Achievement Goal Complexes:

Integrating the "What" and the "Why" of Achievement Motivation

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> "The origin of psychology's conceptual difficulties is to be found in part in the fact that the subject is young as a science but old as a topic of investigation" (Duffy, 1941, p. 178).

A core part of personality are the goals and reasons that drive individual behaviors. In the present chapter, we focus on the achievement domain and discuss how achievement goals and reasons behind achievement goals can predict achievement behaviors. The achievement goal framework focuses on the question of *what* is competence and provides information regarding the psychological *direction* of achievement behavior (i.e., toward or away from a particular standard of [in]competence; Elliot, 1999). However, a complete, coherent, and operative theory of achievement motivation must also address the question of *why* one wants to be competent and provide information regarding the *energization* of achievement behavior (i.e., the reasons behind achievement goals; Deci & R. M. Ryan, 2000; DeShon & Gillespie, 2005; Elliot, 1999; Sheldon, 2004).

In recent year, scholars have shown a growing interest in studying *achievement goal complexes*, that is, the combinations between an achievement goal and an energizing reason (e.g., Grant & Dweck, 2003; Dompnier, Darnon, & Butera, 2009; Urdan & Mestas, 2006; Warburton & Spray, 2014; Wang, King, & Rao, 2019). In particular, scholars have extensively used Self-Determination Theory (SDT; R. M. Ryan & Deci, 2000) to assess the reasons behind achievement goals (for a review, see Vansteenkiste, Lens, Elliot, Soenens, & Mouratidis, 2014b). Our chapter is organized as such: first, we describe how achievement goals are conceptualized; second, we provide an overview of how SDT-derived achievement goal complexes are conceptualized and operationalized; third, we reexamine the extant empirical results regarding the consequences of SDT-derived achievement goal complexes.

The "What" of Achievement Motivation

Conceptualization of Achievement Goals

First Generation of Achievement Goal Research: The Goal Orientation Model.

In the late 1970s to mid- 1980s, a group of researchers from the University of Illinois began to work both independently and collaboratively on the types of goals that individuals pursue in achievement contexts (Ames, 1984; Dweck, 1986; Nicholls, 1984; Maehr, 1984; for a historical review, see Elliot, 2005). For example, Dweck and her colleagues highlighted why learners with equivalent ability reacted differently to failure (Dweck, 1975, 1986; Dweck & Legget, 1988; Elliott & Dweck, 1988). They showed that learners' goal orientation (rather than ability) predicted different patterns of response to failure. Goal orientation was then understood as the overarching purpose for which learners engage in achievement behavior: *Mastery* goals focused on the purpose of *developing* competence (learning), whereas *performance* goals focused on the purpose of *demonstrating* competence relative to others (seeking favorable judgments or avoid unfavorable judgments of one's competence). Dweck and her colleagues showed that mastery-oriented learners tended to believe that ability is an expendable quality (i.e., they hold incremental beliefs), attribute failure to a controllable lack of effort, and show resilience in the face of obstacles. However, performance-oriented learners were found to believe that ability is a fixed quantity (i.e., they hold entity beliefs), attribute failure to an uncontrollable lack of intelligence, and show helplessness in the face of obstacles.

At that time, a considerable array of research confirmed that mastery goals were associated with a pattern of *adaptive* cognitive, affective and behavioral achievement-relevant outcomes (for a representative review, see Dweck, 1991). For instance, mastery-oriented individuals were found to report a higher level of cognitive engagement (Meece, Blumenfeld, & Hoyle, 1988), to verbalize less or the absence of negative affect during difficulty (Elliott & Dweck, 1988), or to display a behavioral preference for task-related rather than normative feedback (Butler, 1992). However, research was not as consistent when it came to performance goals (for a review, see Midgley, Kaplan & Middleton, 2001). As an illustration,

performance-oriented individuals were sometimes found to use surface rather than deep learning strategies (Greene & Miller, 1996; Miller, Greene, Montalvo, Ravindran & Nichols, 1996; Nolen 1988), but at other times they were found to use deep learning strategies (Archer, 1994; Miller, Behrens, Greene, & Newman, 1993; Wolter, Yu, & Pintrich, 1996). To resolve this kind of empirical inconsistency, the goal orientation model needed to be revised.

Second Generation of Achievement Goal Research: The Goal Standard Model. In the late 1990s to early 2000s, Elliot and his colleagues sought to revise the goal orientation model, suggesting that achievement goals had thus far been characterized as *omnibus* constructs (Elliot, 1994; Elliot & Church, 1997; Elliot & Harackiewicz, 1996). They pointed out two elements.

First, in early achievement goal research, achievement goals were conceptualized as a mixture of the goal (or aim) that the individual strives to achieve *and* the reason (or motive) for which the individual wants to achieve (Elliot & Thrash, 2001). Specifically, mastery goals were often conceptualized as the aim of attaining task-referenced competence (the goal component: mastering the task) *and* the self-improvement motive (a reason component: to improve one's skills and abilities). However, performance goals were often conceptualized as the aim of attaining other-referenced competence (the goal component: outperforming others) *and* the self-presentation motive (a reason component: to prove one's ability; Pintrich, 2000a).

Second, in early achievement goal research, achievement goals were conceptualized as a mixture of the tendency to approach competence *and* the tendency to avoid incompetence (Elliot & McGregor, 2001). In particular, performance goals were conceived as the purpose of demonstrating the adequacy of one's competence (especially for individuals having high self-perceived competence) *and* as the purpose of avoiding the demonstration of inadequate competence (especially for individuals having low self-perceived competence; Dweck & Legget, 1988).

To address these issues, Elliot and his colleagues adopted a *constrained* conceptual definition of achievement goals, focusing exclusively on the focal goal component (Elliot, 1999; Elliot & Thrash, 2001; Elliot & Murayama, 2008). From this perspective, achievement goals are *cognitive representations of a competence-related possibility that an individual is committed to approach or to avoid*. Achievement goals are differentiated according to how competence is defined and valenced. The *definition* of competence refers to the standard used in competence evaluation (task- or self-referenced vs. other-referenced), whereas the *valence* refers to the positive or negative focus of the goal (approaching competence vs. avoiding incompetence). As seen in Figure 1, the mastery-performance definition distinction is crossed by the approach-avoidance valence distinction, which results in 2 x 2 types of achievement goals: mastery-approach goals (the aim to master a task; improve over time), performance-approach goals (the aim to outperform others), mastery-avoidance goals (the aim to not fall short of mastering a task; not decline over time), performance-avoidance goals (the aim to not be outperformed by others).

Operationalization and Consequences of Achievement Goals

It is crucial for the operational definition of achievement goals to be consistent with their conceptual definition. From our perspective, this means that achievement goal items should assess the goal separate from the non-goal-related elements, in particular stripped of any peripheral reason content (e.g., self-presentation motives; Elliot & Murayama, 2008; Hulleman, Schrager, Bodmann, & Harackiewicz, 2010; Hulleman & Senko, 2010). An example of a measure that carefully attends to these issues is the Achievement Goal Questionnaire-Revised (Elliot & Murayama, 2008). In this measure, the performance-approach goal items, for instance, focus exclusively on approaching normative competence (e.g., “My goal is to perform better than the other students”), whereas the performance-avoidance goal items focus exclusively on avoiding normative incompetence (e.g., “My goal

is to avoid performing poorly compared to others"; Elliot & Murayama, 2008, p. 617).

