Student Feelings About Assessment ELISABETH VOGL AND REINHARD PEKRUN	111
Chapter 8	Students' Perceptions of Novel Forms of Assessment KATRIEN STRUYVEN AND JOANA DEVESA	129
Chapter 9	Student Participation in Assessment: Does It Influence Self-regulation? DANIEL L. DINSMORE AND HOPE E. WILSON	145
Chapter 10	Toward a Model of Student Response to Feedback ANASTASIYA A. LIPNEVICH, DAVID A. G. BERG, AND JEFFREY K. SMITH	169
Chapter 11	Student Dishonesty in the Face of Assessment: Who, Why, and What We Can Do About It TAMERA B. MURDOCK, JASON M. STEPHENS, AND MORGAN M. GROTEWIEL	186
Chapter 12	The Validity of Assessment When Students Don't Give Good Effort STEVEN L. WISE AND LISA F. SMITH	204
Chapter 13	Section Discussion: Student Perceptions of Assessment JAMES H. MCMILLAN	221
Section 3	CLASSROOM CONDITIONS	245
Chapter 14	Is It Safe? Social, Interpersonal, and Human Effects of Peer Assessment: A Review and Future Directions ERNESTO PANADERO	247
Chapter 15	Privacy in Classroom Assessment ROBIN D. TIERNEY AND MARTHA J. KOCH	267
Chapter 16	Differentiated Instruction and Assessment: An Approach to Classroom Assessment in Conditions of Student Diversity TONYA R. MOON	284
Chapter 17	Assessment of Collaborative Learning JAN-WILLEM STRIJBOS	302
Chapter 18	Student Self-assessment in the Classroom HEIDI L. ANDRADE AND GAVIN T. L. BROWN	319

Chapter 19	Classroom Processes That Support Effective Assessment	335
	BRONWEN COWIE AND CHRISTINE HARRISON	
Chapter 20	Section Discussion: Building Assessments That Work in Classrooms	351
	SUSAN M. BROOKHART	
Section 4	CULTURAL AND SOCIAL CONTEXTS	367
Chapter 21	The Impact of International Testing Projects on Policy and Practice	369
	JANNA TELTEMANN AND ECKHARD KLIEME	
Chapter 22	Globalization of the Anglo-American Approach to Top-down, Test-based Educational Accountability	387
	BOB LINGARD AND STEVEN LEWIS	
Chapter 23	Exploring the Influence of Culture on Assessment: The Case of Teachers' Conceptions of Assessment in Confucian Heritage Cultures	404
	KERRY J. KENNEDY	
Chapter 24	Educational Assessment in Muslim Countries: Values, Policies, and Practices	420
	ATTA GEBRIL	
Chapter 25	Assessment in Education in Multicultural Populations	436
	FONS J. R. VAN DE VIJVER	
Chapter 26	Public Perceptions About Assessment in Education	454
	CHAD W. BUCKENDAHL	
Chapter 27	Computerising Assessment: Impacts on Education Stakeholders	472
	IRVIN R. KATZ AND JOANNA S. GORIN	
Chapter 28	Section Discussion: Assessment and Sociocultural Context: A Bidirectional Relationship	490
	KADRIYE ERCIKAN AND GUILLERMO SOLANO-FLORES	
Chapter 29	Volume Conclusion: The Future of Assessment as a Human and Social Endeavour	506
	GAVIN T. L. BROWN AND LOIS R. HARRIS	
Contributing Authors		525
Author Index		535
Subject Index		559

7

EMOTIONS THAT MATTER TO ACHIEVEMENT

Student Feelings About Assessment

Elisabeth Vogl and Reinhard Pekrun

Think about the last time your performance was assessed. Were you anxious or hopeful? Did you enjoy the assessment or were you frustrated by it? Were you proud or ashamed of your result? Did you envy, admire, or condemn your fellow examinees' outcomes? How did your examiner make you feel? Answers to these questions suggest that assessment situations arouse a multitude of different achievement-related emotions, including anxiety, frustration, and shame, but also positive emotions such as enjoyment, hope, or pride. Additionally, assessments are usually social situations conveying social evaluations of individual achievement that can trigger not only self-related emotions, but also emotions related to other people or their attainment. Moreover, emotions are not mere epiphenomena of assessments. Rather, emotions can influence motivation, activation of cognitive resources, learning behavior, and consequently students' assessment outcomes.

Maladaptive emotions, such as trait-like test anxiety or hopelessness, are problematic as they can hinder students from tapping into their full potential and may lead to sizable, systematic measurement error for many students. However, even though high-stakes testing and an audit culture is the standard in many school systems around the world today, the impact of assessment on students' emotions and the effects of these emotions on assessment are often overlooked. Measures to prevent maladaptive emotions and foster adaptive ones to ensure reliable and valid measurement of achievement are rarely implemented in assessment settings at schools or universities.

This chapter argues that research on assessment-related emotions needs to go beyond test anxiety and calls for research that explores the role of emotions in various types of assessments. We suggest guidelines for fostering favorable student emotions and preventing emotions that may harm the validity of achievement assessment.

