On the Temporal Dynamics of Implicit Self-Regulation in the Form of Evaluative Goal Shielding

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Summary

In order to successfully pursue a goal, it is important to be able to resolve potential conflict with other activities and resist any temptations that might otherwise distract from the task at hand. By now, a considerable amount of research has shown that this ability, i.e., self-regulation, does not only function on a conscious level (i.e., people exerting self-control), but also has an automatic component that fine-tunes a person's perception, attention, cognition, and evaluations for a facilitated goal pursuit (e.g., Bargh, 1990; Ferguson & Bargh, 2004; Ferguson, 2008; Fishbach, Friedman, & Kruglanski, 2003; Fishbach & Shah, 2006; Fishbach, Zhang, & Trope, 2010; Gollwitzer & Moskowitz, 1996; Milyavskaya, Inzlicht, Hope, & Koestner, 2015; Moore, Ferguson, & Chartrand, 2011; Vogt, De Houwer, & Moors, 2011). These automatic processes, termed implicit self-regulation, are shown to be dependent on a number of different moderators that determine whether an ongoing goal pursuit is actually desirable and adaptive. This suggests that these processes are responsive to the partly subtle dynamics of goal pursuit, eventually playing a role in determining engagement in or disengagement from a goal (e.g., Ferguson, 2008; Fishbach et al., 2003; Milyavskaya et al., 2015; see also Rothermund, 2011).

The present thesis expands the existing research on implicit self-regulation in four substantial ways:

(1) It examines and finds implicit self-regulation in the form of evaluative goal shielding measured as a temporally dynamic process, which it is supposed to be, for the very first time. This is done by measuring the change in implicit evaluations of two goals from before the explicit introduction of an alternative goal (when only one goal has been activated yet) to after the explicit introduction of an alternative goal in a within-subject design, instead of measuring mere states of goal evaluations. This approach allows one to

capture individual differences in evaluative goal shielding without confounding it with participants' initial implicit evaluations of the goals.

(2) The relation between the first and second goal, i.e., goal conflict, is identified as an important moderator of that temporally dynamic process. Evaluative goal shielding appears to be increased in cases where it is needed (i.e., in case of high goal conflict) and decreased when it is not (i.e., in case of low goal conflict).

(3) Additionally, the present research also avoids confounding specific goal contents with the roles of the goals as either a relevant goal or an irrelevant distractor by counterbalancing the content of the goal that is introduced first and the one that is introduced second. This allows for the observation that the effects are indeed independent of the contents of the goals, indicating that these effects are not only due to some specific features of one of the goals, but that they reflect an actual self-regulation process working in a general fashion.

(4) The practical usefulness of the individual measurement of evaluative goal shielding is shown in regression analyses, in which evaluative goal shielding is used to explain variation in past academic performance and even predict future performance. This explanatory and predictive power goes beyond the variation that can be explained or predicted by intelligence and self-discipline, the two most common and successful predictors of academic performance.

Zusammenfassung

Um ein Ziel erfolgreich zu verfolgen, ist es wichtig, den potentiellen Konflikt mit anderen Aktivitäten zu überwinden und Versuchungen zu widerstehen, welche andernfalls von der bestehenden Aufgabe ablenken könnten. Eine beachtliche Menge an Forschungsergebnissen hat inzwischen gezeigt, dass diese Fähigkeit, d.h. Selbstregulation, nicht nur auf bewusster Ebene arbeitet (d.h., Leute üben Selbstkontrolle aus), sondern auch eine automatische Komponente beinhaltet, welche die Wahrnehmung, Aufmerksamkeit, Kognition und Bewertungen einer Person für eine erleichterte Zielverfolgung feinabstimmt (siehe z.B.: Bargh, 1990; Ferguson & Bargh, 2004; Ferguson, 2008; Fishbach, Friedman, & Kruglanski, 2003; Fishbach & Shah, 2006; Fishbach, Zhang, & Trope, 2010; Gollwitzer & Moskowitz, 1996; Milyavskaya, Inzlicht, Hope, & Koestner, 2015; Moore, Ferguson, & Chartrand, 2011; Vogt, De Houwer, & Moors, 2011). Diese automatischen Prozesse, implizite Selbstregulation genannt, zeigen sich abhängig von einer Anzahl unterschiedlicher Moderatoren, welche bestimmen, ob eine laufende Zielverfolgung tatsächlich erstrebenswert und adaptiv ist. Dies legt nahe, dass diese Prozesse auf die teilweise subtilen Dynamiken der Zielverfolgung ansprechen und letztlich die Zielannahme oder -ablösung mitbestimmen (siehe z.B.: Ferguson, 2008; Fishbach et al., 2003; Milyavskaya et al., 2015; siehe auch: Rothermund, 2011).

Die vorliegende Dissertation erweitert die existierende Forschung zu impliziter Selbstregulation um vier wesentliche Aspekte:

(1) Implizite Selbstregulation wird in Form evaluativer Zielabschirmung untersucht und gefunden. Diese wird zum ersten Mal als ein zeitlich dynamischer Prozess gemessen, welcher die implizite Selbstregulation tatsächlich darstellen sollte. Das wird erreicht, indem die Veränderung der impliziten Evaluationen zweier Ziele von vor (wenn bisher lediglich ein Ziel aktiviert worden ist) zu nach der Einführung eines Alternativziels

intraindividuell gemessen wird, anstatt bloße Zustände impliziter Zielbewertungen zu messen. Diese Herangehensweise erlaubt es, individuelle Unterschiede in der evaluativen Zielabschirmung zu erfassen, ohne diese mit den ursprünglichen impliziten Zielbewertungen der Versuchspersonen zu konfundieren.

(2) Die Beziehung zwischen dem ersten und dem zweiten Ziel, d.h. Zielkonflikt, wird als wichtiger Moderator dieses zeitlich dynamischen Prozesses erkannt. Evaluative Zielabschirmung ist erhöht, sofern sie gebraucht wird (d.h. bei hohem Zielkonflikt) und niedriger, sofern sie nicht gebraucht wird (d.h. bei niedrigem Zielkonflikt).

(3) Zudem vermeidet es die vorliegende Forschung, die spezifischen Zielinhalte mit den Rollen der Ziele als relevantes Ziel oder irrelevanter Distraktor zu konfundieren, indem der Inhalt des als erstes eingeführten Ziels und der Inhalt des zweiten Ziels ausbalanciert werden. Dies erlaubt die Beobachtung, dass die Effekte tatsächlich unabhängig von den Zielinhalten sind, was nahelegt, dass diese Effekte nicht lediglich aufgrund spezifischer Charakteristiken eines der Ziele zustande kommen, sondern sie einen tatsächlichen, unbestimmt arbeitenden Selbstregulationsprozess wider-spiegeln.

(4) Der praktische Nutzen der individuellen Messung evaluativer Zielabschirmung wird in Regressionsanalysen gezeigt. Darin wird evaluative Zielabschirmung verwendet, um Variation in früherer akademischer Leistung zu erklären und zukünftige Leistung vorherzusagen. Diese Erklärungs- und Vorhersagekraft geht über die Variation hinaus, die durch Intelligenz und Selbstdisziplin, die zwei gebräuchlichsten und erfolgreichsten Prädiktoren akademischer Leistung, erklärt bzw. vorhergesagt werden kann.