We believe that using a *constrained* operational definition of achievement goals is the optimal way to determine the consequences of the core goal component (akin to the signal) detached from reason elements (akin to the noise). Recent meta-analyses relying (or mostly relying) on such a *constrained* definition sheds light on the consequences of achievement goals per se. First, recent meta-analyses show that focal mastery-approach goals are *predominantly beneficial* for achievement-relevant outcomes. Mastery-approach goals are a robust positive predictor of interest (Baranik, Stanley, Bynum, & Lance, 2010; Hulleman et al., 2010), as well as other beneficial outcomes such as self-efficacy (Baranik et al., 2010; Huang, 2016), positive emotion (Baranik et al. 2010; Huang, 2011), and help-seeking (Baranik et al. 2010). Mastery-approach goals sometimes show a weak positive correlation with performance (Baranik et al., 2010; Huang 2012; Lochbaum & Gottardy, 2015; Van Yperen, Blaga, & Postmes, 2014; Wirthwein, Sparfeldt, Pinquart, Wegerer, & Steinmayr, 2013), but this link is not very consistent (Hulleman et al., 2010; see also, Linnenbrink-Garcia, Tyson, & Patall, 2008). This illustrates that mastery-approach goals facilitate interest-based studying, increasing the subjective value of achievement activities and self-regulated learning (Nicholls, 1984: Pekrun, 2006; Pintrich, 2000b), but that this does not necessarily translate into higher performance attainment (Senko, Durik, & Harackiewicz, 2008).

Second, recent meta-analyses reveal that focal performance-approach goals are *predominantly beneficial* for achievement-relevant outcomes. Performance-approach goals are a robust positive predictor of performance (Baranik et al., 2010; Murayama & Elliot, 2012; Huang 2012; Hulleman et al., 2010; Lochbaum & Gottardy, 2015; Van Yperen et al., 2014; Wirthwein et al., 2013), as well as other beneficial outcomes such as self-efficacy (Baranik et al., 2010; Huang, 2016), positive emotion (Baranik et al., 2010; Huang, 2011; Senko & Dawson, 2016), and adaptive surface learning strategies (Senko & Dawson, 2016).

However, performance-approach goals are a positive predictor of some detrimental achievement-relevant outcomes, such as anxiety (Senko & Dawson, 2016). This illustrates that performance-approach goals arouse performance pressure, which increases a strategic approach to studying, and effort toward one's aspirations (Senko & Harackiewicz, 2005), but which may also increase negative activity emotion (Pekrun, Elliot, & Maier, 2009).[1]

Third, recent meta-analyses reveal that both focal mastery-avoidance and focal performance-avoidance goals are negative or null predictors of interest and performance (Hulleman et al., 2010; Lochbaum & Gottardy, 2015; Van Yperen et al., 2014). However, the meta-analytic literature is somehow more limited for avoidance-based achievement goals. On the one hand, mastery-avoidance goals have not been as extensively studied as the other achievement goals, perhaps due to their lower prevalence and less general ecological relevance (Ciani & Sheldon, 2010; Senko & Freund, 2015). On the other hand, performance-avoidance goals have mostly been operationalized using older subscales that include non-goal-related elements, thereby limiting the conclusions that can be drawn for most meta-analyses (e.g., Cellar et al., 2011; Payne, Youngcourt, & Beaubien, 2007). Nevertheless, it can be stated that the extant data suggests that performance-avoidance goals are problematic for many achievement-relevant outcomes (for a review, see Senko, Hulleman, & Harackiewicz, 2010).

Summary

In the first generation of achievement goal research, achievement goals were conceptualized and operationalized as a mixture of goals and reasons (the goal orientation model). Mastery goal orientation was found to be mostly beneficial for achievement-relevant outcomes, whereas the effects of performance goal orientation were inconsistent. In the second generation of achievement goal research, achievement goals have been conceptualized and operationalized as focal goals stripped of reason elements (the goal standard model).

Mastery-approach goals were found to be primarily beneficial for interest, performance-approach goals were found to be primarily beneficial for performance, and mastery- and performance-avoidance goals were found to be detrimental (or, at least, not beneficial) for both performance and interest. More recently, a third generation of achievement goal research is emerging, emphasizing that achievement goals do not come from a "motivational vacuum" and showing that the reasons behind achievement goals have predictive utility (e.g., see Dompnier et al., 2009; Urdan & Mestas, 2006; Vansteenkiste et al., 2010b). These innovative new lines of inquiry (see Senko, 2016) have begun to lay the empirical foundation for the goal complex approach to achievement goals (Elliot & Thrash, 2001).

The "Why" Behind Achievement Goals

The goal standard model enabled scholars to address the question of *what* one wants to achieve (the *direction* function of achievement motivation). However, by removing all reason elements from definition and measurement, the goal standard model left open the question of *why* one wants to achieve (the *energization* function of achievement motivation).

Achievement motivation has long been viewed as serving a directional *and* an energizing function (for a historical review, see Thrash & Elliot, 2001). For instance, Murray (1938) already envisaged that needs (defined as subjective inner states, wishes, reasons) manifested themselves by leading the organism to approach or avoid certain encounters, and—when eventually facing these encounters—by driving one's cognitive and behavioral responses. Murray called this multicomponent motivational construct a "need integrate" (p. 64; see also, pp. 123-124).

Similar to Murray's need integrate, Elliot and Thrash (2001) conceptualized *the achievement goal complex* (see also Elliot 2006; Thrash & Elliot, 2001). An achievement goal complex is a motivational hybrid comprising a particular type of achievement goal connected to a particular type of reason. An achievement goal complex emerges when a reason prompts

the endorsement of an achievement goal. Reasons may vary from relatively conscious cognitive values to which individuals have easy and direct access to relatively nonconscious affective motives to which individuals have incomplete or indirect access (see McClelland, Koestner, & Weinberger, 1989, for related points). The reason provides the primary motivational impetus for goal endorsement and the achievement goal provides the specific guidelines to interpret, process, and cope with the achievement situation.

The structural form of an achievement goal complex is "*achievement goal* IN ORDER TO *reason*" or "*achievement goal* BECAUSE *reason*." Examples of achievement goal complexes are "*the goal to learn* IN ORDER TO *become a recognized expert in one's job*" or "*the goal to learn* BECAUSE *learning is fun*." From this perspective, in the first generation of achievement goal research, the performance-approach goal orientation was often conceptualized and/or operationalized as an achievement goal complex (rather than an achievement goal *per se*), namely "*outperforming other* [the goal component] IN ORDER TO *demonstrate competence* [a self-presentation reason component]" (e.g., A. M. Ryan & Pintrich, 1997; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Urdan & Maehr, 1995).

While there are only a *finite* number of possible achievement goals (i.e., 3 conceivable definitions of competence × 2 conceivable valences of competence; Elliot, Murayama, & Pekrun, 2011; Elliot & Thrash, 2001), there is an *infinite* number of possible reasons behind achievement goals, and therefore an *infinite* number of possible achievement goal complexes. Different achievement goals may be undergirded by similar reasons: One can endorse a performance-approach goal for self-presentation reasons (an appearance-grounded performance-approach goal complex), whereas another may endorse a mastery-approach goals for the very same self-presentation reasons (an appearance-grounded mastery-approach goal complex; F. A. Hodis, Tait, G. M. Hodis, M. A. Hodis, & Scornavacca, 2016). Conversely, similar achievement goals may be undergirded by different reasons: One can

endorse a performance-approach goal because outperforming others is viewed as a challenge, whereas another may endorse the same performance-approach goal in response to pressure from his/her teammates (Vansteenkiste, Mouratidis, & Lens, 2010a).

The *functional significance* of an achievement goal (i.e., the meaning attributed to the goal) is presumed to depend on its underlying reasons (Vansteenkiste et al., 2014b; see also, Deci & R. M. Ryan, 1985). During the regulatory process, the achievement goal is viewed as the channel through which the overarching reason affects achievement behavior. Similar achievement goals may therefore differ in meaning as a function of the reason they serve and—by extension—these similar achievement goals can be tied to different mechanisms and produce different effects. For instance, a mastery-approach goal endorsed with a sense of choice and interest is arguably more adaptive in terms of achievement-relevant outcomes than a mastery-approach goal endorsed with a sense of internal or external compulsion (Benita, Roth, & Deci, 2014; see also Benita, Shane, Elgali, & Roth, 2017; Pulfrey, Vansteenkiste, & Michou, 2019; Spray, Wang, Biddle, & Chatzisarantis, 2006). Thus, taking both achievement goal and reason content into account not only allows for a more complete description of achievement motivation; it allows for sharper predictions of achievement behavior.

