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REVIEW ARTICLE

Toward an Organising Theoretical Model for Teacher Clarity, Feedback and Self-Efficacy in the Classroom

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Abstract

The meta-analytic evidence aligning aspects of instruction and critical individual differences with student achievement continues to mount. Scant research effort has, however, been invested in connecting these findings to and through substantive theory which might drive both further research and enhance classroom practice. The current theoretically organising review aims to make connections, focusing on two elements of instruction (teacher clarity and feedback) and one individual difference (self-efficacy) which are each consistent top meta-analytic correlates of student achievement. The review begins by acknowledging Bandura's longstanding suggestions regarding self-efficacy beliefs support and his model for self-efficacy beliefs in context (i.e. model of reciprocal determinism). These contributions, while important, fail to comprehensively address the plethora of educational affordances offered by formal education. This review points towards a parallel theory for explaining the development and sustenance of students' ability beliefs (i.e. perceived control theory). Specifically, this review suggests that the related Self-System Model Motivational Development (SSMMD) is a more comprehensive means of explaining self-efficacy in classrooms. This model provides a theoretical mechanism for partially explaining the contribution of teacher clarity and feedback to student achievement, mediated by self-efficacy which will be treated as one specific type of perceived control. This review includes an adapted version of SSMMD for structuring research in this area and a detailed table for instructional implications arising from the connections suggested. This review concludes with two 'recipe cards', which provide clear directions for testing the updated model, and its mediated connections and outcomes.

Keywords Feedback · Teacher Clarity · Self-efficacy · Perceived Control Theory

This article is part of the Topical Collection on *Hybridizing Motivational Strains*

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During the past two decades, meta-analyses have slowly grown in prominence (Alexander, 2020; Sipe & Curlette, 1996) and have rapidly mapped the relative alignment of educational covariates with achievement. Their ability to compare the relative relationship between a wide range of variables and achievement has been central to their contribution (Lipsey & Wilson, 2001). The most recent decade has yielded meta-analyses and meta-meta-analyses, strengthening consensus about critical factors for teaching and learning in the specific context of higher education. While helpful, meta-analytic findings are limited by their correlational nature and their dependence on (the quality of) underlying studies. Meta-analyses are only able to weigh the relative importance of specific variables and thereby often lack a clear connection to theory and practice.

The growing number of published meta-analyses have made reviews of meta-analytic findings possible (e.g. Schneider & Preckel, 2017). Research of this kind has the potential to provide direction, driven as they are by specific questions. While this kind of research is a powerful means of making connections, it inherently lacks precise theoretical and practical direction. For meta-analytic findings comparing a broad array of constructs (e.g. Hattie, 2015; Richardson et al., 2012), an additional, strategic means forward might involve theoretical consolidation (i.e. theoretical integrative reviews). By organising constructs that have consistent and robust connections to achievement, a new wave of construction might build on meta-analytic foundations, especially when using models with strong theoretical underpinnings that stipulate causal and reciprocal linkages.

When linking teaching interventions to student variables, more insight is provided into how impactful an intervention is likely to be and why it has impact. Both teacher and student perspectives should be united in such efforts. Only by connecting the meta-analytic outcomes can we draw a complete picture about how to promote student achievement. Established psychological theories are in a strong position to connect the key variables highlighted by meta-analytic work. Constellations that result will be well situated to drive best practice and future innovation in both practical and research arenas.

The current organising theoretical review focuses on two teaching constructs and one student construct that have consistently been identified as important correlates of achievement in higher educational research and practice (Hattie, 2015; Richardson et al., 2012; Schneider & Preckel, 2017): feedback, teacher clarity, and self-efficacy beliefs. Empirically, these areas of research can overlap but are generally investigated separately. To illustrate, feedback and teacher clarity are both recognised aspects of teacher's structuring approach in Self-Determination Theory (SDT; Ahmadi et al., 2022), and their relationship with competence beliefs is indicated repeatedly within SDT-papers (e.g. Vansteenkiste et al., 2020). However, both feedback and teacher clarity have become siloed research areas in which those insights from SDT are rarely used. Recent reviews on feedback, for example, took feedback models as a starting point (Lipnevich & Panadero, 2021; Panadero & Lipnevich, 2022), ignoring other research areas in which empirical evidence is collected on (the effectiveness of) feedback processes, like SDT. Researchers in these areas commonly draw on very specific—rarely overlapping—theoretical and empirical literatures when framing their studies. As a result, although many might recognise

these meta-analytic findings as being related, an organising and focusing theoretical framework is necessary for researchers and educators to engage with them together. Insights into how these constructs work together will make effective study and application of those processes feasible.

In the present organising review, we build on existing theories in order to explain reciprocal interactions between the educational context (i.e. instruction and curricula), personal appraisals (i.e. self-efficacy), and behavioural processes (i.e. studying) within higher education. This organising conceptualisation will present a case for the organising and focusing power of Bandura's social cognitive theory (Bandura, 1977), perceived control theory (Connell, 1985, 1990), and the Self-System Model of Motivational Development (SSMMD; Skinner & Belmont, 1993) as optimal framing tools. This Special Issue's first aim (supporting cross-fertilisations across theories) is at the heart of the present organising review. This cross-fertilisation will address the special issue's second question by seeking to fill in the gaps in the models reviewed.

The present organising review is presented in three sections; the first introduces and briefly reviews the constructs (feedback, teacher clarity, and self-efficacy), theories (social cognitive theory and perceived control theory), and models (Reciprocal Determinism and Self-System Model of Motivational Development). The second section provides both the rationale and organisation of an organising model to bring these components together. This review will conclude with a discussion of the theoretical and practical implications for the organising model and explicitly address the remaining questions that guide this special issue.

Three Latent Teaching–Learning Constructs That Arise From Meta-analyses

The present theoretical organising review seeks to align three latent teaching–learning constructs from siloed research areas: teacher clarity, teacher feedback, and self-efficacy beliefs. This review will seek to build on findings of one meta-analysis (Richardson et al., 2012), one meta-meta-analysis (Hattie, 2015), and a review of meta-analyses (Schneider & Preckel, 2017). Each of these articles brings a unique but often overlapping perspective to the three constructs, which are the focus of the current conceptualisation. Their specific meta-analytic findings will be summarised following a brief general review of teacher clarity, feedback, and academic self-efficacy.