CONCEPT OF ACHIEVEMENT EMOTIONS

Contemporary emotion researchers agree that emotions are complex, multifaceted phenomena which comprise an emotion-specific subjective affective experience or feeling, cognitive processes, motivational tendencies, expressive behavior, and physiological components (Kleinginna & Kleinginna, 1981; Scherer, 2009). For instance, test anxiety involves, among others, uneasiness and nervous feelings (affective component), worries about failing the exam (cognitive component), impulses to avoid the test situation (motivational component), an anxious facial expression characterized by open eyes and raised eyebrows (expressive component), and physiological changes such as an increased heart rate or perspiration (physiological component).

In line with the multi-componential nature of the emotion construct, emotions can be assessed by means of diverse measures such as self-report questionnaires; implicit assessment (e.g., IAT-Anxiety, Egloff & Schmukle, 2002); peripheral physiological and neuro-physiological measures (e.g., electrodermal activity, EEG); observation of non-verbal behavior (facial, gestural, and postural expression); or the prosodic features of verbal speech (Reisenzein, Junge, Studtmann, & Huber, 2014). Standardized self-report scales are the most widely used instruments to date, and have proven reliable, valid, and cost-effective (Hodapp & Benson, 1997; Pekrun et al., 2004; Zeidner, 1998), although they may be subject to socially desirable response style. Traditionally, emotion questionnaires focused on students' test anxiety; however, instruments such as the Test Emotions Questionnaire (TEQ; Pekrun et al., 2004) and the Achievement Emotions Questionnaire (AEQ; Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011) have broadened this spectrum to include a variety of assessment-related emotions.

Assessments can trigger a variety of different types of emotions. Specifically, assessments of achievement can induce achievement emotions, which are defined as emotions that relate to achievement activities and their success and failure outcomes (Pekrun, 2006). Achievement emotions related to tests and exams are referred to as test emotions (Pekrun et al., 2004; Zeidner, 1998, 2014). *State test emotions* can occur during different temporal phases of assessment: (1) the forethought phase in which students prepare for the assessment, (2) the performance phase during the assessment, and (3) the self-reflection phase after the assessment in which students reflect on the assessment (Schutz & Davis, 2000; Zimmermann, 2000). It is important to discriminate between these phases or stages because they may be associated with different emotional experiences and may therefore call for different coping strategies (Folkman & Lazarus, 1985; Pekrun et al., 2004). Individual dispositions to experience test emotions in habitual ways constitute *trait-like test emotions* (Pekrun et al., 2004). Test anxiety, for instance, is often defined as a situation-specific personality trait that refers to the individual's tendency to react with extensive worry, intrusive thoughts, mental disorganization, tension, and physiological arousal when exposed to evaluative situations (Spielberger & Vagg, 1995). Since assessments are also frequently embedded in social situations, they can also induce social emotions directed towards the examiner or the other examinees, including social achievement emotions related to the attainment of others, such as empathy, 'Schadenfreude,' envy, contempt, or admiration (Hareli & Parkinson, 2008; Hareli & Weiner, 2002; Pekrun & Stephens, 2012).

The type of assessment might influence the frequency and intensity of different emotions. For instance, self-assessment might induce, in particular, self-related achievement emotions; peer assessment might trigger social achievement emotions; informal and formal tests administered by teachers can arouse achievement emotions that are especially intense due to high-stakes purposes of selection and placement.

Unfortunately, research on social achievement emotions in academic settings is still largely missing, with only few exceptions (e.g., Mosquera, Parrott, & de Mendoza, 2010; Van de Ven, Zeelenberg, & Pieters, 2011). Research has focused primarily on emotions related to written tests and exams administered by teachers, possibly because this is one of the most common assessment types in school and university settings, and because the format lends itself relatively easily to investigation.

Achievement emotions differ in terms of their *valence*, their degree of *activation*, and their *object focus*. Similar to circumplex models of affective states (e.g., Barrett & Russell, 1999), discrete achievement emotions can be categorized as positive (pleasant) or negative (unpleasant) as well as physiologically activating or deactivating. Accordingly, achievement emotions include positive activating emotions (e.g., enjoyment of the challenge implied by an exam, hope for success, pride in positive outcomes), positive deactivating emotions (e.g., relief or pleasant relaxation after taking a test), negative activating emotions (e.g., anger about the examiner, anxiety before an exam, or shame following failure), and negative deactivating emotions (e.g., hopelessness when failure cannot be avoided).

In addition to valence and activation, achievement emotions can be grouped according to their object focus as displayed in Table 7.1 (Pekrun, 2006). Activity emotions, such as enjoyment and frustration, refer to the activity (e.g., test taking) rather than the outcome of the activity. Other emotions relate in prospective (anticipatory) or retrospective ways to achievement outcomes (Pekrun et al., 2004). Anticipatory joy, hope, anxiety, and hopelessness can be classified as prospective achievement emotions; by contrast, retrospective joy, relief, pride, and shame relate to success and failure that were already obtained. Typically, prospective achievement emotions peak before and at the start of an assessment and retrospective achievement emotions after the assessment; however, both prospective and retrospective achievement emotions can be experienced at any time before, during, and after an assessment (e.g., relief about successful preparation prior to an exam).