1   Theoretical introduction

> "[…] the force exerted on an individual by any one goal cannot be considered in isolation and instead depends on the salience and interrelation of other goals present in one's life space at a given moment."
> –Shah and Kruglanski (2002), pp. 379/380

Life can be seen as a continuous string of different goal pursuits. There is usually not one single superordinate goal. Even if one is assumed—like, for example, the maximization of well-being—the pursuit of such a very general, overarching goal has to be and is commonly partitioned into many smaller sub-goals. Even these sub-goals, if still very general, can often be further fragmented into more sub-goals. For example, in order to be happy, one might want to have a fulfilling professional life as well as a gratifying romantic relationship. For a fulfilling professional life, it might be necessary to study, pass exams, and get acquainted with the explicit and implicit rules of the desired profession. For a gratifying romantic relationship one might want to learn to talk to people, be empathetic, and stay in good shape.

All of a person's goals have their place in his or her life. Not only one of them is pursued, but as many of them as possible, if they truly are goals. The struggle to do so is not always an easy one, but there is a growing amount of research examining how it is actually achieved and even facilitated automatically. The latter is the research on implicit self-regulation, on which the present thesis is focusing.

The adopted definition of "goal" can be found slightly varied in several dictionaries, for example, "the end toward which effort is directed"[1]. It is certainly possible to further distinguish between different kinds of goals, especially with regard to their source of motivation, i.e., whether they are deliberately and intrinsically chosen, or

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[1] This specific example can be found at http://www.merriam-webster.com/dictionary/goal.

motivated by extrinsic rewards or authorities. The self-determination theory by Deci and Ryan (2000) started to outline the psychological differences that come with these different motivations. Also, the role of differentiation between "want-to" and "have-to" goals for self-regulation was just recently examined in the literature (Milyavskaya, Inzlicht, Hope, & Koestner, 2015). However, the research in the present thesis takes a more general approach, neglecting any potential distinction between these two goal types.[2] If anything, it could be assumed that the two goals examined in this thesis both tend to be want-to goals. However, this is speculative, most certainly differs from person to person, and will not be explored any further in the present empirical studies. Instead, the influence of activation of one goal on the implicit evaluation of a second goal is going to be examined in a new design, leaving the goals' types out of the picture for the time being, and focusing on another moderating variable, namely goal conflict.

1.1   Goal activation

Not every situation lends itself to the pursuit of every goal, and personal and interpersonal circumstances demand different things at different times. So, priorities are changing depending on current circumstances and situations, and accordingly, active goals are changing, which results in strategies and preferences changing. If a lonely single notices an attractive person who is repeatedly searching eye-contact, it is more likely for him or her to try to engage into getting to know that person than to do the annual tax declaration. If one has not eaten for 24 hours, the search for food is probably a stronger contender for being the currently held goal than looking for a better paid job.

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[2] An earlier small-scale pre-study was conducted in 2013 that was actually aimed at the question of differences in implicit self-regulation due to intrinsic or extrinsic motivation, but the idea was dropped, because of unpromising results. See Appendix A for a short summary.

It is usually assumed that goals are knowledge structures (Kruglanski, 1996). As such, their representation is similar to the representation of any mental concept (Kruglanski, Shah, Fishbach, Friedman, Chun, & Sleeth-Keppler, 2002), in that there can be facilitative and inhibitory connections between goals and other concepts. So, the activation or priming of goals is possible by internal or external cues that are in some way related to the goals, for example, by means to achieve them (see Shah & Kruglanski, 2003).

These cues do not have to be as blatant as in the examples given above. In fact, they can be and often are so subtle that the person holding the goal is not aware of the influence of the activation at all. The person might not even perceive the cues consciously, while his or her behavior, cognition, and affect would still be guided by it (Bargh, 1990; Bargh & Chartrand, 1999; Bargh & Chartrand, 2000; Bargh & Ferguson, 2000; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001; Ferguson, 2008; Moore, Ferguson, & Chartrand, 2011; Gollwitzer & Moskowitz, 1996; Shah, 2005). For example, Chartrand and Bargh (1996) show that the mere priming of a goal with a scrambled sentence test is sufficient to elicit effects very similar to explicit instructions. A primed goal is then not only semantically activated, but also has a motivational component (see Förster, Liberman, & Friedman, 2007); that is, the pursuit of the goal is motivated and facilitated. The automatic facilitation of goal pursuit after the activation of a goal is called automatic, implicit, or sometimes also non-conscious self-regulation in the literature (for an overview of automaticity, see Moors & De Houwer, 2006; see also Bargh & Chartrand, 2000).

1.2   Goal conflict

Why is goal pursuit facilitated after a goal is activated? What purpose does self-regulation have? As mentioned above, people have a multitude of goals, and many goal pursuits, like most activities, are incompatible and thus mutually exclusive at a

given moment. For example, one cannot simultaneously be writing a dissertation and playing board games. So, one can basically only do one thing at a time, even though there are a lot of alternative possibilities and tempting opportunities, i.e., a lot of tendencies that one could follow instead. In order not to get stuck undecided and inactive between all those possibilities or tendencies, and to avoid permanent oscillating between different pursuits and activities, one has to resolve these conflicts and commit oneself to one activity.[3] One of the main questions of motivation research is why people choose one specific activity over others and, once an activity or goal is chosen, how it is maintained over time and shielded against competing alternatives (see Brandstätter, Schüler, Puca, & Lozo, 2013; Heckhausen & Heckhausen, 2010; see also Bargh, 1990; Shah, 2005).

Atkinson and Birch (1970) state that the observable activity of an organism reflects its currently dominant behavioral tendency. They suggest that "[t]he observation of a change in activity implies a change in the dominance relations among the behavioral tendencies of the individual" (Atkinson & Birch, 1970, p. 4) and that "[a] behavioral tendency, once it has been aroused, will persist in its present state until acted on by some force that either increases or decreases its strength" (Atkinson & Birch, 1970, p. 10). So, the revolutionary account by Atkinson and Birch (1970) already describes the dynamic nature of motivation and behavioral regulation reflected in the influence of "some force" on the behavioral tendency, i.e., the increase or decrease of the strength/activation level of a goal or activity.

In this context, "some force" can be, for example, the completion of the activity or goal at hand, or—as it will be the case in the present research—the introduction or encounter of an alternative activity/goal. In which way this introduction or encounter

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[3] That does not necessarily mean that this activity or goal will then be completely finished in one go without interruptions by other activities, as this depends a lot on the level of abstractness of the goal in question. For example, abstract long-term goals like acquiring an academic degree or finding and maintaining a happy romantic relationship require repeated engagement in a number of different activities, while quenching thirst is a very concrete short-term endeavor.

affects the activation level or strength of the currently active goal should depend on the relation that the alternative has to the active goal. Even if one cannot engage in multiple activities or goals at the same time, the engagement in different activities or goals can be more or less detrimental or beneficial for each other. The perception of these relations can also differ between individuals. Even two goals that are perceived as extremely conflicting with each other by one person might be seen as a unit by another person.

Some goals necessitate commitment to activities over a longer period of time to ensure their pursuit. If an available alternative activity or goal is perceived as non-conflicting with or facilitating/beneficial for the currently active goal there is no reason to keep the dominance relations of tendencies constant. A switch to the new goal/activity can be permitted without concern, and might even be reinforced. However, if the pursuit of the encountered alternative activity/goal would be in conflict with the pursuit of the currently active goal, the dominance relations of tendencies should be shielded, i.e., kept constant or even strengthened, if one truly wants to achieve the active goal. In other words, in order to resist temptations and resolve goal conflicts, self-regulation is needed.