Teacher Clarity

Research highlighting the central role of teaching clarity was thriving decades before meta-analyses brought it to the forefront. Early broad (Rosenshine, 1971, 1978) and higher education–specific (Feldman, 1977, 1978) reviews highlighted many facets of teacher clarity (Bush et al., 1977), such as written/verbal explanations, presenting clear learning goals, verbal fluency, and organising student work.

This early research and research done since has been driven by pragmatic concerns. This is particularly the case in higher education, where teaching is formally evaluated. Questions focusing on how to evaluate instructors/instruction and construct/predictive validity (Marsh, 1987) have remained at the pragmatic heart of this area of research.

Both Hattie (2015) and Schneider & Preckel (2017) conclude that teacher clarity has a strong relationship with students' achievement during higher education. Their meta-meta-analysis and review of meta-analyses both point back to the rich and longstanding tradition of research in this area. Schneider & Preckel (2017) highlights the important role of teacher clarity, noting that small improvements to teacher clarity, and its constituent parts (e.g. presenting clear learning goals and beginning teaching units with advanced organisers), can meaningfully enhance learning. This is consistent with the broader history of work on teacher clarity and related aspects of instruction, which are often directly translated to practice-orientated articles (e.g. Rosenshine, 2012).

Teacher Feedback

Since Hattie & Timperley's (2007) review of meta-analysis drew attention to the power of feedback, provision of feedback has become an increasingly popular teaching strategy in higher education. However, beginning in the 1960s and 1970s, the effect of feedback on student's achievement was recognised and actively researched (Kulhavy, 1977). In those early studies, feedback was conceptualised as information about the correctness of the instructional response of the student, often referred to as 'knowledge of response' or 'knowledge of the correct response' (Kulhavy, 1977). Given this early feedback research, in which the focus was on the information that is provided with feedback, it is not surprising that both in feedback research and in practice, a search was conducted to find the optimal feedback ingredients to support students' learning (Ajjawi & Regehr, 2019; Chong, 2021). Suggestions were formulated about the kind of feedback a teacher should provide to facilitate students' uptake of it (e.g. Kulhavy & Stock, 1989; Shute, 2008). According to Schneider & Preckel (2017), the nature, quality, and frequency of feedback have a medium relationship with students' achievement. However, those feedback characteristics were ineffective when conditions were not optimal to activate students' engagement with feedback (Boud & Molloy, 2013; Evans, 2013; Middleton et al., 2020).

The current paradigm for feedback has shifted from teacher-centred to student-centred and from transmission-oriented to process-oriented (Ajjawi & Regehr, 2019). Feedback is no longer seen purely as progress information that a teacher provides to a student but as a process that is organised by the teacher and involves both teacher and student (Carless & Boud, 2018). Students' role in feedback processes is recognised, with attention is drawn to students' feedback literacy (Carless & Boud, 2018; Noble et al., 2020; Sutton, 2012) and attitudes (e.g. feedback beliefs; Winstone et al., 2021).

Self-efficacy

Self-efficacy is narrowly defined as an individual's belief in their ability to affect actions that yield the successful completion of a future task or goal (Bandura, 1997). While the classic definition limits self-efficacy to a specific task, self-efficacy beliefs are commonly measured at the course level (i.e. a sustained, consistent series of learning experiences). In support of operationalisations of self-efficacy across sustained engagements in specific area, Bandura (2012) has noted that

> judgments of self-efficacy for pursuits like academic achievement, organizational productivity, entrepreneurship, and effecting social change encompass activities of broad scope, not just an isolated piece of work. Moreover, strength of self-efficacy is measured across a wide range of performances within an activity domain, not just performance on a specific item. (p. 17)

This definition does not stretch to support generalised self-efficacy (e.g. for school or a subject of study). Generalised self-efficacy is widely seen as either ineffectual (i.e. too distant from task experiences; Schunk & DiBenedetto, 2020) or entirely inconsistent with social cognitive theory's model of persistent behaviour in the face of challenge (Bandura, 1993). For this reason, the present review constrains the scope of self-efficacy to a task or series of related tasks. In the context of higher education, these levels refer to tackling anything from a specific problem, to a semester or year-long course.

Since the early 1990s, self-efficacy has been widely recognised as a powerful predictor of engagement and academic success (Bandura, 1993). While it has long been a mainstay for belief-related management research (Bachman et al., 2021; Newman et al., 2019), it has experienced a period of low educational research activity but undergoing a small resurgence with reviews (Honicke & Broadbent, 2016; Schunk & DiBenedetto, 2020; Schunk & DiBenedetto, 2020) and meta-analyses highlighting its critical role in achievement and learning processes.

Richardson et al. (2012) presented the first major meta-analytic review of the comparative role of individual differences in psychological processes within learning during higher education. Consistent with a broad body of research (Honicke & Broadbent, 2016; Schunk, 1989), Richardson et al. (2012) established the critical role of students' perceptions of their ability to succeed in learning: self-efficacy beliefs (Bandura, 1993), partially mediated by grade goals (Chen et al., 2000). Schneider & Preckel (2017) drew on 38 meta-analyses for their review (including Richardson et al., 2012), investigating 105 correlates of achievement. Consistent with Richardson et al.'s findings, Schneider and Preckel found self-efficacy and grade goals were both very strong correlates of achievement (ranked no. 2 and no. 5, respectively).

Self-efficacy's robust relationship with learning outcomes is partly due to its clear forward focus and pairing of two beliefs about the relationship between the self and task outcomes. Self-efficacy is built on outcome and efficacy expectations (Bandura, 1977). Outcome expectations represent contingency (Bandura, 1977; Skinner, 1995): 'The connection between an individual's effort and desired and undesired outcomes' (Skinner, 1995, p. 59). Contingency is about the expectations

that behaviour will result in corresponding outcomes. Self-efficacy expectations are about whether persons expect that they themselves can successfully perform the behaviour to reach the outcomes (Bandura, 1977).