OCCURRENCE OF ACHIEVEMENT EMOTIONS RELATED TO ASSESSMENTS

Qualitative studies that explored students' affective responses to assessments using drawings and interviews about assessments found that students from primary school to university report negative reactions to assessment more frequently than positive ones. For instance, Carless and Lam (2014) found that primary school students associate assessments mostly with negative feelings even though they can bring a sense of satisfaction. This result may reflect the high-stakes consequences of assessment in Chinese contexts, because, in contrast, New Zealand primary school children drew relatively positive emotional responses to assessment (Harris, Harnett, & Brown, 2009). However, negative feelings towards assessments may continue in higher levels of education in Eastern (Hong Kong) as well as Western (U.K.) countries (Brown & Wang, 2013; McKillop, 2006). While negative responses mostly focus on the forethought phase and the performance phase, positive responses are more often related to having finished the test and achieved positive outcomes. The most frequently reported discrete negative emotion related to assessments is anxiety (e.g., Spangler, Pekrun, Kramer, & Hofmann, 2002), which underscores the high-stakes nature of many assessments in educational contexts such as in Germany.

In line with these findings, research on assessment-related emotions has focused on students' test anxiety. This research has predominantly examined anxiety and

other negative emotions in the forethought phase and the self-reflection phase (e.g., Folkman & Lazarus, 1985; Smith & Ellsworth, 1987). Less is known about anxiety and other emotions during the performance phase (Schutz & Davis, 2000). This is likely due to ethical considerations, since examining students' emotions during testing might negatively influence their test results by interrupting their concentration and problem-solving efforts (Zeidner, 1995). Some studies indicate that negative emotions such as anxiety, hopelessness, and sadness peak at the beginning of a test (e.g., Goetz, Preckel, Pekrun, & Hall, 2007; Pekrun et al., 2004; Spangler et al., 2002). However, other negative emotions, such as anger, shame, and disappointment, are reported more often during and after a test (Goetz et al., 2007; Pekrun et al., 2004). Positive emotions, such as joy, pride, and relief, seem to increase during the process of completing the exam (see also Pekrun et al., 2004; Reeve, Bonaccio, & Winford, 2014; Spangler et al., 2002). Peterson, Brown, and Jun (2015) found a similar pattern of the dynamics of emotions during a three week period including all three phases of assessment: positive emotions decreased until the test date but increased afterwards; conversely, negative emotions, which did not increase greatly towards the test, did decrease afterwards.

ORIGINS AND DEVELOPMENT OF ACHIEVEMENT EMOTIONS

Given that assessment-related achievement emotions can relate to student achievement and well-being, researchers and practitioners alike would be well advised to attend to their origins, making it possible to design, based on evidence, assessment settings that foster favorable student emotions. In the following sections, we address individual variables as well as environmental factors as antecedents of these emotions and summarize evidence on their development over the school years.

Appraisals as Proximal Individual Antecedents

Cognitive appraisals have been identified as the proximal determinants of achievement emotions related to assessments. First, test anxiety studies described appraisals concerning threat of failure as causes of anxiety. In Lazarus' transactional stress model (Lazarus & Folkman, 1987), a person evaluates a potential threat in a given achievement setting (e.g., an exam) first in terms of the likelihood of failure (primary appraisal) and thereafter in terms of coping resources and options (secondary appraisal). According to this theory, a student may experience anxiety when failure on the exam is likely (primary appraisal) and coping resources are not sufficiently available; that is, that the outcome of the exam is perceived as uncontrollable (secondary appraisal).

Weiner (1985, 2007) discussed causal achievement attributions (i.e., explanations about the causes of success and failure in assessments, such as ability, effort, task difficulty, luck) as primary determinants of achievement emotions beyond anxiety. Exceptions are attribution-independent emotions that are directly instigated by perceptions of success or failure (e.g., happiness about success and sadness/frustration about failure). Three dimensions of causal attributions were proposed to play key roles in determining attribution-dependent emotions: the perceived locus of causality (internal vs. external causes of achievement; such as, ability vs. environmental circumstances); the perceived controllability of causes (e.g., subjectively controllable effort vs. uncontrollable ability); and the perceived stability of causes (e.g., stable ability vs. unstable chance). For example, the theory posits that pride is aroused when success is

Table 7.1 A Three-dimensional Taxonomy of Achievement Emotions (adapted from Pekrun & Stephens, 2012)

<i>Object Focus</i>	<i>Positive^a</i>		<i>Negative^b</i>	
	<i>Activating</i>	<i>Deactivating</i>	<i>Activating</i>	<i>Deactivating</i>
<i>Activity</i>	Enjoyment	Relaxation	Anger	Boredom
<i>Outcome</i>	Hope	Contentment	Anxiety	Hopelessness
	Pride	Relief	Anger	Disappointment
	Gratitude		Shame	

Note: ^a Positive = pleasant emotion.