Which theoretical framework should be used to conceptualize achievement goal complexes? To answer this question, one needs to define the nature of the reason component of a goal complex. A reason corresponds to "the *psychological starting point* for action" (Elliot & Thrash, 2001, pp. 143-144). As such, it is important to distinguish between the various possible reasons behind achievement goals and the various *antecedents* of achievement goals. Specifically, contextual antecedents (or mere social perceptions) are not reasons *per se,* because they do not *directly* instigate achievement goals. For instance, competitive environments (antecedent) are presumed to fuel competitive motives (reason)

before further fostering performance-based goals (for a related point, see Murayama & Elliot, 2012). The same applies to dispositional antecedents (or self-perceptions), which are not reasons *per se* unless *directly* instigating achievement goals. For instance, incremental beliefs about intelligence (antecedent) are presumed to fuel self-improvement motives (reason) before further fostering mastery-approach goals (for a related point, see Heslin & Keating, 2016).

One can list various lines of research in which the reasons behind achievement goals serve an energizing function. For instance, in the hierarchical model of achievement motivation (Elliot & Church, 1997), need for achievement and fear of failure (McClelland, 1985) are posited to exert a distal, latent, and indirect influence on achievement-relevant outcomes, with motive-charged achievement goals serving as regulatory surrogates and exerting a proximal, manifest, and direct influence. Other example includes the Model Action Theory (in which self- and principle goals are conceived as higher-level goals, and achievement goals are considered as lower-level goals; DeShon & Gillespie, 2005), research on the social value of achievement goals (in which social desirability and social utility reasons are shown to alter the predictive utility of achievement goals; Dompnier et al., 2009, 2013; Smeding et al., 2015) or, more recently, a theoretical proposition to combine Bronfenbrenner's bioecological model with the achievement goal framework (in which macro- [e.g., cultural] to micro- [e.g., family] level antecedents predict distal and proximal reasons for achievement goal adoption; Liem & Elliot, 2018). However, Self-Determination Theory (SDT) has thus far been the most generative approach to operationalize reasons behind achievement goals and achievement goal complexes (for reviews, see Senko, 2016; Vansteenkiste et al., 2014b; Vansteenkiste & Mouratidis, 2016).

Conceptualization of SDT-Derived Achievement Goal Complexes

A fundamental aspect of SDT is that the regulatory processes tied to goals depend on

whether three basic psychological needs are satisfied (for a review, see R. M. Ryan & Deci, 2008). These three needs are conceived as innate, cross-developmental, and culturally universal antecedents (as in Hull's [1943] or White's [1959] traditions) rather than acquired reasons (as in Murray [1938] and, by extension, as in McClelland [1985]). These three needs are: the need for autonomy (the necessity to self-endorse one's own goals and behaviors), the need for competence (the necessity to feel efficacious), and the need for relatedness (the necessity to be connected to others).

An environment providing the nutriments of need fulfillment (especially need for autonomy and competence) facilitates intrinsic motivation. In an autonomy- and competence-supportive context, individuals will be more likely to adopt goals and goal-directed behavior for the inherent satisfaction they procure, out of interest and enjoyment (Koestner, Powers, Milyavskaya, Carbonneau, & Hope, 2014). Conversely, an environment thwarting need satisfaction generates extrinsic motivation. In a controlling and competence-threatening context, individuals will be more likely to adopt goals and goal-directed behavior for operationally separable reasons, because of self-imposed pressure or external contingencies (Kanat-Maymon, Benjamin, Stavsky, Shoshani, & Roth, 2015).

Most daily activities are instrumental in nature, thereby producing extrinsically motivated goals and behavior (e.g., the grading system prompts students to focus on normative performance; Pulfrey, Buchs, & Butera, 2011). However, when conditions favor basic need satisfaction, individuals may attempt to internalize these goals and behaviors, that is, to transform them into their own. As seen in Figure 2, SDT can be used to describe a continuum of reasons behind achievement goals, each reflecting the degree to which the goal has been internalized. The self-determination continuum extends from highly controlled reasons (no goal internalization) to highly autonomous reasons (full goal internalization).

In the left-most side of the continuum, there is extrinsic motivation with external

regulation (labeled external reasons). An achievement goal undergirded by external reasons is endorsed as a response to an external demand, that is, to earn a reward or avoid a punishment administered by others (e.g., a mastery-approach goal enacted to comply with teachers' expectations). Further to the right, there is extrinsic motivation with introjected regulation (labeled introjected reasons). An achievement goal undergirded by introjected reasons is endorsed as a response to an internal pressure, that is, to garner self-esteem or avoid projected disapproval, applied by individuals to themselves (e.g., a performance-avoidance goal pursued to avoid the shameful experience of failure). External and introjected reasons are considered as two subtypes of *controlled reasons*.

In the middle of the continuum, there is extrinsic motivation with identified regulation (labeled identified reasons). An achievement goal undergirded by identified reasons is consciously valued and accepted as personally important (e.g., a performance-approach goal endorsed as a means to reaching academic success). Further to the right, there is extrinsic motivation with integrated regulation (labeled integrated reasons). An achievement goal undergirded by integrated reasons is fully assimilated to the self and brought into congruence with other aspects of one's values and identity (e.g., a mastery-approach pursued because of an overarching and inner inclination toward growth and progress). Along with intrinsic motivation (i.e., when the goal is pursue for its own sake), identified and integrated reasons are considered as three subtypes of *autonomous reasons*.

Operationalization and Study of SDT-Derived Achievement Goal Complexes

Vansteenkiste et al. (2010b) were the first to use SDT to operationalize reasons behind achievement goals. In two studies, secondary school students first reported their performance-approach goals (e.g., "[m]y goal at school is to get a better grade than most other students''; p. 210). Then, they reported the autonomous reasons connected to their performance-approach goals (e.g., "[I pursue this goal because] I find this a highly stimulating

and challenging goal') as well as the controlled reasons connected to these same goals (e.g., "[I pursue this goal because] I have to comply with the demands of others such as parents, friends, and teachers"; p. 338). The authors observed that autonomous reasons connected to performance-approach goals were a positive predictor of beneficial educational outcomes (e.g., adaptive learning strategies, persistence, performance). More importantly, they observed that the relation between performance-approach goals and most of these beneficial educational outcomes dropped to non-significance (or diminished considerably) when the autonomous reason variable was statistically controlled for. Similar findings were later observed for other types of outcomes (e.g., satisfaction, positive affects), other achievement domains (e.g., work settings, sport setting), as well as with mastery-approach goals and autonomous reasons connected to mastery-approach goals (Gaudreau & Braaten, 2016: Gillet et al., 2017; Gillet, Lafrenière, Huyghebaert, & Fouquereau, 2015; Gillet, Lafrenière, Vallerand, Huart, & Fouquereau, 2014; Vansteenkiste et al., 2010a).

The disappearance (or diminishment) of the influence of achievement goals when partialling out the influence of the autonomous reasons to which they are connected has often been interpreted as indicating that the influence of achievement goals might be reducible to the influence of reasons. For instance, Vansteenkiste et al. (2010a) stated that such findings "suggest that the association between PAp [i.e., performance-approach goals] and well-being outcomes is not very robust" (p. 236). Moreover, Gillet et al. (2015) stated that "motivation underlying achievement goals are stronger predictors of subjective well-being than the endorsement of goals themselves" (p. 858), whereas Deci and R. M. Ryan (2016) concluded that "people's motives […] [are] more important that the strength of the goals themselves in predicting various educational outcomes" (p. 19). These interpretations—at least implicitly—question the predictive utility of achievement goals when studying achievement motivation (but see Vansteenkiste, Mouratidis, Van Riet, & Lens, [2014a] for more nuanced

"[t]heoretical [r]eflections," p. 142).