Connecting the Teaching–Learning Constructs

Self-efficacy-related latent constructs are important factors for achievement in higher education. However, connective theories are necessary to connect self-efficacy to classroom practices. Current connective theories provide only a few explanations of the causal factors in class/course learning and instruction that shape self-efficacy. Bandura (1993) gave general recommendations for the enhancement of an individual's self-efficacy beliefs: (1) through experiences of success which give a sense of mastery (i.e. mastery experiences), (2) by watching or hearing about successful experiences of others (i.e. vicarious experiences), (3) by having successful behaviour modelled (i.e. modelling experiences), and (4) by having other provide support and encouragement orally (i.e. verbal persuasion). These recommendations have been integrated into interventions across various human activities (see Short & Ross-Stewart, 2008; Schunk & Ertmer, 2000; Marks & Allegrante, 2005). Research along these lines has yielded some direction for teaching and learning (Schunk, 1985; for a recent review see Schunk & DiBenedetto, 2020). However, it has failed to meaningfully integrate with cognate research seeking to enhance the quality of teaching and learning. This has left what are clearly central components of the learning process woefully underutilised.

Moreover, the impact of teacher clarity and feedback on students' achievement is highlighted in many meta-analyses, meta-meta-analyses, and reviews of meta-analyses (e.g. Hattie & Timperley, 2007; Kluger & DeNisi, 1996; Shute, 2008; Witt et al., 2004); however, we lack a comprehensive theory about *how* these teaching and instruction strategies contribute to students' achievement. One theoretical construct that encompasses both teacher clarity and feedback (amongst other elements) is *structure*, a construct central to theories of perceived control (Connell, 1985, 1990; Skinner, 1995). Structure refers to contextual factors (e.g. teaching approaches) that provide information and support to lead students to desired outcomes, which reinforce students' experiences of effectiveness and self-confidence (Skinner, 1995). In addition to teacher clarity and feedback, communicating clear and positive expectations and offering step-by-step instruction and guidance are seen as aspects of teachers' structuring approach (e.g. Leenknecht et al., 2017). Conceptualisation of these components of teaching as 'structure' has primarily been applied to the earlier years of formal education (Jang et al., 2010; Skinner & Belmont, 1993), primarily by SDT researchers. However, more recent research (Fryer & Bovee, 2020; Leenknecht et al., 2017) has suggested that structure also readily applies to teaching and learning during higher education.

Preliminary evidence has pointed to direct longitudinal connections between a common classroom form of feedback/teacher clarity (formative assessment) and self-efficacy (Fryer et al., 2021; Rakoczy et al., 2019). Further research employing structure has also posited longitudinal linkages to students' self-efficacy (Fryer

& Oga-Baldwin, 2019). Structure, and its fundaments in perceived control theory therefore, has the potential to function as connecting lines between the unconnected variables from meta-analyses presented to this point.

Structure as part of the broader concept of need-supportive teaching has been studied extensively in SDT literature (see Ahmadi et al., 2022; Stroet et al., 2013; Vansteenkiste et al., 2020). Robust results indicate that the provision of structure by teachers results in satisfaction of students' basic psychological needs and consequently engagement and achievement. This puts SDT in a good position to (1) confirm the link between teacher clarity and feedback (i.e. aspects of the educational context) and students' self-appraisals (e.g. perceived competence or self-efficacy); and (2) explain how these teaching approaches contribute to students' achievement. Students' self-appraisals are seen as a linking pin between the educational context and students' achievement. Where SDT does not help is in explaining *how* teacher clarity and feedback (as part of the teachers' structuring repertoire) contribute to students' self-appraisals. Teacher motivational behaviour, including teacher clarity and feedback, can be listed, but the relative importance of the behaviours is hard to distinguish (Ahmadi et al., 2022), especially in those studies that use general measures of teachers' structuring approach or style. For that reason, the focus in the current review is on two task-specific teaching approaches (i.e. teacher clarity and feedback). Moreover, the presumed independency of the three dimensions of need-supportive teaching (i.e. autonomy support, structure and involvement) can be questioned, as students' perceptions of teaching approaches were found to be intertwined (e.g. Fryer & Oga-Baldwin, 2019; Leenknecht et al., 2017), and the teaching approaches were not always found to solely support the corresponding need (e.g. Vansteenkiste et al., 2020). SDT therefore falls short in explaining the mechanisms between teaching approaches (i.e., educational context) and students' self-appraisals.

Organising Model: Under the Umbrella of Perceived Control

Perceived control can be defined as a self-appraisal of one`s control over a specific situation or process. It refers to the connection between actions and outcomes and is the extent to which a person feels capable of producing desired and preventing undesired events (Skinner, 2021, personal communication). In conceptualisations of perceived control, three beliefs sets are distinguished (Skinner, 1995): control beliefs ('If I want, I can be successful'); strategy beliefs ('If I want to succeed, I have to apply this strategy'); and capacity beliefs ('I am capable of succeeding').

Perceived control constructs, such as Locus of Control (Lefcourt, 1966), Attribution (Weiner, 1979), Self-efficacy (Bandura, 1977), Level of self-determination, and satisfaction of basic psychological needs (SDT; Deci & Ryan, 1985), can trace their conceptual framing back through seminal psychological research through Rotter (1966) and the review by White (1959), which is often referred to as a wellspring for much of our modern theorising about motivation and competence (Elliot et al., 2017; Koestner & McClelland, 1990; Skinner, 1996). Building on this robust psychological theorising, Skinner (1995) adopted an inclusive

framework, the SSMMD (Connell & Wellborn, 1991), drawing on principles brought together within Self-Determination Theory (Deci & Ryan, 1985) that addressed the practical realities of formal education (e.g. feedback and teacher expectations) all from the students' perspective (Skinner, 1995). These theoretical connections make this conceptualisation of perceived control useful to frame and focus our growing understanding of crucial but seemingly theoretically disparate factors for learning during higher education.

There are four strong arguments for modelling self-efficacy within this larger conceptualisation of perceived control and thereby within the SSMMD framework, three theoretical, and one practical. The first is recognising that self-efficacy, along with many other competency beliefs (e.g. attribution, locus of control, competence satisfaction), is a type of perceived control (Skinner, 1995). The second, Schunk (1991) seated self-efficacy neatly within perceived control theory SSMMD framework by positing that self-efficacy is a capacity belief (one of three sets of control beliefs posited). The third is the theoretical foundation on which the SSMMD and Bandura's Reciprocal Determination model are built: Contingency ('The connection between an individual's effort and desired and undesired outcomes'; Skinner, 1995, p. 59). Contingency, specifically a contingent learning environment, is necessary for Bandura's and the SSMMD model to work. The final practical argument for seating self-efficacy within the broader construct of perceived control and conceptualising its functioning in the manner suggested by the SSMMD is that Bandura's broad model necessarily was not designed to engage with the highly structured, idiosyncratic nature of classrooms and the affordances they were designed to lend learners. Classrooms present barriers to Bandura's suggested means of enhancing self-efficacy (e.g. they often are not designed to provide mastery experiences), while at the same time they can provide highly structured, repetitive means of potentially supporting students' self-efficacy (consistent feedback about progress, ample modelling by teachers and peers).