^b Negative = unpleasant emotion.

attributed to an internal cause (ability or effort), whereas shame is experienced when failure is attributed to an internal and uncontrollable cause (lack of ability).

In Pekrun's (2006; Pekrun & Perry, 2014) control-value theory of achievement emotions, core propositions of the transactional stress model and attributional theory were integrated and expanded to explain a broader variety of emotions experienced in achievement settings (Table 7.1), including both outcome emotions related to success and failure (e.g., hope, anxiety, pride, and shame) and activity emotions (e.g., enjoyment and boredom). The theory posits that the joint action of control and value appraisals instigate different achievement emotions. Retrospective outcome emotions such as pride and shame are thought to be induced when success and failure, respectively, are perceived to be caused by internal factors implying control (or lack of control) over these outcomes. Prospective outcome emotions, such as hope and anxiety, are thought to be experienced if a person perceives control as moderate to low and focuses attention on anticipated success (hope) or anticipated failure (anxiety), respectively. If perceived control is high, anticipatory joy may be experienced, but if there is a complete lack of perceived control, hopelessness may ensue. Regarding activity emotions, the theory proposes, for example, that a student would enjoy taking a test when she feels competent to meet the demands of the exam and perceives the material as interesting. Boredom may be experienced when the test is perceived as lacking any relevance and does not match the examinee's ability (Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010).

Gender and Achievement Goals as Distal Individual Antecedents

Appraisal theories imply that more distal individual antecedents affect students' emotions by first influencing their appraisals. In this context, students' gender and their achievement goals have received particular attention. Empirical evidence shows that females generally experience more negative achievement emotions such as anxiety, hopelessness, shame, and boredom, as well as less enjoyment and pride than male students (Else-Quest, Higgins, Allison, & Morton, 2012; Hyde, Fennema, Ryan, Frost, & Hopp, 1990). However, recent research indicates that these emotional differences may be mediated by gender differences in appraisals, in line with propositions of Pekrun's (2006) control-value theory (Frenzel, Pekrun, & Goetz, 2007; Goetz, Bieg, Lüdtke, Pekrun, & Hall, 2013).

An extension of the control-value theory links achievement goals to achievement emotions and suggests that emotions can function as mediators of the effects

of achievement goals on learning by promoting varied appraisals and focusing attention on the task versus the self (Daniels et al., 2009; Elliot & Pekrun, 2007; Linnenbrink & Pintrich, 2002a; Pekrun, Elliot, & Maier, 2006, 2009). It is posited that performance-approach goals focus attention on the controllability of the task and success, thus facilitating positive outcome emotions, such as hope and pride; whereas, performance-avoidance goals induce negative outcome emotions (e.g., anxiety, shame, and hopelessness) by focusing attention on uncontrollability and failure. In contrast, mastery goals focus attention on the controllability and positive values of task activities, thus promoting positive activity emotions (e.g., enjoyment) and reducing negative activity emotions (e.g., boredom). The empirical evidence is in line with these propositions (Huang, 2011; Pekrun et al., 2006, 2009).

The Influence of Learning Environments and Assessments

The impact of learning environments and assessments on achievement emotions is largely unexplored, with the exception of research on the antecedents of test anxiety (for reviews, see Wigfield & Eccles, 1990; Zeidner, 1998, 2007, 2014). However, goal structures in the classroom and social expectations, the design of assessments, as well as feedback and the consequences of assessments have been discussed as important factors influencing the experience of assessment-related emotions.

Goal Structures and Social Expectations

Goal structures in the classroom can influence the achievement goals students adopt (Murayama & Elliot, 2009; Urdan & Schoenfelder, 2006). The emotions students experience are mediated by these goals (Kaplan & Maehr, 1999; Roeser, Midgley, & Urdan, 1996). For instance, competitive goal structures are more likely to induce negative assessment emotions (e.g., test anxiety and hopelessness) since competition implies that some students fail (Zeidner, 1998).

Excessively high achievement expectations from teachers and parents can also induce negative emotions (e.g., anxiety, shame, and hopelessness) because they reduce students' sense of control and expectancies for success (Pekrun, 1992a). Surprisingly, cooperative classroom climate and social support from teachers and parents does not necessarily reduce test anxiety and often fails to correlate with students' test anxiety scores (Hembree, 1988). One possible explanation is that social support may actually increase pressure to perform, thus counteracting any beneficial effects of support (Pekrun & Stephens, 2012).

Design of Assessments

Lack of structure and transparency, as well as excessive task demands (e.g., lack of information regarding demands, materials, and grading practices), are associated with students' elevated test anxiety (Zeidner, 1998, 2007). These links are likely mediated by students' expectancies of low control and failure (Pekrun, 1992a). Furthermore, the format of test items has been found to be relevant. Specifically, open-ended formats, such as essay questions, induce more anxiety than multiple-choice formats (Zeidner, 1987), possibly because open-ended formats require more attentional resources (i.e., working memory capacity). In addition, there is evidence that practices such as permitting students to choose between test items, relaxing time constraints, and giving second chances (e.g., opportunities to retake a test) may reduce test anxiety

(Zeidner, 1998), presumably because perceived control and achievement expectancies are enhanced under these conditions.