Sommet and Elliot (2017) challenged these interpretations. They noted that the structural form of the reason variable in the aforementioned research is in fact that of an achievement goal complex (i.e., "*achievement goal* BECAUSE *reason*"). Thus, it should not be surprising that the influence of a given achievement goal is eliminated or reduced when controlling for a related achievement goal complex, since the two variables overlap in content (see Senko & Tropiano, 2016, for a similar point). Simply put, the achievement goal is assessed a first time as a focal goal, and a second time as part of a composite goal complex. An alternative approach to assessment that disentangles the influence of goals from the influence of reasons, focuses on three components: (i) the focal goal component; (ii) the focal reason component; (iii) the goal complex. From this perspective, the focal goal component should be detached from any exogenous reason elements and assessed with items such as "my goal is to learn" (mastery-approach goals) or "my goal is to outperform others" (performance-approach goals). The focal reason component should be detached from any specific exogenous goal elements and assessed with items such as "I pursue goals because I find them challenging" (autonomous reasons) or "I pursue goals because others will reward me only if I achieve these goals" (controlled reasons). The goal complex should encompass one "pure" goal and one "pure" reason and be assessed with items such as "my goal is to learn because I find this a challenging goal" (autonomous mastery-approach goal complex) or "my goal is to outperform others because others will reward me only if I achieve this goal" (controlled performance-approach goal complex).[2] When including a "pure" goal, a "pure" reason, and their related goal complex in the same statistical model, one can disentangle the effect of each construct from the others, that is, testing the unique variance explained by each construct after removing the shared variance explained by the other two.

Sommet and Elliot used this approach in four studies involving more than 1,700

participants and reached three main conclusions. First, testing goals and reasons *separately*, mastery-approach goals and autonomous reasons were each a positive predictor of beneficial experiential and self-regulated outcomes (e.g., interest, positive emotion, deep learning, and persistence). This replicates the well-known findings from the achievement goal literature reviewed above, as well as those from the SDT literature showing that autonomous reasons make tasks more meaningful and foster personal growth (Deci, Vallerand, Pelletier, & R. M. Ryan, 1991; Vansteenkiste, Zhou, Lens, & Soenens, 2005).

Second, testing goals and reasons *simultaneously*, mastery-approach goals and autonomous reasons were each still a positive predictor of most of the beneficial outcomes, with the predictive strength of *both* mastery-approach goals and autonomous reasons being diminished when controlling for the other (without dropping to non-significance). This demonstrates that mastery-approach goals and autonomous reasons are both distinct (operating at different level) and overlapping (predicting similar outcomes), but that none of the construct unilaterally "captures" all the variance explained by the other. In light of this set of results, it cannot be concluded that the influence of goals is reducible to the influence of reasons or, for that matter, vice versa.

Third, testing goals, reasons, and goal complexes *together*, the autonomous mastery-approach goal complex was found to be a positive predictor of most of the beneficial outcomes, with the predictive strength of *both* mastery-approach goals and autonomous reasons being diminished when controlling for the goal complex construct (without dropping to non-significance). This demonstrates that mastery-approach goals and autonomous reasons may fuse into an autonomous mastery-approach goal complex and produce additional benefits. Moreover, as in the extant research, controlling for the autonomous mastery-approach goal complex diminished the effect of "pure" mastery-approach goals (since the goal component is assessed two times), but *in the same way it* diminished the effect of "pure"

autonomous reasons (since the reason component is also assessed two times). Similar results were observed for performance-approach goals, the autonomous performance-approach goal complex, and performance goal-relevant outcomes (e.g., grade aspiration, persistence).

Interestingly, Sommet and Elliot's (2017) findings are reminiscent of a past controversy regarding the relative influence of financial goal content and autonomous goal motives. Kasser and R. M. Ryan (1993) demonstrated that financial goals (striving for status or wealth) were a negative predictor of well-being. Later, Srivastava, Locke, and Bartol (2001) disputed these findings, suggesting that this relation could be accounted by "the 'why' behind the [financial] goal, rather than the goal itself" (p. 959; see also Carver & Baird, 1998). Accordingly, the authors showed that the negative relation between financial goals and well-being was eliminated when including the controlled reasons connected to these financial goals (e.g., appearance reasons). However, Sheldon, R. M. Ryan, Deci and Kasser (2004) critiqued their operationalization, arguing that there was a confound in the assessment of goals and reasons. Once the ambiguity had been resolved, the authors observed that financial goals had a negative effect on well-being, with controlled reasons (relative to autonomous reasons) having an additional, independent, and incremental negative effect on well-being.

The idea that both the energizing force of reasons and the directive force of goals are needed to give a full account of human motivation can be found in other lines of inquiry as well, such as intrinsic *versus* extrinsic exercise goal content and autonomous *versus* controlled reasons (Sebire, Standage, & Vansteenkiste, 2009; see also Sheldon, Sommet, Corcoran, & Elliot, 2018; Vansteenkiste, Lens, & Deci, 2006), short-term emotional preference and long-term instrumental reasons for emotion regulation (Tamir, 2009), or the relation between superordinate goals and their corresponding attainment means (Shah & Kruglanski, 2003). In the case of achievement motivation, this analysis supports the idea that studying achievement goals and SDT-derived reasons is best served by adopting an integrative, rather than

comparative or even competitive, approach.

Consequences of SDT-Derived Achievement Goal Complexes: A Systematic Review

As stated earlier, we believe that the SDT-derived reason variables used in the extant work are based on a *twin-track* operationalization, encompassing a focal goal and a focal reason (e.g., in Gaudreau & Braaten, 2016; Gillet et al., 2015; Vansteenkiste et al., 2010a). As such, these SDT-derived reason variables really correspond to SDT-derived achievement goal complexes and the past findings should be (re)interpreted accordingly.

Three basic patterns of results may emerge from this approach. The first possibility is that specific goals are systematically associated with (dis)advantageous outcomes, *regardless of the reason to which they are tied* (a goal-driven pattern). If that is the case, all possible *approach*-based achievement goal complexes are likely to have equally beneficial consequences, whereas all possible *avoidance*-based achievement goal complexes are likely to have equally detrimental consequences.

The second possibility is that specific reasons are systematically associated with (dis)advantageous outcomes, *regardless of the goal to which they are tied* (a reason-driven pattern). If that is the case, all possible *autonomous* achievement goal complexes are likely to have equally beneficial consequences, whereas all possible *controlled* achievement goal complexes are likely to have equally detrimental consequences. This position is advocated by some SDT researchers: For instance, in reviewing the literature, Özdemir Oz, Lane, and Michou (2016) stated that it reveals that "the same underlying reasons of different achievement goals account for the same outcomes irrespective of the goal to which they are tied" (p. 1160).

We favor a third possibility: Specific achievement goal complexes are associated with specific (dis)advantageous outcomes (a goal complex-specific pattern). From a theoretical perspective, the reason component of a goal complex gives a certain color or flavor

to the goal, whereas the goal component takes a particular route to serve the reason (Elliot & Thrash, 2001). One the one hand, autonomous reasons enhance goal ease, progress, and attainment (an adaptive form of goal regulation; see Ntoumanis et al., 2014; Koestner, Otis, Powers, Pelletier, & Gagnon, 2008; Werner, Milyavskaya, Foxen-Craft, & Koestner, 2016) and achievement goals energized by autonomous reasons, in turn, efficiently direct individuals toward specific behavior. On the other hand, controlled reasons diminish goal ease, progress, and attainment (i.e., a maladaptive form of goal regulation) and achievement goals energized by controlled reasons fail to efficiently direct individuals toward specific behavior. In particular, controlled mastery- and performance-approach goal complexes may not be as beneficial as their autonomous reason-grounded counterparts.