In tandem with this integrative perspective, Bandura's model for demonstrating how self-efficacy changes over time can be viewed through the SSMMD classroom model. In fact, the step from Bandura's model of reciprocal determination to the SSMMD is a small one (see Figs. 1 and 2). As described in the SSMMD, 'self-system processes' can be plotted in a chain from context to self to action to outcomes (Connell & Wellborn, 1991; Skinner & Belmont, 1993). Central to SSMMD and all perceived control constructs is the notion that a person constructs appraisals about the self in interaction with the context (Connell & Wellborn, 1991), which function as personal resources for motivation and engagement (Skinner et al., 2008). Self-appraisals are 'cognitive structures that provide reference mechanisms and … a set of subfunctions for the perception, evaluation, and regulation of behaviour' (Bandura, 1978, p. 348). The self-appraisals that are built upon mastery experiences determine a person's feeling of being efficacious (i.e. perceived personal control; Connell & Wellborn, 1991; Skinner & Belmont, 1993). In implementing his Reciprocal Determinism Model, Bandura (1978) pointed out that self-appraisals are more than just an intermediate link within a chain of causal events. Instead, a person's self-appraisals, behaviour, and events from the context reciprocally affect each other (see Fig. 1). The individual is embedded in a context

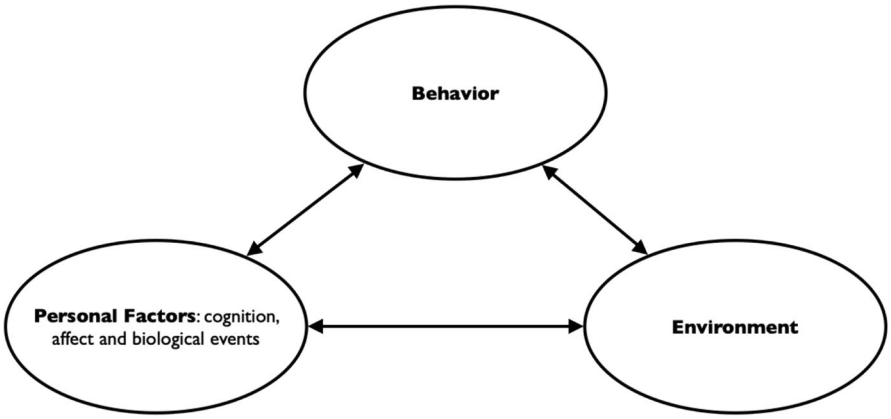

Fig. 1 Bandura's Reciprocal Determinism model

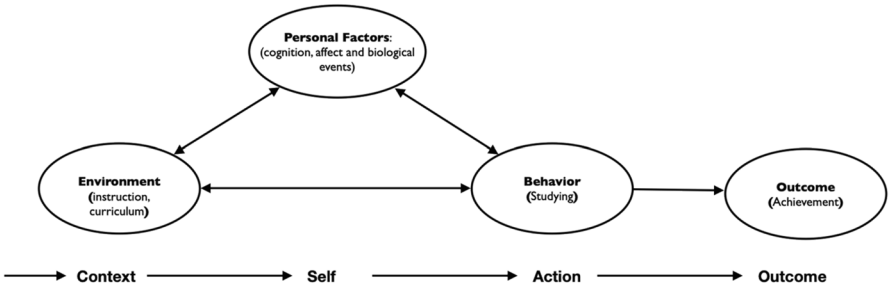

Fig. 2 Explaining the impact of classroom environments within Bandura's Reciprocal Determinism and the Self-System Model of Motivational Development

that directly affects intra-psychic and physical behaviours, while the individual is constantly adjusting their self-efficacy based on the outcomes resulting from behaviours. Based on this model, students who feel more efficacious are more likely to demonstrate persistent behaviour that increases the likelihood of positive outcomes. These outcomes and the broader environment (e.g. peers and teachers) can impact students' behaviour directly (e.g. via coaching) or support students' self-efficacy (e.g. via modelling, supporting mastery experiences, or highlighting vicarious experiences).

Transitioning from Bandura's Reciprocal Determinism model to the classroom entails addressing the broad array of affordances (e.g. teacher instruction and set curricula) and constraints (e.g. strict schedules and lack of choice). As reviews seeking to meld socio-cognitive theory with classroom practice have noted (e.g. Bandura, 1993; Honicke & Broadbent, 2016; Schunk & DiBenedetto, 2020), Bandura's model can yield specific insights in areas such as modelling and goal-setting. Yet, Bandura's Reciprocal Determinism Model is not well positioned to explain the classroom experience comprehensively. However, with just

slight adjustments, the Reciprocal Determinism Model can be combined with the Self-System Model of Motivational Development, yielding a new organising model that explains how and why teaching approaches and students' self-efficacy affect students' achievement (see Fig. 2). Critical linkages within the model are (1) the Environment, which includes factors under the teacher's control (instruction/curricula) and aspects less under the teacher's control (peer interactions); (2) Personal Factors which include cognition, affect, beliefs (e.g. self-efficacy), and biological events; and (3) Behaviour, which in the context of formal education is mainly concerned with how students engage in learning (i.e. paying attention in class, expending effort on academic tasks, studying inside and outside of the classroom). In Bandura's model of reciprocal determinism, the Behaviour component is the outcome, and its reciprocal effects arise from intra-individual interpretations of the behaviour and its outcomes. However, when learning at school, Behaviour (e.g. studying) is consistently measured. Therefore, the learning or achievement can be conveniently disaggregated from the behaviour component and modelled as being distinct from Behaviour.

Aside from this disaggregation and slight revisions to the model components, the key contribution of SSMMD to Bandura's Model of reciprocal determinism is the additional connection from Environment (i.e. context) to Personal Factors (i.e. self-system appraisals). The SSMMD proposes that the instructor, directly through teaching or indirectly through curricula and interpersonal climate, can support students' perceived control (and therefore their self-efficacy) through the provision of structure. The details and implications of the organising model are reviewed next (Fig. 2).