Feedback and Consequences of Assessments

In environments involving frequent assessments, achievement outcomes shape individual appraisals and thus students' emotions. In addition, performance feedback is likely of primary importance for the arousal of achievement emotions. Recent findings suggest that achievement goals are significant mediators of the influence of anticipated feedback on emotions (Pekrun, Cusack, Murayama, Elliot, & Thomas, 2014). Self-referential feedback was found to have a positive influence on mastery goal adoption and consequently the experience of positive achievement emotions (i.e., hope and pride), whereas normative feedback positively influenced performance-approach and performance-avoidance goal adoption and consequently the experience of negative achievement emotions (i.e., anxiety and shame).

Besides the type of feedback, the social setting might influence emotions. Unfortunately, research on the emotional impact of feedback given by different people (e.g., authority figures vs. peers) is sparse. It seems, however, that peer pressure and fear of disapproval, which may undermine the motivation for participating in assessments, is an important topic that needs to be addressed in social assessment situations such as peer assessment. In this context, anonymous peer feedback may be one way to dampen negative perceptions of peer assessment and reduce negative emotions experienced in the process (e.g., Vanderhoven, Raes, Montrieux, & Rotsaert, 2015; see Panadero, this volume, for a review on peer assessment).

Development and Reciprocal Causation

Qualitative studies that have explored emotional responses to assessments indicate that older students have more negative emotional reactions to assessment than younger students, which can at least be partly explained by their increased awareness of the personal implications of test results (Brown & Wang, 2013; Harris et al., 2009). With the exception of test anxiety studies, quantitative empirical evidence on the development of discrete achievement emotions is scarce. At the beginning of elementary school, average scores for test anxiety are low but increase dramatically during the elementary school years (Hembree, 1988). After elementary school, average anxiety scores stabilize and remain at high levels throughout middle school, high school, and college. However, despite stability at the group level, anxiety can change in individual students, for instance due to a change in reference groups (e.g., when changing schools; Marsh, 1987; Preckel, Zeidner, Goetz, & Schleyer, 2008).

Emotions, their antecedents, and their effects, are thought to be linked by reciprocal causation over time (Linnenbrink & Pintrich, 2002b; Pekrun, 2006). In this sense, positive feedback loops (e.g., success on an exam induces pride which fuels motivation to prepare and succeed on the next exam), as well as negative feedback loops (e.g., failure on an exam induces anxiety which prompts more effort in learning and subsequent success) can be important.

EFFECTS ON LEARNING, ACHIEVEMENT, AND WELL-BEING

Emotions can be experienced at any stage of assessment and can influence achievement outcomes not only by affecting cognitive processes during the assessment, but

also by impacting the cognitive and motivational processes present when preparing for the assessment. While experimental research has mostly focused on the effects of positive versus negative mood and its influence on information processing, links between discrete student emotions and academic performance have been mostly analyzed in field research in education.

Mood and Information Processing

Emotions have been found to consume cognitive resources (i.e., working memory resources) by focusing attention on the object of an emotion (Ellis & Ashbrook, 1988). For negative emotions, such as test anxiety, which have task-extraneous objects and produce task-irrelevant thinking (e.g., worries about impending failure), the impact can be detrimental because fewer resources are available for task completion (Meinhardt & Pekrun, 2003). By contrast, positive task-related emotions, such as enjoyment of learning, can focus attention on the task, thus being beneficial for achievement. However, it is also possible that some positive task-related emotions, such as over-excitement, may distract attention away from the task (Pekrun & Linnenbrink-Garcia, 2012).

Studies on mood-congruent retrieval (Levine & Burgess, 1997; Parrott & Spackman, 1993) find that positive mood facilitates the retrieval of positive self-related information, and negative mood facilitates the retrieval of negative self-related information. By implication, positive mood can foster positive self-appraisals and thus promote motivation to learn and boost performance; in contrast, negative mood can facilitate the retrieval of negative self-appraisals and thus hamper motivation and performance (Olafson & Ferraro, 2001). In addition, positive and negative mood can moderate the memory effects of assessment on learning (i.e., testing effect; Roediger & Karpicke, 2006). Specifically, emotions can influence retrieval-induced forgetting. Negative mood can undo forgetting, likely because it inhibits spreading activation in memory networks (Bäuml & Kuhbandner, 2007). Conversely, positive emotions should promote relational processing of information and with that retrieval-induced facilitation (Kuhbandner & Pekrun, 2013).

Positive mood has been found to promote flexible and creative ways to solve problems, whereas negative mood fosters more focused, detail-oriented, and analytical ways of thinking (Clore & Huntsinger, 2007; Fredrickson, 2001). One possible explanation is that mood is used as information to guide further action: positive affective states signal that 'all is well,' indicating that it is safe to explore, whereas negative states suggest that something is amiss, making it necessary to analyze the problem more closely. A different explanation suggests that affective states influence the mode of information processing. Positive affect facilitates spreading activation in memory networks, thus promoting creative thinking and top-down information processing (accommodation), whereas negative affect facilitates bottom-up processing driven by sensory perception (assimilation; Fiedler, Nickel, Asbeck, & Pagel, 2003; Kuhbandner et al., 2009).