1.3   Implicit self-regulation and conscious self-control

While the term "self-regulation" is often used as a conglomerate of the conscious processes directed at goal pursuit (like conscious self-control/self-discipline and mental strategies) and implicit self-regulation, the present thesis is especially concerned with the latter—implicit self-regulation as an automatic, mostly unconscious, effortless process. This can actually be contrasted against conscious, non-automatic, effortful self-control and self-discipline.

At first glance, implicit self-regulation could seem to go against the everyday observation that people still have to exert great efforts to overcome even seemingly

small temptations in order to be successful, for example, to get some work done, keep away from cigarettes, stay on diet, and so on. Because of that, one might think that implicit self-regulation contradicts the dual-system theory (Hofmann, Friese, & Strack, 2009; see also Metcalfe & Mischel, 1999; Strack & Deutsch, 2004), which assumes people's behavior is guided by a reflective process on the one hand and an impulsive process on the other. The reflective system is a conscious consideration of what one wants to achieve, often considering long-term goals. It is thought of as the source initiating and maintaining deliberate self-discipline and motivation to resist temptations, requiring mental resources in the process. The impulsive system, on the other hand, is exactly what draws people to those temptations, seeking instant gratification by hedonistic and easily accessible means. Therefore, the reflective system and the impulsive system are often in direct opposition to one another.[4] It was repeatedly observed that people give in to temptations more often after their self-control resources were depleted in a previous task, so that the impulsive system gets the upper hand over the reflective system (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven & Baumeister, 2000; Vohs & Heatherton, 2000; see also Baumeister & Vohs, 2007).

It is important to note that this impulsive system, as the commonly assumed antagonist of the reflective system, is not at all what implicit self-regulation is meant to reflect (see Rothermund, 2011). As suggested by Baumeister et al. (1998; see also Muraven & Baumeister, 2000; Vohs, 2006), self-control/self-discipline can be thought of as a limited resource used to overcome temptations. Implicit self-regulation can then be thought of as an automatic process that makes the temptation weaker and therefore makes goal pursuit demand less of this limited resource (without the use of

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[4] The reflective and impulsive systems do not always have to be antagonistic, and there are deliberate ways to reduce the need for self-control resources in tempting situations, like implementation intentions (Brandstätter, Lengfelder, & Gollwitzer, 2001; Gollwitzer, 1999; Gollwitzer & Brandstätter, 1997), the exertion of mental strategies (Hofmann, Deutsch, Lancaster, & Banaji, 2010), or habit formation (Galla & Duckworth, 2015).

consciously automated strategies like, e.g., implementation intentions; Brandstätter et al., 2001; Gollwitzer, 1999; Gollwitzer & Brandstätter, 1997). In that sense, implicit self-regulation does not stand in contradiction to the dual-system theory. Implicit self-regulation does not necessarily eliminate need for conscious self-control (or work of the reflective system) altogether once a goal is activated. Instead, both implicit self-regulation and conscious self-control should work in tandem for successful goal pursuit (Rothermund, 2011), especially if self-control is a limited resource[5] (see Fitzsimons & Bargh, 2004). A task that serves an overarching goal can still be perceived as aversive and demand conscious self-control, but less so if implicit self-regulation is at work. It is working against temptations and distractions to facilitate current goal pursuit, just as self-discipline is. This protection of a goal from temptations and distractions is also called goal shielding in the literature (see, e.g., Shah, Friedman, & Kruglanski, 2002).

1.4 Different forms of implicit self-regulation

Besides the distinction between conscious self-control/self-discipline and implicit self-regulation, one can further distinguish between different forms that implicit self-regulation can take or in which it can be observed. This naturally ties into the way, in which implicit self-regulation is measured. Since it is basically defined as automatic processes that facilitate an individual's goal pursuit, one can imagine various kinds of such processes.

It is possible to examine differences of approach and avoidance tendencies towards goal-relevant and goal-irrelevant stimuli. Using a joystick task, in which participants have to push stimuli away from or pull stimuli towards themselves, Fishbach and

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[5] There is a growing amount of research qualifying the statement that self-control is a limited resource, for example, having the participant's belief about the depletion or non-depletion of self-control as a moderator (see Job, Dweck, & Walton, 2010). However, for the purpose of the present thesis it will still be assumed as depletable, since this discussion is not the core topic of the thesis.

Shah (2006) show that participants pull goal-related words towards themselves faster than temptation-related words, and push temptation-related words away from themselves faster than goal-related words.

Implicit self-regulation can also take the form of differences in cognitive accessibility of goal-related and goal-unrelated stimuli, given a goal is activated versus not activated. Goal-related stimuli should be more easily identifiable while the recognition of temptation-related stimuli and alternative goals should be inhibited when a goal is activated. For example, after the presentation of temptation-related stimuli as primes that were relevant for a certain goal, a stimulus depicting this goal is identified easier as a word in a lexical decision task (Fishbach, Friedman, & Kruglanski, 2003; Papies, Stroebe, & Aarts, 2008), while temptation-related stimuli after priming with a goal-related word are recognized slower (Fishbach et al., 2003). This inhibition is also observed for alternative goals after a goal has been primed (Shah et al., 2002).

Most relevantly for the present thesis, implicit self-regulation can be observed in terms of differences in implicit evaluations of goal and temptation concepts. This form of implicit self-regulation can also be termed "evaluative goal shielding", since it describes the difference in (or change of) evaluations of goals and alternatives in order to shield the goal against those alternatives. The research on implicit self-regulation has been making more and more use of this measurement, expecting higher positivity for goals than for temptations when a respective goal is activated (e.g., Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach, Zhang, & Trope, 2010; Moore et al., 2011). For the most part, these studies use affective/evaluative priming (Fazio, Sanbonmatsu, Powell, & Kardes, 1986) to capture such evaluations.[6] In this

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[6] In an affective/evaluative priming paradigm a goal or temptation stimulus (in some cases also irrelevant control-stimuli are used) is presented as a prime and shortly after, a clearly positive or negative stimulus (the target) has to be classified as positive or negative via the press of one of two buttons. If the prime is perceived as having the same valence as the target, the response to the target is facilitated, since the prime has already been able to pre-activate this response.

vein, Fishbach et al. (2010) present results for implicit evaluations that parallel the results previously shown by Fishbach et al. (2003) for cognitive availability: After a goal has been activated, implicit evaluations of respective temptation-related stimuli are found to be less positive compared to when the goal has not been activated; and goal-related stimuli are found to be more positive after a respective temptation has been made accessible beforehand.

It is also possible to examine implicit self-regulation in the form of differences of attention allocation to goal-relevant and goal-irrelevant stimuli (see Vogt, De Houwer, & Moors, 2011), and still this list is not exhaustive. There could be other forms as well, such as different selective memories for goal-relevant and goal-irrelevant stimuli (see Appendix A). The present thesis deals with implicit self-regulation in the form of differences in implicit evaluations of goals; more specifically, with the dynamic change of these implicit goal evaluations, i.e., evaluative goal shielding, which is the subject of Chapter 1.5.