Reciprocal Determinism in Classrooms

In Bandura's model of Reciprocal Determinism, self-efficacy is positioned as a personal process that affects environmental and behavioural processes and is in turn affected by them (Bandura, 1993; Schunk & DiBenedetto, 2020). Based on the reciprocal nature of the processes and on the two building blocks of self-efficacy (i.e. [1] outcome and [2] efficacy expectations), we can distinguish two two-way pathways through which teachers can support students' self-appraisals of self-efficacy: [1a] Creating contingent environments; [1b] Contributing to interpretations of contingency; [2a] Supporting mastery experiences; [2b] Contributing to interpretations of efficacy. Pathways 1a and 1b contribute to experiences of contingency (i.e. outcome expectations), while pathways 2a and 2b contribute to efficacy experiences (i.e. competence). The pathways with the suffix *a* describe pathways in which a teacher creates the right conditions for students to experience self-efficacy, while the pathways with the suffix *b* describe how a teacher can support students in making self-appraisals of their own effectiveness. In Table 1, the mechanisms described by Skinner (1995), the recommendations by Bandura (1993), and advices by Schunk (1985) are assigned to the four two-way pathways.

Table 1 Pathways of teacher support of students' self-appraisals of self-efficacy

	Skinner's (1995) mechanisms	Bandura's (1993) recommendations	Schunk's (1985) advice
Pathway 1a Creating contingent (learning) environments	- Contingency - Help		
Pathway 1b Contributing to interpretations of contingency		- Modelling experiences - Verbal persuasion	- Offer opportunities to observe other students - Pass on persuasive information
Pathway 2a Supporting efficacy experiences	- Expectations	- Mastery experiences - Vicarious experiences	- Classroom performance provide valid information regarding personal mastery
Pathway 2b Contributing to interpretations of efficacy	- Translations	- Verbal persuasion	- Pass on persuasive information - Physiological experiences

[Pathway 1a] Creating Contingent Learning Environments

A teacher can set the right conditions by designing learning activities and tasks that are aligned with the learning objectives, that is, selecting a series of academic tasks that will cumulatively help students to reach the learning objectives, scaffolding tasks so that they are within students' current capacities, and providing the level of support or help students need to be capable of performing the actions (i.e. Vygotsky's zone of proximal development; Vygotsky, 1987). Teacher help will be supportive to the extent that it offers the resources needed to attain the learning objectives and provides effective strategies for applying those resources (Skinner, 1995; see also Leenknecht et al., 2021). Aspects of teacher clarity that create contingent learning environments are organising student work (Bush et al., 1977) and beginning teaching units with advanced organisers (Schneider & Preckel, 2017). Moreover, teachers can create contingent learning environments by organising feedback processes that are related to the learning objectives and focused on self-regulation or self-evaluation of students (Hattie & Timperley, 2007).

[Pathway 1b] Contributing to Interpretations of Contingency

Contingent environments do not guarantee that students' outcome expectations will be accurate. Multiple kinds of misinterpretations and inadequate self-appraisals are apparent (as described, for example, in attribution theory; Weiner, 1979). Bandura (1993) described two recommendations to support students in making accurate self-appraisals: By having successful behaviour modelled (i.e. modelling experiences) or by having others provide support and encouragement orally (verbal persuasion). Also, Schunk (1985) suggests that classrooms offer considerable opportunities to observe other students, and he discusses the ample opportunity teachers have to pass

on persuasive information. Of course, both modelling and verbal persuasion should be focused on the relationship between a student's actions (i.e. means) and outcomes (i.e. ends) to contribute to interpretations of contingency, with a particular focus on the nature of effective actions. Teacher clarity and feedback can reinforce each other when feedback uptake is modelled to students to make sure they know to detect clues for contingency.

[Pathway 2a] Supporting Efficacy Experiences

According to Bandura (1993), students can experience self-efficacy through experiences of success which give a sense of mastery (i.e. mastery experiences), or by watching or hearing about successful experiences (i.e. vicarious experiences). Teachers can support the efficacy experiences of students by stimulating actions through communicating expectations (Skinner, 1995). Those expectations tell the students what action they can take and encourage involvement in actions that result in efficacy experiences. Teachers can provide and discuss clear learning objectives with students (Bush et al., 1977), provide feed-up (Hattie & Timperley, 2007), and allow students to familiarise themselves with the learning objectives and assessment criteria (e.g. with a dialogue about exemplars; Carless & Chan, 2017).

[Pathway 2b] Contributing to Interpretations of Efficacy

Besides involving students in activities and actions that allow them to experience efficacy, teachers can also contribute to students' interpretations of efficacy. Skinner (1995) argues that a teacher can help students to interpret learning progress by supporting translations: 'contributions of the social context to the interpretation of control episodes' (Skinner, 1995, p. 63). With translations, students' control beliefs are evaluated and consolidated. Teachers provide students with evidence for their success or failure, which confirms their efficacy (Skinner, 1995). Feedback is an optimal tool for teachers to help students with translating experiences into efficacy experiences, especially when the feedback is accompanied by a clear conclusion about the mastery level of the student. Moreover, by supporting evaluative judgements (Tai et al., 2018), teachers can equip students to make adequate interpretations about their own efficacy. Schunk (1985) adds to this by noting that across these kinds of classroom experiences, students might acquire some additional self-efficacy related information from physiological experiences.

Organising Teacher Feedback, Teacher Clarity, and Self-efficacy: the Self-system Model for Self-efficacy in the Classroom

This conceptualisation examined three factors essential to linking strong meta-analytic correlates of achievement: teacher feedback, teacher clarity, and self-efficacy. Its contribution is threefold. First, the contention that self-efficacy is a type

of perceived control, specifically a capacity belief (Schunk, 1991; Skinner, 1995) with a powerful (Schneider & Preckel, 2017) proximal focus (Bandura, 1993), and by doing so bringing together self-efficacy and need for competence. Second, viewing Bandura's theory of Reciprocal Determinism through the SSMMD yields a clear lens for examining the impact and pathways of specific classroom interactions on students' behaviour, self-efficacy, and learning outcomes, beyond contemporary theories like SDT. Third, through its structure component, this same model encompasses and provides a theoretical home and rationale for the importance of teacher clarity and feedback. Based on these steps, we constructed a model presented in Fig. 3 that organises and establishes theoretical directions for the three constructs being reviewed. This model provides powerful correlates of achievement with a causal, mediated framework for understanding their precise role within teaching and learning environments.