Thus, experimental research indicates that experiencing positive or negative affective states may affect assessment outcomes by: (a) influencing the availability of cognitive resources to master a given task, (b) promoting or undermining motivation triggered by the retrieval of positive or negative appraisals, and (c) impacting the problem-solving process. However, because these studies may lack ecological validity for real-life achievement, it is difficult to generalize these findings to actual assessment situations.

Discrete Emotions and Achievement

Field research in education has analyzed links between discrete achievement emotions and students' academic performance. In doing so, this research takes into account differential effects of activating and deactivating emotions (e.g., anxiety vs. boredom) beyond the valence of emotions and differential effects of discrete emotions of equal valence and activation (e.g., anxiety vs. anger; Carver & Harmon-Jones, 2009). The empirical evidence implies that the overall effects of emotions on learning and assessment outcomes are inevitably complex and may depend on the interplay between different mechanisms and task demands. In addition, correlational findings need to be interpreted with caution since the links between emotions and performance are likely reciprocal. Nevertheless, it seems possible to derive inferences from the existing evidence.

Positive Emotions

The available evidence suggests that *activating positive emotions*, such as enjoyment, hope, and pride, can have beneficial effects on students' interest, effort, and academic performance by focusing attention on the task, promoting interest and intrinsic motivation, and facilitating the use of flexible cognitive strategies (Ainley & Ainley, 2011; Pekrun et al., 2004). In line with theory, findings by Reeve et al. (2014) suggest that positive activating emotion experienced immediately prior to an exam may facilitate performance by decreasing distraction. Interestingly, high school students' belief that assessments should be fun was found to correlate negatively with academic achievement (Brown & Hirschfeld, 2008; Brown, Peterson, & Irving, 2009; Hirschfeld & Brown, 2009). However, beliefs about the purpose of assessments do not necessarily reflect the actual emotional experiences related to assessments.

General positive affect has also been found to correlate positively with students' engagement (Linnenbrink, 2007). However, other studies have found null relations (Linnenbrink, 2007; Pekrun et al., 2009). One possible explanation for the inconsistent findings for positive affect may be that *deactivating positive emotions* such as relief or contentment may reduce task attention, undermine current motivation, and lead to superficial information processing. In conclusion, the evidence on positive emotions is currently too scant to warrant firm conclusions, but highlights the importance of carefully defining and differentiating between discrete achievement emotions and related but different constructs such as moods, beliefs, or perceptions and their effects on academic outcomes.

Negative Emotions

Activating negative emotions, such as anxiety, shame, and anger appear to exert complex effects. These emotions promote task-irrelevant thinking and reduce interest and flexible thinking, but can simultaneously strengthen effort to avoid failure (Pekrun, 2006). Meta-analytic reviews demonstrated that *test anxiety* correlated moderately negatively with various measures of academic achievement and cognitive ability (Ackerman & Heggestad, 1997; Hembree, 1988). However, correlations with performance variables have not been uniformly negative across studies. Zero correlations have sometimes been found, especially for state test anxiety (e.g., Díaz, Glass, Arnkoff, & Tanofsky-Kraff, 2001; Gross, 1990; Kantor, Endler, Heslegrave, & Kocovski, 2001). Findings suggest that *shame* related to failure at assessments negatively correlates with students' effort and

academic achievement (Pekrun et al., 2004) and negatively predicts exam performance (Pekrun et al., 2009). However, if students continue to be committed to future academic goals and believe these goals are attainable, then their motivation may increase after they experienced shame following negative exam feedback (Turner & Schallert, 2001). Similarly, students' *anger* has been shown to correlate negatively with academic interest, motivation, and self-regulated learning (Pekrun et al., 2004). However, the overall correlations with academic performance, which range from zero to moderately negative, may depend on whether the anger is directed at another individual or at oneself (Boekaerts, 1994; Pekrun et al., 2004). Nevertheless, the benefits of negative activating emotions are probably outweighed by their overall negative effects on performance and interest for the vast majority of students. This is in line with findings by Reeve et al. (2014) suggesting that negative activating emotions (shame, anxiety, and anger) may hinder performance on exams by increasing distraction.

Deactivating negative emotions, such as hopelessness and boredom, seem to relate uniformly negatively to measures of learning and performance (Craig, Graesser, Sullins, & Gholson, 2004; Pekrun et al., 2010; Pekrun, Hall, Goetz, & Perry, 2014; Tze, Daniels, & Klassen, 2015) possibly because they reduce attentional resources, undermine both intrinsic and extrinsic motivation, and promote superficial information processing (Pekrun, 1992b, 2006).