1.5   Current misconception about implicit self-regulation

There exists a major drawback in the existing research on evaluative goal shielding as well as implicit self-regulation in general. Instead of an actual process, only static data are examined, from which the process is inferred. Thus, in the best case, the results of implicit self-regulation are observed, but not necessarily an actual form of implicit self-regulation itself. In most instances in the literature, two (or more) between-subject conditions are compared. These conditions can be differentiated by goal priming (Ferguson, 2008; Fishbach et al., 2010), relevance of goal pursuit (Ferguson & Bargh, 2004) or the presence versus absence of a goal itself (Ferguson & Bargh, 2004; Fishbach et al., 2010). It is then examined how differences of approach/avoidance-tendencies towards or cognitive accessibility or automatic evaluations of different stimuli vary between those different groups of goal

activation (Ferguson & Bargh, 2004; Fishbach & Shah, 2006) or in regard to different between-subject moderators (Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach et al., 2003).

The present thesis argues that it is not these differences of evaluation states that should constitute the actual implicit self-regulation measure. Instead, within-subject differences in approach/avoidance-tendencies and attention towards as well as cognitive accessibilities and implicit evaluations of goals between two states of goal activation are the most promising and actually only sensible candidates for the observation and use of real forms of implicit self-regulation processes. As the existing research shows, this does not mean that states cannot be informative by themselves. However, they do not reflect implicit self-regulation as a process. As such, focusing on the implicit evaluations of goals, the present thesis ambitiously aims at measuring changes in these implicit evaluations of goals upon the introduction of a situation that should elicit or demand dynamic self-regulation processes.

Furthermore, the way implicit self-regulation functions should be independent of the goals at hand. So, in order to measure actual implicit self-regulation instead of phenomena that are exclusive to certain constellations or features of specific goals, it is necessary to eliminate the confounding between the content of a goal and its role as either a relevant goal or an irrelevant distraction. Aside from priming studies dealing with short-term effects for cognitive accessibility (see Fishbach et al., 2003; Shah et al., 2002), this has not been attempted yet.

1.6   Practical use of an implicit self-regulation measures

A question that is naturally important in research is whether the examined concepts and measures are actually useful. Accordingly, this has also been part of the research and discussion surrounding implicit self-regulation. Fishbach and Shah (2006) show a positive relation between their implicit self-regulation measure and their

participants' GPA scores as a measure of performance as well as between their implicit self-regulation measure and food choice in the laboratory as a measure of behavior. Ferguson (2007) finds her measure of implicit evaluations to be predictive for subtle prejudice towards elderly people and for how well participants resist food temptations when they are dieting.

If actual implicit self-regulation as a process could be measured in individuals, ideally it would allow for predictions of performance and decisions of these individuals. As the observations of Fishbach and Shah (2006) indicate, it could be another decisive factor for academic success, like intelligence and self-discipline (see Brody, 1997; Deary, Strand, Smith, & Fernandes, 2007; Duckworth & Seligman, 2005; Spinath, Spinath, Harlaar, & Plomin, 2006). This appears especially likely if one takes the recent discussion into account, according to which the everyday understanding of self-control/self-discipline may actually imply effortful resistance of temptations and focus on goals, the use of mental strategies, as well as implicit self-regulation processes (see Fujita, 2011; de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Gillebaart & de Ridder; 2015).

1.7   Moderators of implicit self-regulation

There are situations in which the pursuit of a goal might be more or less desirable or adaptive. In fact, to cling stubbornly to a goal against all odds can be rather maladaptive. Accordingly, implicit self-regulation can be more or less useful. So it is safe to assume that implicit self-regulation and self-regulation processes in general are moderated by a number of different variables that have a relation to the person that holds the goal, and/or to the goal itself.

Most importantly, the present thesis claims that self-regulation should only be necessary when there is conflict to begin with. The greater the conflict is, the more self-regulation should become necessary and adaptive (see Chapter 1.2). There can

even be situations that make any self-regulation superfluous, when "letting go" could be beneficial for the goal pursuit. Fishbach and Shah (2006) show that the stronger temptations are, the more they are shielded against in order to protect the endangered goal pursuit. In contrast, if alternative goals are perceived as facilitative for the focal goal, implicit self-regulation is lowered (Shah et al., 2002). On a more abstract level, this is really about the relation between the goals that might be available at a given moment. The perceived goal conflict as a moderator of evaluative goal shielding will be a focus of the present research.

There are many other variables that should and are partly shown to moderate self-regulation processes in the literature.[7] Such variables are a person's commitment to a goal or the importance the person attributes to the goal, whether the goal is intrinsic ("want-to") or extrinsic ("have-to goal"; Milyavskaya et al., 2015; see also Deci & Ryan, 2000), or how satisfied one is with a goal. So, for example, an argument can be made that an actual goal is only defined with a minimal amount of commitment and importance. If a person does not feel committed to a goal in any way—and therefore should not have any intent of pursuing it—speaking of a goal does make little to no sense to begin with (see Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach et al., 2010; Shah et al., 2002). Similarly, it makes sense, that extrinsically incentivized goals might not be adopted as actual goals as easily as freely chosen goals that a person feels he or she truly wants to achieve (see Milyavskaya et al., 2015). Disengaging from a goal can also be adaptive when its pursuit is unsatisfying or perceived as negative, implying that self-regulation should collapse. Even the degree of competence a person perceives to have in a goal (see Ferguson, 2008) as well as experience of success or failure in goal pursuit (see Ferguson & Bargh, 2004; Moore et al., 2011) have been shown to be possible moderators. Some of these variables were also assessed in the present research to examine their potential influences.

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[7] At least for the measurements of "non-dynamic implicit self-regulation", as it is found in the existing literature (see Chapter 1.5).

2   Present research

The implicit self-regulation process that is examined in the present research can be more specifically described as evaluative goal shielding, i.e., goal evaluations change in order to shield one goal against an alternative (by increasing the goal evaluation and/or devaluing the alternative). This term will be used from this point onwards when talking about the self-regulation process in the context of the present studies.

As discussed in Chapter 1.5, something that surprisingly has not been done yet is the measurement of evaluative goal shielding as an actual change in implicit evaluations of goals within participants over time as opposed to a mere difference between multiple stimulus categories or treatment conditions. That is, implicit evaluations have never been measured twice for every participant in an attempt to observe a temporally dynamic process. However, as discussed before (see Chapter 1.5), it is this temporally dynamic process that should actually constitute evaluative goal shielding, not the measured differences in states that are considered to reflect evaluative goal shielding (and implicit self-regulation in general) in the majority of existing studies.

Especially for the sake of predicting future performance or decisions (or explaining past ones) by evaluative goal shielding on an individual level, those states are unavoidably confounded with the initial evaluations of the goals[8]. So instead of examining implicit self-regulation processes as potentially responsible for success or failure in goal pursuit, implicit evaluations (or approach/avoidance tendencies) might be examined as predictors in those cases. While this is interesting in itself, it should be of far greater concern for the implicit self-regulation research whether the actual changes in the goal evaluations upon encountering obstacles show connections to variables like goal conflict, or even have predictive (and/or

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[8] Naturally, comparisons between conditions do not provide any measure of implicit self-regulation for individual cases. In an attempt to measure implicit self-regulation in individuals, between-subject designs can also only compare evaluation states of different stimulus categories within conditions.

explanatory) power. In other words, is implicit self-regulation itself really a motivational construct that has behavioral consequences? In order to answer this question, it is essential to examine implicit self-regulation as a dynamic process it is actually supposed to be, not just as differences in states of evaluations. Therefore, one of the main efforts of the present research is aimed at doing exactly that.