To date, we know of 15 published empirical articles on the consequences of SDT-achievement goal complexes measured using a twin-track operationalization. As seen in Figure 3, these 15 articles reported 391 zero-order correlations between SDT-achievement goal complexes and a set of achievement-relevant outcomes from 25 independent samples involving 6,859 participants. We chose to focus on zero-order correlations rather than regression coefficients because research designs and regression models varied from one sample to another, making it impossible to compare regression results across studies.[3]

Several findings emerged. First, the autonomous mastery-approach goal complex is *predominantly beneficial* in terms of achievement (86% of the correlations are beneficial). The autonomous mastery-approach goal complex shows robust moderate-to-strong positive correlations with beneficial affective (e.g. positive emotion, satisfaction), (meta)cognitive (e.g., self-regulated learning, interest), and behavioral (e.g., persistence) responses to achievement activities. However, the controlled mastery-approach goal complex shows, in most cases, *no predictive utility* (63% of the correlations are null). As an illustration, the controlled mastery-approach goal complex is never or seldom correlated with positive

emotion, self-regulated learning, or persistence.

Second, the autonomous performance-approach goal complex is *mainly beneficial* in terms of achievement (61% of the correlations are beneficial). The autonomous performance-approach goal complex shows rather moderate positive correlations with the same beneficial affective (e.g. positive emotion, satisfaction), (meta)cognitive (e.g., self-regulated learning, interest), and behavioral (e.g., persistence) responses to achievement activities as the autonomous mastery-approach goal complex. However, these correlations are not necessarily as robust as those involving the autonomous mastery-approach goal complex (e.g., null effects were reported with positive emotion, satisfaction, self-regulated learning). However, the controlled performance-approach goal complex shows, in most cases, *no predictive utility* 60% of the correlations are null). Taken together, the empirical research therefore indicates that individuals pursuing autonomous mastery- or performance-approach goal complexes may reap the epistemic benefits of the goal and the reason constructs, with the autonomous mastery-approach goal complex being particularly adaptive. However, both mastery- and performance-approach goals enacted through controlled regulation no longer seem beneficial.

Third, the autonomous avoidance-based goal complexes are predominantly beneficial in terms of achievement-relevant outcomes (88% of the correlations are beneficial for mastery goals and 92% are beneficial for performance goals). Controlled avoidance-based goal complexes show little, if any, predictive utility (85% of the correlations are null for mastery goals and 77% are null for performance). However, these correlations were collected from studies in which it was not possible to disentangle the effects of approach-based and avoidance-based achievement goal complexes.[4] That is, because we are examining zero-order correlations, the influence of a goal complex might be confounded with the influence of its goal component, its reason component, another goal to which it is correlated, and/or another reason to which it is correlated. Moreover, participants may have trouble recognizing

seemingly ambiguous, convoluted, or even antithetical achievement goal complexes, such as the autonomous performance-avoidance goal complex (i.e., the goal not to be outperformed by others because one find this a highly stimulating and challenging goal). Finally, it is possible that maladaptive avoidance-based achievement goals endorsed with a sense of volition, willingness, and congruence may produce beneficial achievement-relevant outcomes, at least in some instances. Future research is needed to test this provocative possibility.

Summary and Conclusion

An achievement goal complex is conceptualized as the combination of an achievement goal and an energizing reason. Although countless theoretical frameworks could be used to operationalize reasons behind goals (e.g., achievement motives, social values), SDT has, to date, spurred considerable interest among researchers. Within this framework, autonomous achievement goal complexes (pursuing an achievement goal because it is stimulating and valued) are differentiated from controlled achievement goal complexes (pursuing an achievement goal because it enables one to bolster one's ego or to obtain a reward). In contrast to the extant research, Sommet and Elliot (2017) showed that focal reasons, focal achievement goals, and achievement goal complexes all made *independent* contributions to achievement-relevant outcomes. In other words, none of the three motivational constructs seems reducible to any of the others. A systematic examination of the literature reveals that autonomous mastery- and performance-approach goal complexes are both beneficial in terms of achievement-relevant outcomes, whereas controlled mastery- and performance-approach goal complexes are not. It is premature to draw any conclusions regarding the influence of autonomous and controlled avoidance-based achievement goals.

In conclusion, we believe that if scholars are able to reach an agreement regarding the conceptualization, operationalization, and nature of the consequences of achievement goal complexes, the goal complex approach is likely to become a full-grown model of achievement

motivation. Obviously, many research questions need to be addressed, in particular in the field of personality: To what extent do achievement goal complexes remain stable or change over time? What are the dispositional antecedents of achievement goal complexes (e.g., trait competitiveness, temperament, needs)? Do self-regulatory processes such as challenge and treat appraisal mediate the relation between achievement goal complexes and achievement-relevant outcomes? We believe that motivation scientists from different theoretical perspectives could collaborate to answer such questions, helping us to better grasp the complexity of achievement motivation.

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The 15 publications reviewed in Figure 3 are marked with a dagger (†)

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Footnotes

[1] For both Hulleman et al.'s (2010) and Senko and Dawson's (2016) work, we focus on the meta-analytic correlation involving *normative* goals.

[2] One could consider achievement goal complex statements as double-barreled questions, that is, as assessing two elements simultaneously (i.e., a goal and a reason; see Podsakoff, MacKenzie, & Podsakoff, 2012). However, this twin-track operationalization directly relates to the ontology of the achievement goal complex construct. Echoing the principles of Gestalt psychology, achievement goal complexes are more than the mere sum of a goal and a reason. As such, they are inseparable motivational units and they may only be assessed with single and indivisible items. Importantly, this implies that an achievement goal complex could not be constructed as an interaction variable between a "pure" goal and a "pure" reason, because such an interaction variable does not necessarily indicate a goal complex. For instance, a high mastery-approach goal and high autonomous reasons does not necessarily indicate a high autonomous mastery-approach goal complex: The mastery-approach goals may very well be energized by controlled reasons, while the autonomous reasons may be directed by performance-approach goals.

[3] A correlation of $r = .1$ is regarded as weak, a correlation of $r = .3$ as moderate, and a correlation of $r = .5$ as strong (Cohen, 1992).

[4] In Gillet et al. (2017) and Michou, Vansteenkiste, Mouratidis, & Lens, 2014 (Study 1), multicollinearity was so high that autonomous approach and avoidance-based achievement goals were collapsed into a single score. In Gillet et al. (2015), principal component analyses revealed that autonomous mastery-approach and -avoidance goals and autonomous performance-approach and -avoidance goals each loaded on the same factor in Studies 1 and 2 (the pattern was less clear for Study 3; Nicolas Gillet was kind enough to share the raw data for us to run the analyses; the findings do not change the conclusions of his and his co-

authors' paper). In Delrue et al. (2016), achievement goal complexes were assessed for the focal dominant goal only, and the emphasis was put on dominant mastery-approach and -avoidance goal; however, Ciani and Sheldon (2010) have shown that the approach and avoidance form of these goals were often hard to discriminate.

Valence of competence	Definition of competence: Task- or self-referenced standard (using task requirement or past attainment as a benchmark to assess competence)	Definition of competence: Other-referenced standard (using others' attainment as a benchmark to assess competence)
Positive (approaching competence)	**Mastery-approach goals** master a task; improve over time *predominantly beneficial: primarily for interest*	**Performance-approach goals** outperform others *predominantly beneficial: primarily for performance*
Negative (avoiding incompetence)	**Mastery-avoidance goals** not fall short of mastering a task; not decline over time *not beneficial; neither for interest nor for performance*	**Performance-avoidance goals** not be outperformed by others *not beneficial; neither for interest nor for performance*

Figure 1. The 2 x 2 achievement goal framework (adapted from Elliot & McGregor, 2001).