Effects on Students' Well-being

In addition to the influence of test emotions on students' achievement, emotions related to assessment may also impact students' well-being and health. In particular, test anxiety has detrimental effects on students' psychological well-being (Zeidner, 1998, 2014). Furthermore, negative test emotions, such as anxiety, anger, shame, and hopelessness, have been found to correlate positively with perceived health problems, including cardiovascular problems, stomach problems, and sleep disturbances; by contrast, positive test emotions, such as hope, may be negatively related to health impairments (Pekrun et al., 2004). While more research is needed to explore the differential effects of discrete test emotions other than anxiety on various health factors, test anxiety research clearly indicates an urgent need to ameliorate excessive negative achievement emotions in students' academic careers.

EFFECTS OF ACHIEVEMENT EMOTIONS ON THE VALIDITY OF ASSESSMENTS

The cumulative evidence on direct and indirect effects of emotions on the outcomes of performance assessments cited here indicates that students' maladaptive emotions may limit the validity of assessments; that is, assessments no longer accurately reflect the construct of interest, such as a student's competency or ability. To secure the validity of achievement assessments, it needs to be ensured that differences in test scores reflect individual differences in the ability trait rather than differences in construct-irrelevant factors such as emotions (Haladyna & Downing, 2004; Lubke, Dolan, Kelderman, & Mellenbergh, 2003). Accordingly, the validity of an assessment would be reduced if examinees with equal levels of the ability trait but different emotional experiences have different probabilities of correctly answering test items. For example, if emotions alter test responses by modifying aspects of respondents' cognitive processes during the assessment, the validity of the assessment might be at risk (Bornstein, 2011).

More specifically, emotions can reduce the validity of test scores in two different ways. First, emotions could change the measurement properties of the assessment at the item level in terms of changing item properties such as factor loadings, intercepts, etc. For example, the measurement properties of an achievement test could differ across students with low, medium, and high test anxiety, which would imply that test scores cannot be compared across these groups of students. Terms such as measurement bias and test bias have been used to denote such a change of measurement properties (for different interpretations of these terms, see Warne, Yoon, & Price, 2014). This type of measurement bias has been examined in a few studies for effects of test anxiety using structural equation modeling (SEM). The findings are inconclusive. Using different approaches to SEM, Reeve and Bonaccio (2008) and Sommer and Arendasy (2014) found that test anxiety did not change the measurement properties of cognitive tests, whereas Halpin, da-Silva, and De Boeck (2014) reported that test anxiety differentially influenced responses to different test items, suggesting that measurement properties were not equivalent across levels of test anxiety.

Second, emotions can change the latent ability variable that is measured by an assessment, even if the item-level measurement properties of the assessment are preserved. In line with this possibility, Reeve and Bonaccio (2008) and Sommer and Arendasy (2014) found that respondents' test anxiety correlated with latent ability factors underlying responses to items on intelligence tests. Such correlational findings do not, however, necessarily indicate that achievement assessments are biased against test anxious individuals. These correlations can be explained in at least three ways: (1) anxiety could reduce ability scores due to negative effects on resources and motivation during the assessment (e.g., worrisome cognitions and task-irrelevant thoughts), thus altering test responses and endangering the validity of the assessment; (2) anxiety could undermine the development of abilities prior to the assessment, due to negative effects on cognitive resources and motivation during learning; (3) anxiety may simply reflect existing lack of ability, without impacting learning and assessment (the deficit hypothesis).

Longitudinal or experimental evidence would be needed to disentangle these three possibilities and investigate if emotions reduce the validity of assessments by influencing the measured factor during the assessment itself. One option to examine test score validity would be to investigate if experimental manipulations of respondents' states emotions during testing impact their test scores (Bornstein, 2011). As discussed earlier, experimental studies on mood and information processing found negative effects of mood on attention and memory, which indicates that the validity of assessments might in fact be at risk due to state emotions during testing. The existing longitudinal evidence suggests that students' test anxiety and their academic achievement are linked by reciprocal causation over time (Meece, Wigfield, & Eccles, 1990; Pekrun, 1992b), suggesting that test anxiety is in fact both a cause and an effect of reduced performance. However, this research has not clarified if test anxiety reduced students' performance during learning, during the assessment of performance, or both.

More research is needed to explore if and how emotions impact the validity of assessments. Given the practical relevance of this issue, it would be especially important to further examine possible biases induced by anxiety and other state and trait-like test emotions such as intense anger or overexcitement that may limit the cognitive resources available for responding to assessments in real life settings (e.g., in low- vs. high-stakes testing situations; Putwain, 2008).

IMPLICATIONS FOR EDUCATIONAL POLICY AND PRACTICE

To avoid possible bias, which harms construct validity, assessments need to be arranged in particular ways to avoid emotions that might hinder students being able to show their full potential. In line with this, some scholars have called for special arrangements for test-anxious students (Hill & Wigfield, 1984; Zuriff, 1997). Furthermore, to reduce students' maladaptive achievement emotions and promote adaptive emotions, the learning environment needs to be designed in an appropriate way. Teachers need to be made aware of the influence of emotions on learning and assessment, and educational policy should promote emotionally sound learning environments, including adequately designed assessment settings. Even though research on achievement emotions other than test anxiety is clearly at a nascent stage, the empirical evidence discussed earlier has a number of implications for how to reach these aims.