Another drawback of existing studies is the confounding of the contents of the examined goals with their role as either a goal or a distraction. Again, this has detrimental consequences for the interpretation of the observed results. Is the observed pattern of evaluations indeed the result of self-regulatory processes, or is it merely a result of systematic differences between the two goals (or the goal and temptation)? For example, Ferguson (2008) uses two goals (one academic and one social goal) in her first two experiments. However, in contrast to the present thesis, Ferguson (2008) only examines the evaluations of the academic goal while treating the social goal as a control (besides a neutral control category). She does not activate both goals within participants and never looks at or at least does not report the evaluations of the social goal primes in the social goal condition (nor does her design allow for temporal-dynamic observations). She observes increased positivity towards academic goal primes in the academic goal condition compared to the social goal condition (given participants are skilled in the academic goal). It remains unclear whether this is observed because of features of the academic goal (or the control categories), or whether the observations indeed reflect an implicit self-regulation process that would be triggered by the priming of essentially any goal. Shah and Kruglanski (2002) also use one focal and one alternative goal in their design but do not measure any implicit evaluations or implicit self-regulation directly. Nevertheless, they find the presence of multiple goals and their relation to each other to be critical for goal pursuit.

For that reason the present thesis also uses two goals, an academic and a social one. However, their role in the experiment as either the relevant goal or irrelevant goal/distractor is counterbalanced. For one half of the participants, the academic goal is presented as relevant, for the other half, the social goal is introduced as the relevant one, with the other goal being introduced as a potentially distracting alternative.

So, in the present studies, there are two conditions participants could be in: because these goals are assumed to be prevalent among all students, of which the subject pool has been comprised, either an academic goal (studies; academic frame) or a social goal (finding or maintaining a romantic relationship; social frame) is activated, and then implicit evaluations of these goals are assessed. But in addition, in order to measure the dynamic changes of implicit goal evaluations within subjects, the respective other goal is explicitly introduced and implicit evaluations of the goals are measured again. By doing so, it is possible to observe the temporal-dynamic processes underlying evaluative goal shielding. In addition, by counterbalancing the order of introduction of the two goals, the confounding of the specific contents of the goals (studies versus relationship) with their role in the experiment (goal versus distractor) is avoided.

As noted in the beginning of this chapter, the measure of implicit self-regulation that the present research uses is the evaluative shielding of the relevant goal against the irrelevant one. This means that once the irrelevant goal is explicitly introduced, the implicit evaluation of the relevant goal should become more positive and/or the implicit evaluation of the irrelevant goal should become more negative—i.e., evaluative goal shielding is the (positive) change of the evaluation of the relevant goal relative to the irrelevant one. This should be expected, as these changes in evaluations would facilitate the engagement into the pursuit of the relevant goal and make it easier to resist alternatives.

The definition of which goal is considered to be relevant and which one is considered to be irrelevant is quite intuitive. Whatever goal is introduced first is assumed to be the relevant goal for the session; whatever is introduced afterwards takes the role of the potentially distracting irrelevant alternative. This is exactly what Shah et al. (2002) observe in their studies. They look at multiple goals, but do only for associative accessibility, not automatic evaluations of these goals. Furthermore, there is no goal activation as such. Instead, a priming procedure with a lexical decision task has been used, in which alternative goal stimuli are recognized slower (i.e., inhibited) in case another goal has been shown as a prime before. This very short-term inhibition might translate to a larger time frame and automatic evaluations.

Thus, the findings of Shah et al. (2002) are extrapolated to the present design choice. Instead of a mere trial-by-trial priming of goals for a few hundred milliseconds, which might entail equally short-lived effects, the goal activation in the present design is realized by the means of a questionnaire about the commitment to/importance of (in Experiment 2, also about the explicit evaluations of) the respective goals (see Ferguson, 2008; Ferguson & Bargh, 2004). Thereby, participants are led to reflect on the goals in a deliberate way and presumably, for a longer period of time. However, the present research does not make any predictions about the longevity of the potentially observed self-regulation processes but merely assumes that the duration of the goal activation correlates positively with the salience, intensity, duration, and/or awareness of the goal introduction itself.

The goal introduced first is hypothesized to embody the currently relevant goal. Any goal introduced afterwards would therefore be treated as an irrelevant and potentially interfering distractor.[9] Accordingly, the first goal is the one that should be

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[9] The idea that the perception of the first or second goal as either relevant or irrelevant may differ between people and situations is basically another way of looking at moderating variables—i.e., whether implicit self-regulation/evaluative goal shielding is needed/desired (that is, the goal is relevant) or maladaptive/undesired (that is, the goal is irrelevant; see Chapters 1.2 and 1.7). Overall, it is reasonable to assume that the order of introduction is most likely an impactful factor that

shielded against the second goal. This means the automatic evaluation of the first goal should become more positive and/or the automatic evaluation of the second goal should become more negative. Therefore, evaluative goal shielding is an interaction between relevance and time—i.e., it is a (positive) change of evaluation of the relevant goal relative to the irrelevant one over time.

The first half of the present design somewhat mirrors the comparison of two goals, with one goal activated only, in Ferguson (2008) and other studies. It is therefore expected to see a difference in automatic goal evaluations between the two goal conditions at the first time of measurement already. The academic goal compared to the social goal should be evaluated relatively more positive in the academic frame rather than in the social frame whereas the social goal compared to the academic goal should be evaluated relatively more positive in the social frame rather than in the academic condition. So, translated into the terminology of the present research, there should be a main effect of relevance of the goals overall, and possibly even for the first measurement of the implicit goal evaluations.

2.1 Moderators and control variables

The general role of moderators for implicit self-regulation should not be underestimated (see Chapters 1.2 and 1.7). The present research puts a strong emphasis on goal conflict as an important moderator. Other variables that have been examined include goal commitment (see Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach et al., 2003; Fishbach et al., 2010; Shah et al., 2002), perceived goal competence (see Ferguson, 2008), goal satisfaction and explicit goal evaluation.

Furthermore, as discussed in Chapter 1.6, it is important to show that evaluative goal shielding is not a mere theoretical concept just mirroring another construct, like self-

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determines which goal is perceived as relevant for the session, since the two goals used in the present research do not differ much in importance for students. There are other possible moderating variables, e.g., goal conflict, which is a crucial point in the present thesis.

discipline, that may allow for some observations in the laboratory. Instead, for it to be taken seriously and considered worth of research, evaluative goal shielding has to be shown to have observable consequences, possibly being a useful candidate for explaining and predicting variation in decisions and performance. If evaluative goal shielding is a distinct concept indeed, it should show explanatory and/or predictive power above and beyond other measures such as abilities and personality traits. So, with evaluative goal shielding as a potential variable to explain and/or predict academic performance in mind, the two most commonly found "competitors" in this domain—self-discipline and intelligence (see, e.g., Duckworth & Seligman, 2005)—have been assessed as control variables for regressions as well.