Note: The nature of the pattern of achievement-relevant outcomes associated with each goals in reported in italics.

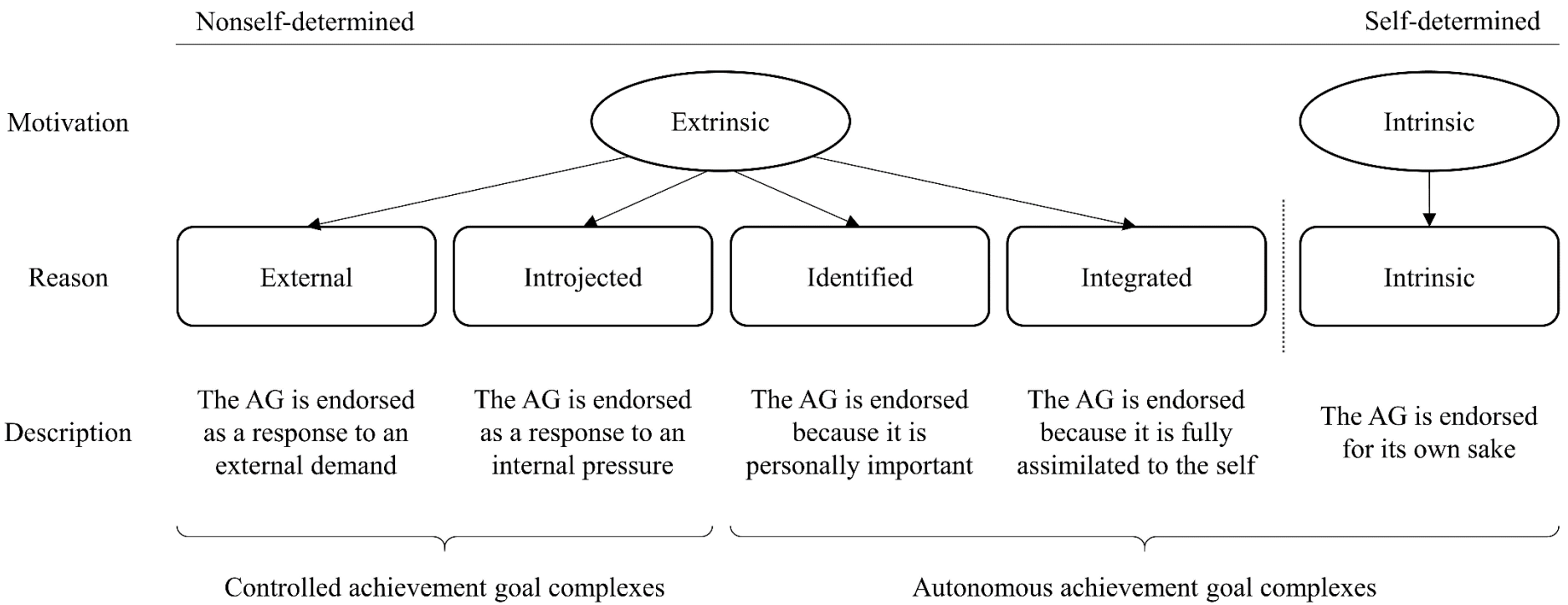
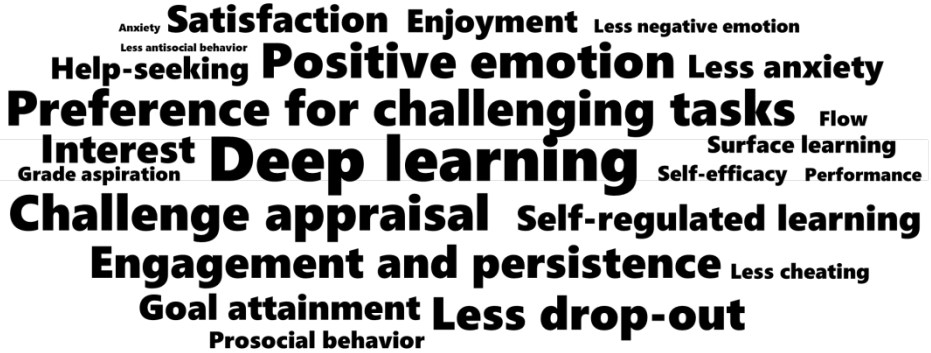
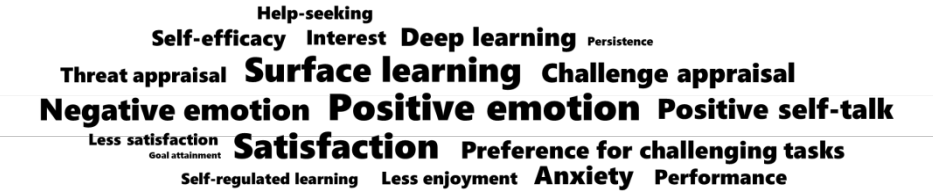
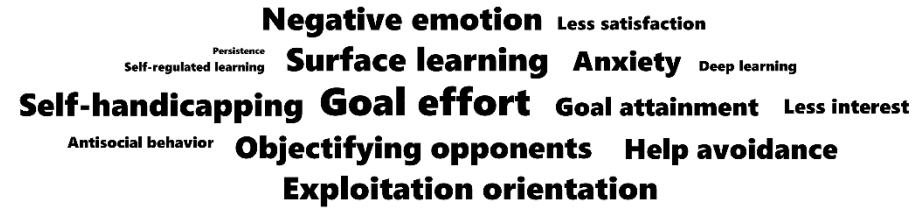


Figure 2. The self-determination continuum applied to achivement goals (adapted from R. M. Ryan & Deci, 2000); a brief description of the reason for goal endrosement is given for each reason.

Note: AG means Achievement Goal.

Autonomous mastery-approach goal complex	**Controlled mastery-approach goal complex**
(76 correlations: 86% beneficial, 3% detrimental; 12% null	(73 correlations: 26% beneficial, 11% detrimental; 63% null)
	
Additional null effects: Self-efficacy; Positive self-talk; Performance; Cheating; Negative self-talk; Threat appraisal; Antisocial behavior; Pressure/tension	*Additional null effects:* Self-efficacy; Positive self-talk; Performance; Cheating; Negative self-talk; Threat appraisal; Antisocial behavior; Pressure/tension
Autonomous performance-approach goal complex	**Controlled performance-approach goal complex**
(69 correlations: 61% beneficial, 3% detrimental; 36% null)	(67 correlations: 13% beneficial, 27% detrimental; 60% null)
	
Additional null effects: Self-handicapping; Antisocial behavior; Anxiety; Cheating; Satisfaction; Self-regulated learning; Negative affect/emotion; Performance; Positive affect/emotion; Help avoidance	*Additional null effects:* Self-handicapping; Antisocial behavior; Anxiety; Cheating; Satisfaction; Self-regulated learning; Negative affect/emotion; Performance; Positive affect/emotion; Help avoidance

Autonomous mastery-avoidance goal complex	**Controlled mastery-avoidance goal complex**
(40 correlations: 88% beneficial; 3% detrimental; 10% null)	(40 correlations: 5% beneficial, 10% detrimental; 85% null)
	
Additional null effects: Satisfaction; Flow; Performance; Threat appraisal	*Additional null effects:* Challenge appraisal; Self-regulated learning; Self-efficacy; Satisfaction; Engagement; Drop-out; Positive affect/emotion; Self-efficacy; Satisfaction; Flow; Performance
Autonomous performance-avoidance goal complex	**Controlled performance-avoidance goal complex**
(13 correlations: 92% beneficial; 8% detrimental; 0% null)	(13 correlations: 15% beneficial: 13% beneficial; 77% null)
	
Additional null effects: None	*Additional null effects:* Engagement; Satisfaction; Self-regulated learning; Positive affect/emotion

Figure 3. Word clouds of the variables with which SDT-derived achievement goal complexes are significantly correlated (based on 391 correlations from 25 independent samples involving 6,859 participants).