To briefly review Fig. 3's linkages, *Structure* can be viewed as an organisational construct that encompasses a range of means by which instructors and curricula inform students about and potentially enhance their perceptions of their ability to be successful in a specific learning environment. *Pathways 1* and *2* connote the direct contribution of structure to students' perceived control in the classroom (as discussed above). Within the broad construct of perceived control, self-efficacy is a forward-focused, proximal capacity belief that contributes to sustained (or persistent) student engagement (*Pathway 3*). Consistent with both SSMMD and Bandura's model, sustained engagement with learning content/tasks is expected to contribute to learning outcomes (i.e. achievement; *Pathway 4*) that feed back into the system. These learning outcomes support both students' self-beliefs (*Pathway 5*) and potentially guide instructors in their future classroom behaviour (i.e. formative feedback for instructors: *Pathway 6*).

Implications for Theory

The focus of our conceptualisation has been to situate self-efficacy within perceived control theory, thereby affording educators with a wider variety and potentially powerful set of pedagogical tools for enhancing these potent self-beliefs during formal education (Special Issue question no. 1). The concept of structure is the chief amongst these tools. While simple, i.e. any aspect of a teaching–learning environment which enhances students' perception of control over their learning, it can also take a myriad of shapes that might not be obvious to all educators. The contribution of the different aspects of structure to students' self-efficacy beliefs is an open question. However, aspects that align with or extend Bandura's original themes (e.g. Mastery experiences) are a firm base for designing and testing hypotheses. Elements of structure, such as supporting students in staying within their zone of proximal development (e.g. a structure item: 'My teacher makes sure I understand before he/she goes on' vs a chaos item: 'My teacher begins new things before he/she makes sure I have learned the old ones'; Leenknecht et al., 2017; Vansteenkiste et al., 2009), enhance students' mastery experiences. Perceived control theory through

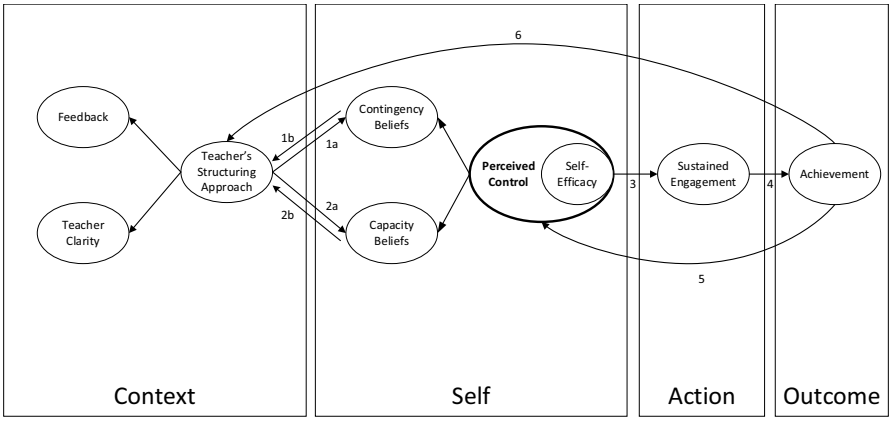

Fig. 3 The self-system model for self-efficacy in the classroom: framing feedback and teacher clarity within the SSMMD and mediating their impact through self-efficacy'

structure offers an array of instructional pathways (see Table 1; Skinner, 2021, personal communication) that provide universal explanations for the effectiveness of teaching approaches and might be worthy of rigorous testing for their short- and long-term impact on students' self-efficacy (SI question no. 2).

Neither Teacher Clarity nor Feedback evolved as teaching and learning constructs from a cohesive psychological theory. Feedback coalesces around different weakly connected models (e.g. Carless et al., 2011; Hattie & Timperley, 2007; Lipnevich & Panadero, 2021). Like Teacher Clarity, feedback is primarily the product of inductive development from reasoned observation and investigation through a variety of practical lenses. The question is then, how do these constructs practically benefit from being situated within perceived control theory? The two most obvious benefits are that by connecting them to a critical mediator of learner persistence and thereby achievement (i.e. self-efficacy beliefs), perceived control theory clarifies how these constructs affect the learner and learning outcomes. This sharpens their aims and offers direction regarding more sophisticated interventions and statistical modelling, moreover by providing a robust psychological theory as a backboard for tests and refinement. Through scientific exploration, the advance of human understanding must pass through hypotheses, which are not possible without a robust theory. By providing such a theory, one that stretches to fit the complex experience of classroom teaching and learning, perceived control offers substantial opportunity for the test and refinement of these constructs (SI question no. 3).

It is worth adding at this stage that considerable research (e.g. Jang et al., 2010; Sierens et al., 2009) has found that autonomy-support can enhance structure's contributions to learning and learning outcomes. By situating support for students' control beliefs within a broader network of emotional and motivational support, teachers can balance their efforts and provide a more secure foundation for students' efforts (SI question no. 4). The acknowledgement of the importance of this pairing is a reminder that teaching is not unidimensional and that the outcomes of formal education do not begin and end with achievement.

Our model (see Fig. 3) once more illustrates the similarity in motivating and didactic strategies. While sometimes studied strictly separately, it seems plausible that effective didactic strategies are motivating as well and vice versa. A research area where this artificial separation becomes prominent is formative assessment. In the growing number of process models of formative assessment (e.g. Antoniou & James, 2014; Kruiper et al., 2022; Ruiz-Primo & Furtak, 2007), strategies are incorporated that are similar to structuring strategies (see Leenknecht et al., 2021): i.e., communicating expectancies and success criteria, setting challenging tasks, and providing informative feedback. However, the student is often seen as the unit of analysis rather than an active agent (Boud et al., 2018), and the impact of the teaching strategies on students' mood and well-being is ignored. By placing perceived control and self-efficacy at the centre of our model, we acknowledge both teachers' and students' perspectives. Combining both perspectives could be a worthwhile aim for future theory building (SI question no. 6).