2.2   Measurement of evaluative goal shielding

Most research on evaluative goal shielding uses the evaluative priming paradigm to measure implicit evaluations (Fazio et al., 1986; e.g., Fishbach et al., 2010; Moore at al., 2011). However, after an earlier experiment, involving a masked evaluative priming paradigm, that led to some complications,[10] it was eventually decided to measure automatic evaluations with an Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz., 1998; e.g., Hofmann, Rauch, & Gawronski, 2006) for the present experiments.[11]

Moreover, most of the measurements that infer implicit evaluations from reaction time differences of mere hundreds, often even tens of milliseconds are subject to very low reliability. In the design at hand, with its repeated within-subject measurements, reliability is particularly important, since any inaccuracy of the method affects both measures, polluting the difference metric basically twice as much as a single

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[10] See Appendix B for a short summary.
[11] Another measure of implicit evaluation that is used in the implicit self-regulation research is the affect misattribution procedure (AMP; Payne, Cheng, Govorun, & Stewart, 2005; e.g., Milyavskaya et al., 2015).

measure. With the IAT being by far the most reliable of all implicit evaluation/attitude measures that work with reaction times, it was the natural choice for the present research design (see Bosson, Swann Jr., & Pennebaker, 2000; see also De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009; Meissner & Rothermund, 2013). More specifically, a variant of the IAT was used in order to interpret its results with the so-called ReAL model (Meissner & Rothermund, 2013).

The ReAL IAT[12] is a modified version of the IAT that uses error rates in the prime-target combinations in the two different compatibility blocks[13] to estimate parameters, which mirror the processes that presumably influence the outcome of the IAT: a recoding parameter, association parameters, and parameters for a label-based identification. The recoding parameter (Re), as its name already suggests, estimates the magnitude of recoding used by the participant, i.e., in how far participants make the task easier for themselves in the compatible block by reducing pairs of the attribute and target categories into one single superordinate category. So instead of categorizing the presented stimuli as either positive or negative, or as either academic or social (depending on whether the word is written completely in capital letters or in a usual way), participants might categorize them merely into either stressful or not stressful. Although this recoding can superficially seem to be derived from attitudes, it does not have to be. Other features can be used in order to create superordinate categories as well, salience being one example (Rothermund & Wentura, 2004).

Even if valence indeed were the superordinate category, the observed effects would be due mostly to the difference in task difficulties between the two block types. If participants can recode the target and attribute categories into one set of valence categories, they can only do this in the compatible block (e.g., social/positive and

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[12] In the present thesis, the term "ReAL IAT" is used to denote the modified version of the IAT that is used in order to estimate the parameters of the ReAL model.

[13] The design of the ReAL IAT will be explained in more detail in Chapter 2.4.4.2.

academic/negative). This cannot unambiguously be interpreted in terms of associative links (Rothermund & Wentura, 2004), and it is therefore not the desired measure of the present research.

The parameters for the label-based identification (L) basically estimate a participant's application of the explicit instructions of the IAT. Finally, the association parameters (A) are meant to estimate the actual associations between prime and target categories, which is of most interest for the present research. Unlike the standard IAT, which only provides a relative measure of evaluation (i.e., how positive or negative one target category is evaluated in relation to the other), the ReAL model also allows for an absolute evaluation of each target category in the form of association parameters. Since attitudes are assumed to reflect associations linking the attitude object to the attributes or evaluations ascribed to it (Fazio, Chen, McDonel, & Sherman, 1982; see also Fazio et al., 1986), these association parameters are the core variables that constitute automatic evaluations in the present research. The association parameters assume values between 0 and 1, with values below .5 denoting a negative association, and values above .5 denoting a positive association. The value of .5 is the neutral point.

In the present research, evaluative goal shielding is considered a dynamic change of these association parameters, or implicit goal evaluations. Specifically, it is the change in evaluation of the relevant goal relative to the irrelevant one, i.e., the interaction between relevance of the goal and time of measurement. As one variable, it can be calculated as the change of the difference in evaluations between the relevant ($A^{relevant}$) and irrelevant goal ($A^{irrelevant}$) from before (t_1) to after (t_2) the explicit introduction of the irrelevant goal (see formula below). The higher the value of evaluative goal shielding is, the more the relevant goal is shielded against the irrelevant one.

Evaluative goal shielding $= \left(A_{t2}^{relevant} - A_{t2}^{irrelevant} \right) - \left(A_{t1}^{relevant} - A_{t1}^{irrelevant} \right)$

2.3 Overview

The present thesis aims to expand the research on implicit self-regulation in multiple ways.

(1) It introduces a design that allows for a measurement of evaluative goal shielding as a temporally dynamic process that it is supposed to be. Instead of mere differences in implicit evaluations of goals (or temptations), the actual changes of these implicit goal evaluation differences are measured within subjects from before to after the explicit introduction of an alternative goal, a situation demanding implicit self-regulation. It is hypothesized that the evaluation of the relevant goal should become more positive relative to the irrelevant alternative goal. For the measurement of the implicit evaluations, the ReAL IAT, an instrument that has not been previously used in implicit self-regulation research, is employed.

(2) It is examined, whether the relation the two goals have to each other, i.e., the degree of goal conflict, has a moderating effect on the potentially observed evaluative goal shielding.

(3) The design avoids confounding goal content (i.e., studies or relationship) with the role of the goal (i.e., relevant or irrelevant) by counterbalancing the roles of the two goals, effectively making the observations more generalizable and independent of specific features of one of the goals or one particular combination of a relevant and an irrelevant goal.

(4) It is examined whether evaluative goal shielding has any explanatory and/or predictive power with respect to academic performance while controlling for self-discipline and intelligence.

2.4   Experiment 1

The main aim of Experiment 1 was to show the temporal dynamics of evaluative goal shielding while ruling out the confounding of the role of the goal (as either an actual goal or a distractor) with the actual content of the goal. So, a relative increase of positive implicit evaluation of the first (i.e., relevant) goal compared to the second (i.e., irrelevant) goal after the explicit introduction of the second goal was predicted, regardless of whether the social or academic goal was introduced first. In statistical terms, an interaction between relevance and time was expected, which in turn, should not interact with the framing condition. The factor of time had the following two values: t_1, "before the explicit introduction of the second goal"; and t_2, "after the explicit introduction of the second goal". Self-discipline and intelligence were assessed as control variables for a possible regression of academic performance on evaluative goal shielding. The commitment to/importance of the goals was assessed as a means to activate the goals themselves. A few other variables were assessed exploratively. Those were satisfaction with or explicit evaluations of the goals, and relationship status.

2.4.1   Participants

Sixty students of different fields of study of the Friedrich Schiller University Jena participated in the first experiment. They were recruited from a large subject pool of the Max Planck Institute of Economics and the Department for Empirical and Experimental Economic Research. Two participants had to be removed from all analyses, since they apparently had not solved the tasks as instructed. One of them was the only far outlier with respect to the average reaction times in the IAT and thereby ignored the adapting reaction time deadline (as described in greater detail in Chapter 2.4.4.2) in 37 % of all cases. The other participant showed an unusually high error rate (46 %, outlier) while having a reaction time below 250 ms in 86 % of mixed

trials in the IAT, suggesting that he or she had been quickly pressing random buttons in order to speed up the progress in the task. The remaining 58 participants (28 female, 30 male) were on average 23.45 years old (SD = 3 years); 24 of them were single, and 34 were in a relationship.

2.4.2 Design

The experiment basically consisted of a 2 (frame: academic goal first vs. social goal first) × 2 (goal: academic vs. social) × 2 (time: t_1, before vs. t_2, after the explicit introduction of the second goal) mixed design, with the frame being a between-subject factor. The goal and time were within-subject factors.