Notes: For each word cloud, the font size of the word is proportional to the correlation between the achievement goal complex and the variable (non-significant correlation were not considered); the correlations were collected from the following articles: Delrue et al. (2016), $N = 221$; Gaudreau & Braaten (2016), $N = 515$; Gaudreau (2012), $N = 220$; Gillet et al. (2014), $N_1 = 424$, $N_2 = 123$; Gillet et al. (2015), $N_1 = 278$, $N_2 = 327$,

N_3 = 169; Gillet et al. (2017), N = 330; Michou et al. (2014), N_1 = 606, N_2 = 435; Michou et al. (2016), N_1 = 226, N_2 = 331; Özdemir Oz et al. (2016), N = 212; Senko and Tropiano (2016), N_1 = 168, N_2 = 160; Sommet and Elliot (2017), N_2 = 406, N_3 = 429, N_4 = 457; Sommet et al. (2019), N = 166; Vansteenkiste et al. (2010a), N_1 = 304, N_2 = 245; Vansteenkiste et al. (2010b), N_1 = 150, N_2 = 190; Vansteenkiste et al. (2014a), N = 67; the full set of correlations is presented in Supplementary Material (https://figshare.com/s/7a47f3a688b62c49760d).

Table S1.

Summary of the 391 correlations between SDT-derived achievement goal complexes and outcomes.

	Autonomous reasons	Controlled reasons
Mastery-approach goals	*Beneficial effects* (86%). Deep learning (r = .70[k3], r = .58[k4]); Positive affect/emotion (r = .66[k2], r = .58/.58[e3], r = .52/.42[e2], r = .45/.35[e1], r = .46[b]); Interest (r = .62[k2] r = .32[i], r = .29[i]); Engagement/Persistence (r = .62/.64[e3], r = .53[k4], r = .43/.36[e1], r = .43/.36[e2], r = .27[i]); Satisfaction (r = .60[k2], r = .48/.46[e3], r = .44[a], r = .44[c], r = .42[a], r = .42[b], r = .39/.34[e2], r = .30[f], r = .29[f], r = .27/.33[e1], r = .26[o]); Preference for challenging tasks (r = .57[k3], r = .44[k4]); Challenge appraisal (r = .51[a]); (Lower) drop-out (r = -.48[f], r = -.46[f]); Self-regulated learning (r = .52[g1], r = .44[g1], r = .42[h1], r = .41[h2], r = .40[h2], r = .36[g1], r = .30[g2], r = .23[g2], r = .17[g2]); Goal attainment (r = .36[b]); Enjoyment (r = .33[o]); (Lower) anxiety (r = -.33[c]); Help-seeking (r = .31[k3]); (Lower) Cheating (r = -.25[g2], r = -.18[g2]); Prosocial behavior (r = .24[o]); Self-efficacy (r = .24[f], r = .19[f]); Flow (r =.21[a]); Grade aspiration (r = .20[k4]); Performance (r = .24[a], r = .19[f], r = .13[f]); (Lower) Negative affect/emotion (r = -.19[b]); (Lower) Antisocial behavior (r = -.11[o])	*Beneficial effects* (26%). Positive affect/emotion (r = .38[k2]); Satisfaction (r = .36[k2]); Deep learning (r = .31[k3], r = .21[k4]); Positive self-talk, r = .29[a]); Preference for challenging tasks (r = .28[k3], r = .21[k4]); Challenge appraisal (r = .27[a]); Self-efficacy (r = .22[a]); Self-regulated learning (r = .21[h1], r = .17[h2], r = .17[i], r = .14[g1], r = .10[g1]); Performance (r = .21[a]); Interest (r = .21[k2]); Help-seeking (r = .18[k3]); Persistence (r = .12[k4]); Goal attainment (r = .09[b])
	Detrimental effects (3%). Surface learning (r = .24[k4]); Anxiety (r = .12/.10*n.s.*[e2])	*Detrimental effects* (11%). Surface learning (r = .35[k4]); Negative affect/emotion (r = .31[b]); Anxiety (r = .29/.23[e2]); Threat appraisal (r = . .21[a]); (Lower) Satisfaction (r = -.18[b], r = -.15[o]); (Lower) Enjoyment (r = -.13[o])
	Null effects (12%). Self-efficacy (r = .15[a]); Positive self-talk (r = .10[a]); Performance (r = .07[c]); Cheating (r = .06[i]); Negative self-talk (r = .02[a]); Threat appraisal (r = .02[a]); Antisocial behavior (r = -.02[o]); Pressure/tension (r = -.01[i])	*Null effects* (63%). Negative self-talk (r = . .21[a]); Satisfaction (r = .19[a], r = .06/-.01[e3], r = .05[f], r = -.04/.07[e1], r = .02/.04[e2], r = -.02[f], r = . .01[a]); Interest (r = .12[i], r = .07[i]); Cheating (r = .11[i], r = .04[g2], r = -.01[g2]); Drop-out (r = -.11[f], r = -.10[f]); Engagement/Persistence (r = .10[i], r = .08/.05[e2], r = .02/.11[e1], r = .00/.03[e3]); Self-regulated learning (r = .10[h2], r = -.07[g2], r = .06[g1], r = .01[g2], r = .00[g2]); Antisocial behavior (r = .09[o], r = .03[o]); Self-efficacy (r = .08[f], r = -.02[f]); Positive affect/emotion (r = -.06[b], r = .03/.09[e2], r = .02/.08[e1], r = -.01/-.04[e3]); Grade aspiration (r = -.06[k4]); Performance (r = -.03[f], r = -.01[f]); Flow (r = . .03[a]); Prosocial behavior (r = .02[o]);

Table S1 (continued – performance-approach goals).