We see an important role for perceived control theories in bringing together the perspectives presented in this organising review. Bandura recognised what has come to be affirmed as one of the most important individual difference for achievement in formal education. However, in almost Aristotelian fashion, the clarity of his conception and the strength of his beliefs have held educational psychology, thereby educators, back from exploiting self-efficacy beliefs properly. The present conceptualisation contends that perceived control theory's extension of Bandura's model of reciprocal determinism clearly situates self-efficacy and its development in classrooms. This extension yields theoretical direction to modelling an array of instructional factors, from those at the heart of this conceptualisation (teacher clarity and feedback) to other learning outcome covariates which are highlighted by meta-analyses (e.g., formative testing and spaced learning). Perceived control theory can also provide a more robust framework for widely accepted initiatives such as Mastery Testing. By providing a more nuanced theory about how aspects of the learning environment affect perceptions of control, this theory also suggests directions for testing and then refinement of these broad teaching and learning initiatives (SI question no. 7).

Implications for Practice

Perceived control broadens the scope of self-efficacy from beliefs in one's ability to successfully perform a specific task to perceptions of control during a learning experience. This broader scope provides instructors with a more coherent perspective on students' learning experiences and bigger, more realistic targets for support. At the same time, it narrows socio-cognitive theories' wide-angle view on how human beings persist and learn from experience to how a specific environment can support individuals in maximising learning engagement. In addition to the specific exemplars drawn upon for this conceptualisation (teacher clarity and feedback), teachers are encouraged to apply other structuring approaches (see Ahmadi et al., 2022) and the broader principles of structure to their curricula and instruction:i.e., predictability and responsiveness (Skinner et al., 1998).

In our model, two feedback loops were included: (1) outcome and efficacy experiences feed back into students' self-appraisals of self-efficacy; (2) assessment of students' performance feeds back into successive implementations of teaching approaches. The structuring teaching approaches described in this conceptual paper require adjusting to students' actual level to be effective. Experiences of contingency and efficacy can only arise when properly aligned with students' previous experiences (Cordova et al., 2014). Assessment of students' achievement provides teachers' information to align their approach to those previous experiences. Besides insight into students' prior achievement, teachers need insight into students' prior outcome and efficacy beliefs, as teachers should not only support efficacy experiences and contingency, but also support students' interpretation of those experiences (Pathways 1b and 2b in Table 1).

Considering the reciprocal connections between teachers' structuring approach and students' self-appraisals and classroom actions, our conceptualisation (as summed up in Fig. 3) provides teachers with a lens to review the effectiveness of their teaching approach. Departing from the four pathways of reciprocal connections (as described in Table 1), specific advice can be formulated for teaching practice. To illustrate how the four pathways can contribute to specific advice on teaching practice, we analysed some common problems with teacher feedback and clarity in Table 2 and formulated specific advice related to the four pathways. For each pathway, we pointed out situations in which teacher feedback and clarity is not effective. Consequently, we provide advice for each ineffective situation to adopt more effective teaching approaches (see Table 2).

Major advantages for practice are that the four pathways are universal and can be applied to analyse the effectiveness of all possible teaching strategies beyond the scope of teacher clarity and feedback. By this means, the four pathways can function as a professionalisation tool for teachers in higher education. Once teachers understand the pathways and can apply them to their own situations, they can analyse and improve their own practice.

Limitations and Future Directions

A systemic limitation that needs to be acknowledged is the inherent weakness of reviews and meta-analyses like those drawn on as a headwater for the current study. As a map of achievement covariates, they provide a very narrow view of key factors for learning. That said, it is important to reaffirm that despite their narrow perspective, they are still invaluable as one of the only tools we have for compiling relationships about learning across time and context.

The present conceptualisation focused narrowly on higher education, chiefly because the meta-analyses it drew on were from that context. Neither the constructs modelled nor perceived control theory is specific to higher education, suggesting that the organising model is likely to apply to other levels of education. Further theoretical and empirical research is needed, however, before that can be stated with confidence.

Table 2 Example: testing the effectiveness of teacher's structuring approach with help of the four pathways

Teacher's structuring approach	Pathway 1a Creating contingent learning environments		Pathway 1b Contributing to interpretations of contingency		Pathway 2a Supporting efficacy experiences		Pathway 2b Contributing to interpretations of efficacy	
	Is not effective	*Advice*	*Is not effective*	*Advice*	*Is not effective*	*Advice*	*Is not effective*	*Advice*
Feedback	If feedback is focused on aspects that do not align with the learning objectives	- Provide feedback that aligns with the learning objectives	If students do not understand the feedback and do not know how to apply the feedback to reach the learning objectives	- Model how to use feedback - Make explicit connections to the LO's in the feedback - Provide "how to" feedback	If students are not well equipped to take up their role in the feedback process (i.e. feedback literacy)	- Use simple and clear feedback forms - Give students the opportunity to familiarise themselves with the LO's and assessment criteria	If teachers provide many feedback comments to help students, but the students interpret this negatively and think they have failed	- Provide a clear conclusion to students about the level of mastery - Only provide detailed comments for students to excel when they have asked for it or when this was agreed upon
Feedback	If processing the feedback does not help students to reach the learning objectives, i.e. students can reach the LO's without processing the feedback, or they are not able to reach the LO's even if they process the feedback	- Put feedback processes in service of the learning objectives. Feedback is not a task on its own; it is part of the series of academic tasks that help students reach the LO's	If the feedback does not reflect on students' actions and outcomes, i.e. the feedback does not provide insight on a past contingency	- Focus on students' actions in feedback	If feedback demotivates students	- Make the feedback process future oriented - Communicate positive expectations	If students are not able to interpret the value of the feedback	- Help student to develop their evaluative judgements - Be clear and precise in your appraisal of students work

Table 2 (continued)

Teacher's structuring approach	Pathway 1a Creating contingent learning environments		Pathway 1b Contributing to interpretations of contingency		Pathway 2a Supporting efficacy experiences		Pathway 2b Contributing to interpretations of efficacy	
	Is not effective	*Advice*	*Is not effective*	*Advice*	*Is not effective*	*Advice*	*Is not effective*	*Advice*
Feedback	If student is a passive recipient of feedback, as the student will not experience contingency of the own actions	- Prompt students to act effectively on feedback	If the feedback process is not explicitly linked to the LO's	- Design tasks in which students cooperatively explore the link between feedback and the LO's - Share exemplars of how feedback contributes to LO's				
Clarity	If tasks are not aligned to the LO's	- Develop learning tasks and instruction at a meta-level to ensure alignment to LO's	If students are not familiar with the LO's	- Stimulate active involvement in setting and understanding LO's in relation to the learning tasks	If learning tasks are too easy or too difficult	- Align learning tasks to students' prior achievement and/or implement options for differentiation	If goals are focused on products and not on the process, students will experience difficulty translating outcomes to their own efficacy	- Formulate LO's focused on the learning process, not on the outcome (product) - Incorporate failure into the learning task: the product does not have to be perfect if you have learned from your mistakes