Since it was assumed that the first goal should be perceived as relevant, while the second goal should be perceived as irrelevant, the design was slightly simplified by combining the frame and the goal into one factor of relevance to ignore the specific goal content. This was to emphasize the anticipation of the effects being independent of goal content, and resulted in a 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) within-subject design. As it will be seen later, the between-subject factor of the frame (i.e., the order of goal introduction) will still be used in some instances.

2.4.3 Apparatus and material

The experiment was programmed in E-Prime 2.0. Everything in writing appeared in black letters, and points of rating scales were equally sized grey rectangles, all against a white background.

In most questionnaires, the participants were asked to rate statements on a 7-point Likert scale from "do not agree at all" to "completely agree". Items used to measure commitment had been inspired by previous research (see Ferguson, 2008; Ferguson & Bargh, 2004). For self-discipline, there were various short questionnaires. Among them was the Brief Self-Control Scale (BSCS) by Tangney, Baumeister, and Boone

(2004), the Urgency Subscale by Whiteside and Lynam (2001), some items for tenacity taken from Shah et al. (2002), as well as a number of items created specifically for self-control and self-regulation. The latter two were designed to disentangle self-control as a resource and self-regulation as a temptation-mitigating process in order to see whether people are aware of this distinction and/or apply it themselves.

Explicit evaluation of studies was assessed with a single item. Relationship satisfaction was assessed with the Relationship Assessment Scale by Hendrick (1988), and corresponding items to assess the satisfaction with being single were created.

For the measurement of intelligence, it was necessary to find something adequately short. While it would not result in the most reliable of intelligence measures, the compromise could not be circumvented, as the duration of one experimental session was not supposed to exceed 75 minutes. So, the short form of the Raven Advanced Progressive Matrices Test by Arthur and Day (1994) was used for an approximation of fluid intelligence, and the MWT-B (*Mehrfachwahl-Wortschatz-Test*, version B) by Lehrl (2005) was used for an estimation of crystallized intelligence.

In the Implicit Association Test (Greenwald et al., 1998), modified for the ReAL model (Meissner & Rothermund, 2013), the two target categories of studies and relationship were each represented by eight exemplary words that partly had been taken and translated from earlier studies using affective priming (see Ferguson, 2008) or joystick tasks (see Fishbach & Shah, 2006), and partly had been selected to fit the aforementioned categories. The two attribute categories of positive and negative consisted of eight clearly valenced words each, commonly used in evaluative priming and IAT studies. Close attention was paid to ensure that the exemplars of the attribute categories were not associated with the target categories in any way. According to common practice, the exemplars of the attribute categories were shown in capital letters. The exemplars of the attribute categories were written in the usual German way, i.e., the first letter capitalized, as all were nouns or nominalized verbs.

All questionnaires in their entirety, test items, and word stimuli of the ReAL IAT of Experiment 1 can be found in Appendices C (ReAL IAT stimuli), D (questionnaires), and E (tests). All materials are in German; for the ReAL IAT stimuli, English translations are provided.

2.4.4 Procedure

One session lasted approximately 60 minutes. Two sessions were run; one with 28 and one with 32 participants. Upon entering the PC laboratory, the participants were assigned to their seats randomly. They were given some general instructions about the experiment verbally. All other instructions were presented on the screen. The participants were informed that they would receive 2.50 € as a show up fee, 7.50 € for completing the experiment, and potentially another 2 € depending on their performance (more than 70 % within response deadline, and a maximum of 30 % incorrect responses) in order to incentivize performance and following the instructions. Figure 1 provides an overview of the procedural parts, which are explained in detail in the following chapters.

2.4.4.1 Activation of the first goal

One half of the participants were allocated to the academic framing condition, the other half to the social framing condition (depending on whether their seat number was even or odd). The participants in the academic frame were asked about their field of studies and the semester they were in, and had to rate statements about the commitment to their studies using the 7-point Likert scale. Similarly, the participants in the social frame were asked about their relationship status as well as for how long they had that status, and then rated statements about the commitment to their relationship or a search thereof, depending on their relationship status, using the same scale. This procedure, while assessing goal commitment, was also meant to activate the respective goal and establish it as the relevant one for the session.
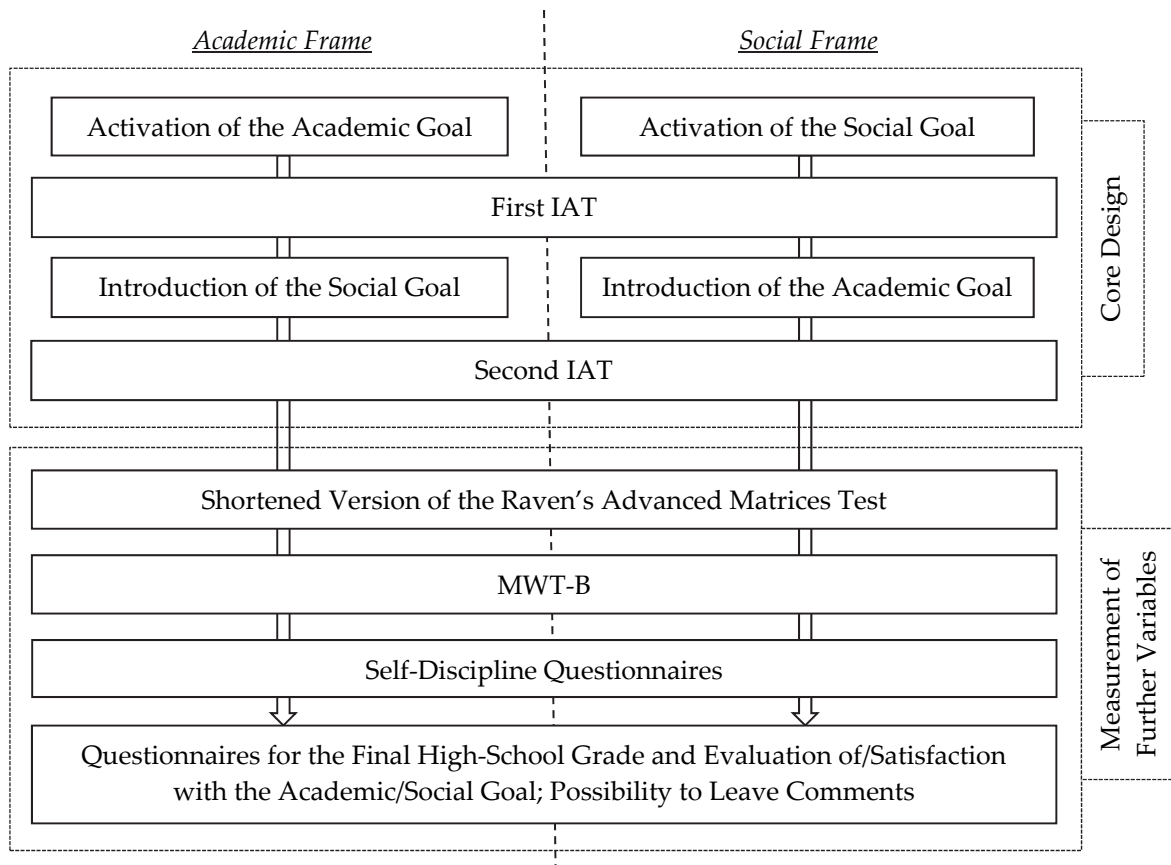
Figure 1:   Overview of the procedure of Experiment 1. The goals are activated/introduced by asking the participants about their commitment to the respective goal.