Goal Structures and Social Expectations

A classroom climate that positively influences students' emotions and achievement can be promoted by avoiding social comparison standards to assess achievement and by communicating realistic expectations about achievement outcomes. Grading based on social comparison promotes competitive classroom goals and should be avoided whenever possible. Although social comparison standards (i.e., normative standards) may be needed for purposes of placement and selection, use of criterion-oriented standards focused on mastery of the learning material, as well as use of intra-individual standards based on learning progress, are recommended to best serve teaching and learning. These standards are better suited to promoting a mastery goal climate in the classroom. Furthermore, teachers' and parents' expectations should reflect students' abilities: exaggerated or unrealistic expectations can negatively influence students' control perceptions and assessment-related emotions.

Design of Assessments

Drawing on test anxiety research, measures that increase perceived control and decrease the importance of failure can help to create favorable test emotions and decrease the impact of maladaptive test emotions on performance (Zeidner, 1998). To prevent uncertainty and lack of control that may lead to anxiety, teachers should provide detailed information about the assessment procedure, the structure of the assessment, and the grading practice used. Surprise assessments that have not been announced to students should be avoided, especially if these tests have important consequences.

Examiners should strive for moderate test difficulty that is matched to students' ability levels. To limit the demands put upon students' attention, formats that reduce working memory load such as multiple-choice items can be used. It is important to note however, that closed item formats may not adequately assess competencies that involve creative problem solving or writing skills, and are not suitable for tracing the strategies students used to solve tasks.

Testing without time pressure allows students to review their answers and correct their mistakes. Relaxed time constraints decrease test anxiety and increase the reliability of the assessment if information processing speed is not a key component of the construct being assessed. Anxiety can also be reduced by assuring greater control over the test situation by allowing students to choose between items of similar difficulty,

providing external aids, and giving students second chances to retake a test or exam. This can increase students' expectations of success.

Naturally, some of these strategies, such as highly structured materials or easy test items, may be advantageous for test-anxious students but may prove less motivating for other students. Further, multiple-choice testing is not always an option and free item choice may create problems when scoring the test. As such, educational measures to reduce students' anxiety should be counterbalanced in the context of multiple goals for assessment.

Feedback and Consequences of Achievement

Students' self-confidence and positive emotions can be strengthened by using the following guidelines for feedback on achievement based on Pekrun (2014).

1. As noted earlier, teachers should be encouraged to use mastery and individual standards to evaluate students' achievement. The use of normative standards should be avoided wherever possible.
2. Repeated feedback about success emphasizing (even small) improvement in performance in terms of task mastery or individual standards can strengthen students' self-confidence over time and increase their positive achievement emotions. By contrast, repeated feedback about failure can undermine self-confidence and increase negative achievement emotions. This is especially true if feedback about failure is coupled with the message that failure is due to lack of ability.
3. Errors should not be regarded as information about lack of ability but as opportunities to learn. Students need to be aware that they can master the material if they invest effort. Attributional retraining can be helpful to build adaptive success and failure attributions (Haynes, Daniels, Stupnisky, Perry, & Hladkyj, 2010). Connections between students' academic effort and future academic success after failure can increase perceived control, thus strengthening positive achievement emotions, and reducing negative ones (Pekrun et al., 2006). However, effort must also be invested in adequate learning strategies.
4. Beyond evaluative feedback about success and failure, it is important to provide informational feedback about how students can improve their competencies and attain mastery. Detailed informational feedback, coupled with positive expectancies that mastery is possible, can strengthen students' confidence in their abilities and adaptive achievement emotions (e.g., Harris, Brown, & Harnett, 2014).
5. The consequences of assessment practices need to be considered, especially when implementing high-stakes testing that has serious consequences, such as decisions about students' career opportunities. High-stakes testing can increase positive achievement emotions for high-achieving students, but for low-achieving students, it increases frustration and shame about failure as well as anxiety and hopelessness related to the future (Pekrun, 2014). Therefore, high-stakes testing should be avoided whenever possible and instead a culture that uses assessments as a means of gaining information about how to develop mastery should be adopted.

CONCLUSIONS

Although assessments can induce a multitude of different emotions, empirical research to date has focused mostly on test anxiety and its effects on students' performance and well-being. This extensive body of research shows that test anxiety has detrimental

consequences for most students. The existing findings also suggest that test anxiety may lead to a sizable systematic error in assessment results. Findings on test emotions other than anxiety are sparse, and research on social emotions related to assessments is largely missing. However, it is possible that any intense emotion that distracts attention away from the task at hand and compromises memory processes represents a potential threat to the validity of academic assessments. In contrast, positive task-focused emotions experienced in assessment situations, such as enjoyment of challenge and problem solving, should foster attention, motivation, and use of adequate strategies, and thus make it possible to assess students' true capabilities. As outlined in this chapter, learning environments and assessments can be designed in emotionally sound ways that support both students' learning and a valid assessment of achievement. Shaping classroom goal structures, achievement expectations, grading practices, the design of tests, and the feedback and consequences provided after the assessment may be especially important to help students develop adaptive, and reduce maladaptive, emotions to ensure that students can tap into their full potential.

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