Table 2 (continued)

Teacher's structuring approach	Pathway 1a Creating contingent learning environments		Pathway 1b Contributing to interpretations of contingency		Pathway 2a Supporting efficacy experiences		Pathway 2b Contributing to interpretations of efficacy	
	Is not effective	*Advice*	*Is not effective*	*Advice*	*Is not effective*	*Advice*	*Is not effective*	*Advice*
Clarity			If students do not understand success criteria	- Make use of exemplars to support students' understanding of success criteria	If students' role in the learning tasks is exchangeable	- Make sure tasks can only succeed with students' effort - During group work: design tasks in which students experience shared responsibility for success		

Note. LO = learning outcome

The bulk of the direction drawn from perceived control theory as a bridge from teacher clarity and feedback to self-efficacy has traced lines from the teachers and the environments they create to students' beliefs. The role of peers, positive and negative, in affording students' structuring experiences, needs to be considered for a full picture of learning experiences to be conveyed. This broader discussion of structure and self-efficacy beliefs support should be had while seeking to adapt the presented model to other levels of education.

Moreover, the presented model could unintentionally suggest that context factors, like teaching strategies and peer interactions, determine students' self-appraisals of perceived control. However, each new experience contributes to our self-appraisals (Deci & Ryan, 1985), so we should also acknowledge the impact of prior self-appraisals and knowledge on building new appraisals about the self. What we know from previous situations can colour our perceptions of a new situation. Therefore, we recommend studying the effect of prior knowledge on students' self-efficacy in more depth, especially in relation to the effect of teaching approaches.

As a final limitation to the present conceptualisation, it is worth pointing out that incorporating the perceived control framework and its implications for self-efficacy does not limit the power of Bandura's original contentions regarding self-efficacy's support. The present organising model sought to make the connections between perceived control theory and social cognitive theory clear. Furthermore, the aim of this conceptualisation was to enhance the situatedness of self-efficacy, clarifying how formal education's specific environments can support self-efficacy development and thereby enhance learning. Future research building on the presented model and working at the task level will be in a strong position to enhance both practice and theory going forward.

Conclusions

This conceptualisation examined three factors essential to linking three powerful meta-analytic correlates: feedback, teacher clarity, and self-efficacy. Perceived control theory (Skinner, 1995) provided a coherent map for educators and educational researchers for supporting student's achievement. The SSMMD (Skinner, 1995) and Bandura's (1978) theory of Reciprocal Determinism form the backbone of our model (see Fig. 3).

Knowing what you are trying to affect is half the battle. Powerful facets of education like teacher clarity and feedback are wasted if their aims are not clear. Without outcomes, there is no means of assessing their effectiveness. Neither of them directly affects achievement; like so many educational constructs, their outcomes are other latent individual differences that are neither clearly theorised nor measured.

The four pathways that we distinguished in supporting students' self-appraisals can be powerful tools to design and evaluate education. As demonstrated in Table 2, problems encountered in practice can be framed within perceived control theory and resolved through the four pathways hypothesised.

With our conceptualisation, we showed that it is best to study and apply teaching strategies while considering the effects on students' self-appraisals. We advise

uniting the perspective of teacher and student in studying the effectiveness of a teaching strategy. The teaching strategy and its effectiveness are determined by students' interpretation and experience, while students' experience also determines the most effective teaching strategy.

Recipe Cards for Future Research

Statistically Testing the Model

Background: The conceptual model (Fig. 3) suggests causal, mediated relationships between teacher clarity and feedback (as sources of structure) to sustained engagement through to achievement. The mediating role of self-efficacy for these latent instructional experiences needs to be modelled longitudinally

Aims: Model the mediated impact of students' perceptions of feedback and teacher clarity on their future course engagement and achievement through their self-efficacy beliefs for learning in the course

Methods: Two approaches to design might be used to address these aims. First, a large scale (minimum > 300) longitudinal study with separate (temporally spaced) data collections for structural components, self-efficacy, engagement, and achievement should be undertaken. The resulting data should be analysed in a latent structural model, controlling for gender and prior achievement. Second, a more exacting design with a similarly large-scale sample, which meaningfully addresses change, would include multiple data points (> 3) for each self-efficacy and observed engagement. These would enable the modelling of Latent Growth Curves for both variables, which could be included in the same latent SEM. The resulting SEM would provide a more accurate sense of the mediated impact of these structuring components (perceptions of feedback and teacher clarity) on the development of key mediating latent variables across time and their effect on learning outcomes

Designing for Perceived Control

Background: The conceptual model (Fig. 3) and pathways (Table 1) in supporting students' perceived control provide a framework for designing effective courses and curricula that result in motivated and high-performing students. However, the step from a conceptual model to practice can be hard to take. A first attempt is made in Table 2, but more research is needed to translate our model to practice

Aim: Providing teachers guidelines to translate the model to practice in a participatory design

Method: Four teaching teams design a course with special attention for students' perceived control, based on the four pathways. The design is documented and evaluated by the research team and analyses of the level of supportiveness of the design are executed, following the four pathways. Effectivity of the design is evaluated in a pre-test post-test design, measuring students' perceptions of self-efficacy, their own engagement, and by measuring their performance. Four contexts are compared with each other with meta-analyses to determine working design principles

Appendix

Appendices 1. Special Issue Questions.

1. What happens when you cross-fertilize your chosen models/theories? What are the points of convergence, divergence that existed, and the creative synthesis that results?

2. What are some complementary gaps that might be addressed through integrative synthesis of established theories?

3. How does the learning environment interface with individual differences in your integrative model?

4 Are there competing theories/models (e.g., variables/processes that do not work well in one theory but might work better in another theory) and how does your integrative model shed light on these perspectives?

5. What does your integrative model have to say about construct validity and predictive validity (i.e., overlap in constructs, how constructs meaningfully predict learning outcomes)?

6. What are the fundamental meta-theoretical, ontological, and epistemological bases of your chosen theoretical approaches? How do you reconcile them with each other?

7. What are the boundaries/boundary conditions across the theoretical models? When is it helpful to integrate or when is it helpful to stay within one theoretical model? When is integration unhelpful?

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