	Autonomous reasons	Controlled reasons
Performance-approach goals	*Beneficial effects* (61%). Goal attainment (r = .61[d1], r = .30[b], r = .24[d2]); Goal effort (r = .57[d2]); Engagement/Persistence (r = .43[e3], r = .36[k4], r = .35[n1], r = .25[n2], r = .17[e1], r = .15[e2]); Interest (r = .42[j2], r = .19[n1], r = .17[n2]); Deep learning (r = .39[k4]); Preference for challenging tasks (r = .34[k4]); Self-regulated learning (r = .41[g1], r = .34[n1], r = .33[n1], r = .28[n2], r = .25[n1], r = .24[n2], r = .20[n1], r = .16[g1], r = .09[g1]); Self-efficacy (r = .33[j1], r = .31[j2]); Positive affect/emotion (r = .44[e3], r = .30[m1], r = .26[b], r = .23[e1], r = .21[e2], r = .19[d1]); Satisfaction (r = .30[c], r = .29[e3], r = .17[b], r = .17[d1], r = .16[e1], r = .13[e2]); (Lower) Cheating (r = -.27[n2]); Vitality (r = .27[m1]); Grade aspiration (r = .19[k4]); (Lower) Anxiety (r = -.17[c])	*Beneficial effects* (14%). Goal effort (r = .38[d2]); Goal attainment (r = .30[d1], r = .20[d2]); Preference for challenging tasks (r = .19[k4]); Self-regulated learning (r = .16[g1], r = .11[g1], r = .09[g1]); Deep learning (r = .14[k4]); Persistence (r = .09[k4])
	Detrimental effects (3%). Surface learning (r = .29[k4]); Objectifying opponents (r = .14[m2])	*Detrimental effects* (26%). Help avoidance (r = .34[j2], r = .21[j1]); Self-handicapping (r = .33[j1], r = .29[j2]); Surface learning (r = .32[k4]); Negative affect/emotion (r = .31[b]); Anxiety (r = .31[n1], r = .27[n2], r = .24[e2]); Objectifying opponents (r = .30[m2]); (Lower) Interest (r = -.24[n2], r = -.16[n1]); (Lower) Satisfaction (r = -.18[b]); Antisocial behavior (r = .17[m2], r = .15[m1], r = .15[m2], r = .13[m1]), Exploitation orientation (r =
	Null effects (36%). Self-handicapping (r = -.14[j2], r = -.01[j1]); Antisocial behavior (r = .10[m1], r = .09[m1], r = -.08[m2], r = -.06[m2], r = .05[m1], r = -.05[m2], r = .03[m2], r = .00[m2]); Anxiety (r = .10[e2], r = .08[n1], r = .05[n2]); Cheating (r = -.10 [n2]); Satisfaction (r = .09[d2]); Self-regulated learning (r = .09 [n2], r = .08[n2]); Negative affect/emotion (r = -.08[m1], r = .02[d2], r = .01[b]); Performance (r = .07[n2], r = .01[c]); Positive affect/emotion (r = .03[d2]); Help avoidance (r = -.02[j1], r = -.02[j2])	*Null effects* (61%). Antisocial behavior (r = .10[m1], r = .10[m2], r = -.04[m2], r = .03[m2]); Self-regulated learning (r = .15[n1], r = -.14[n2], r = -.11[n1], r = .11[n2], r = -.10[n2], r = .06[n2], r = -.05[n1], r = .03[n1]); Performance (r = -.14[n2]); Positive affect/emotion (r = .10[e2], r = .09[e1], r = .06[d2], r = -.06[b], r = .04[e3], r = .02[m1], r = -.02[d1]); Negative affect/emotion (r = .10[m1], r = .03[d2]); Satisfaction (r = .09[d2], r = .06[e1], r = .04[e3], r = .01[d1], r = .01[e2]); Engagement (r = .08[e2], r = .05[e1], r = -.04[n2], r = .03[n1], r = -.02[e3]); Cheating (r = .08[n2], r = .02[n2]); Goal attainment (r = .08[b]); Self-efficacy (r = .04[j1], r = -.03[j2]); Vitality (r = .04[m1]); Grade aspiration (r = -.01[k4]); Interest (r = -.02[j2])

Table S1 (continued – avoidance-based achievement goals).

	Autonomous reasons	Controlled reasons
Mastery-avoidance goals	*Beneficial effects* (88%). Positive affect/emotion (r = .45/.39[e2], r = .38/.29[e1], r = .34/.46[e3]); (Lower) drop-out (r = -.42[f], r = -.38[f]); Engagement (r = .40/.30[e1], r = .38/.45[e3], r = .35/.33[e2]); Satisfaction (r = .35[a], r = .34/.29[e2], r = .30[f], r = .28[f], r = .27/.27[e1], r = .25/.32[e3]); Challenge appraisal (r = .32[a]); Self-regulated learning (r = .31[h1], r = .29[h2], r = .28[h2]); Positive self-talk (r = .29[a]); Self-efficacy (r = .24[a], r = .15[f], r = .13[f]); Performance (r = .20[f], r = .14[f]); Anxiety (r = .16/.17[e2]);	*Beneficial effects* (5%). Positive self-talk (r =.29[a]); Self-regulated learning (r = .16[h1])
	Detrimental effects (3%). Negative self-talk (r = .26[a])	*Detrimental effects* (10%). Anxiety (r = .25/.24[e2])
	Null effects (10%). Satisfaction (r = .14[a]); Flow (r = .13[a]); Performance (r = .11[a]); Threat appraisal (r = .02[a])	*Null effects* (85%). Challenge appraisal (r =.19[a]); Self-regulated learning (r = .12[h2], r = .12[h2]); Self-efficacy (r =.12[a]); Satisfaction (r = -.10[a], r = -.01[a]); Engagement (r = -.09/.03[e3], r = .08/.06[e2], r = .06/.07[e1]); Drop-out (r = -.08[f], r = -.07[f]); Positive affect/emotion (r = .07/.03[e2], r = -.04/.04[e3], r = .03/.09[e1]); Self-efficacy (r = .07[f], r = -.04[f]); Satisfaction (r = -.05/.07[e3], r = -.02/.03[e1], r = .02[f], r = -.02[f], r = .01/.00[e2]); Flow (r =.04[a]); Performance (r = .03[f], r = -.03[a], r = .01[f])
Performance-avoidance	*Beneficial effects* (92%). Self-regulated learning (r = .41[g1], r = .38[g1], r = .29[g1]); Positive affect/emotion (r = .38[e3], r = .23[e2], r = .18[e1]); Engagement (r = .32[e3], r = .22[e2], r = .17[e1]); Satisfaction (r = .23[e3], r = .18[e2], r = .13[e1])	*Beneficial effects* (15%). Self-regulated learning (r = .14[g1], r = .08[g1]);
	Detrimental effects (8%). Anxiety (r = .15[e2])	*Detrimental effects* (13%). Anxiety (r = .25[e2])
	Null effects (0%).	*Null effects* (77%). Engagement (r = .06[e2], r = -.06[e3], r = .03[e1]); Satisfaction (r = -.06[e1], r = .03[e2], r = -.02[e3]); Self-regulated learning (r = .06[g1]); Positive affect/emotion (r = .05[e2], r = .04[e1], r = .03[e3])

Notes: Within each cell, the outcome variables and correlations are listed in decreasing order of absolute magnitude; each superscript corresponds

to a sample (letters correspond to articles and numbers to the study): [a]Delrue et al. (2016), $N = 221$, achievement goal complexes are measured for the dominant focal goal and we retain the participants having a dominant self-approach (50.2%) or self-avoidance (38.9%) mastery goal; we changed the sign of the self-efficacy and performance correlations because they pertained to aspired and actual race running time, respectively (the lower the time, the higher the performance); [b]Gaudreau & Braaten (2016), $N = 515$; [c]Gaudreau (2012), $N = 220$, *self-concordant* achievement goal complexes are measured but we treat them as *autonomous* achievement goal complexes; [d]Gillet et al. (2014), $N_1 = 424$, $N_2 = 123$; [e]Gillet et al. (2015), $N_1 = 278$, $N_2 = 327$, $N_3 = 169$, self-based and task-based mastery goal complexes are measured and we provide the correlations separated by a slash (/); [f]Gillet et al. (2017), $N = 330$; self-based mastery goal complexes are measured; [g]Michou et al. (2014), $N_1 = 606$, $N_2 = 435$, in Study 2, achievement goal complexes are measured for the dominant focal goal and the authors retain the participants having a dominant mastery-approach goal (93.4%); [h]Michou et al. (2016), $N_1 = 226$, $N_2 = 331$; [i]Özdemir Oz et al. (2016), $N = 212$, achievement goal complexes are measured for the dominant focal goal and we retain the participants having a dominant mastery-approach goal (64.1%); [j]Senko and Tropiano (2016), $N_1 = 168$, $N_2 = 160$; [k]Sommet and Elliot (2017), $N_2 = 406$, $N_3 = 429$, $N_4 = 457$; [l]Sommet et al. (2019), $N = 166$; [m]Vansteenkiste et al. (2010a), $N_1 = 304$, $N_2 = 245$; [n]Vansteenkiste et al. (2010b), $N_1 = 150$, $N_2 = 190$; [o]Vansteenkiste et al. (2014a), $N = 67$, achievement goal complexes are measured for the dominant focal goal and the authors retain the participants having a dominant mastery-approach goal (83.6%); Self-regulated learning corresponds to various constructs such as metacognitive regulation, effort regulation, or critical thinking; for Delrue et al. (2016), Gillet et al. (2015, 2017), Michou et al. (2014, Study 1), Özdemir Oz et al. (2016), the relevant correlations are not reported in the article but the corresponding authors were kind enough to provide us with them (or the raw data) –we thank them for that.