2.4.4.2 ReAL IAT

Upon establishing the relevant goal, the first ReAL IAT was conducted. The block structure of the IAT is provided in Figure 2 as a complementary overview beside the following description. Like in a usual IAT, the participants first practiced categorizing clearly valenced words into either one of the two attribute categories, called "positive" or "negative", by pressing one of two keys. The keys were "D", which is located on the left side of the keyboard (i.e., the left key), and "L", which is located on the right side of the keyboard (i.e., the right key). The "positive" category was always assigned to the right key while the "negative" category was always assigned to the left key.

Left Key	Number of Trials	Right Key	
NEGATIVE	16	POSITIVE	
Relationship	16	Studies	
NEGATIVE Relationship	33	POSITIVE Studies	5 Practice Blocks
Studies	16	Relationship	
NEGATIVE Studies	33	POSITIVE Relationship	
NEGATIVE Relationship	33	POSITIVE Studies	Repeated 5 Times = 10 Test Blocks
NEGATIVE Studies	33	POSITIVE Relationship	
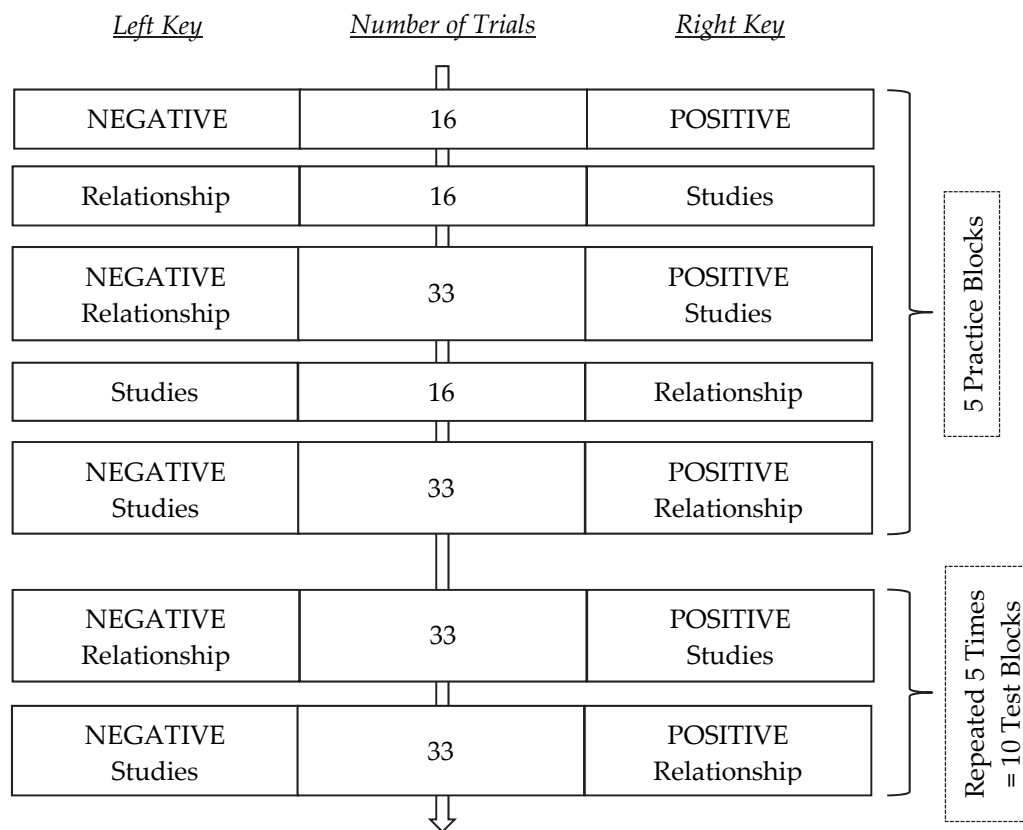
Figure 2: The sequence of blocks in the IAT, showing the key assignment and number of trials (i.e., categorization decisions) in each block. The starting assignment of "studies" and "relationship" (and accordingly the switching of the key assignment) was counterbalanced across the participants. The first of the 33 trials of each combined block had the role of a warm-up trial and was excluded from all analyses.

In the second short practice block, the participants had to categorize words that are associated with either relationship or studies, into those very target categories.[14] The starting assignment of the categories either to the left or right key was counterbalanced across the participants in both goal framing conditions.

The third practice block was a combined block, in which one attribute and one target category shared one key each. The participants had to categorize capitalized words into either positive or negative, and words written in the usual German way into

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[14] The word length of the stimuli was roughly counterbalanced across all four categories. This way, the participants could not determine the correct category simply by looking at the word length but had to comprehend the actual semantic meaning of the word.

either relationship or studies. The key assignment was the same as in the preceding practice blocks.

After the combined block, the participants had to briefly practice the simple categorization of words into either relationship or studies, but with the respective opposite key assignment. This was meant to ease the participants into the repeated switching of key assignment between blocks. Then, a final combined practice block with the opposite key assignment of relationship and studies followed (with the participants having to categorize capitalized words into either positive or negative, and words written in the usual German way into either relationship or studies). Afterwards, the 10 test blocks followed, with the key assignment switching from block to block.[15]

During the task, the categories were always shown on the upper left and right sides of the screen according to their key assignment. Every trial started with an otherwise blank screen for 200 ms, followed by the stimulus word, which was essentially shown until the participant pressed the correct key. However, the participants had been instructed to respond before a certain deadline, otherwise a red frame would appear around the stimulus word (only in the combined blocks).

The deadline (i.e., the time until the appearance of the red frame) varied. In the first two combined blocks, the frame would appear 750 ms after the onset of the stimulus word but that would adjust depending on the individual performance. The adjustment was supposed to make it more likely to observe sufficiently many incorrect responses (about 30 %), which are required, as the parameters of the ReAL model for the IAT are estimated through the pattern of incorrect responses in certain stimuli-block combinations (see Meissner & Rothermund, 2013). The deadline was

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[15] The first trial of each combined block would later be excluded from all analyses, since participants had to "warm up"/get used to the task again, rendering the first trial unreliable. Therefore, a filler trial always preceded the 32 test trials.

adjusted every two combined blocks conditionally on the error rates in the two preceding combined blocks in the following way:

- it was decreased by 150 ms, if the error rate had been smaller than 5 %;

- it was decreased by 100 ms, if the error rate had been between 5 and 15 %;

- it was decreased by 50 ms, if the error rate had been between 15 and 30 %;

- it was increased by 50 ms, if the error rate had been between 30 and 45 %;

- it was increased by 100 ms, if the error rate had been greater than 45 %.

The response deadline could not decrease below 400 ms, and was only adjusted in the abovementioned way if the participant had met the deadline in more than 13 of the 66 trials of the previous two combined blocks. In case the deadline had been ignored more often, the participant was again urged to respond within the deadline.

In case a participant responded incorrectly, a short message would appear, saying that a mistake was made and prompting to continue with the correct response key. If no mistake was made, the next trial would start without interruption. Apart from the first filler trial, which was randomly drawn from all possible stimuli, all stimuli were shown in a randomized order in the remaining trials but with the constraint that task switches and task repetitions would occur equally often in all four categories (again, that method is required for the parameter estimation of the ReAL model; see Meissner & Rothermund, 2013).

Participants had been told beforehand that the additional payment of 2 € was contingent on their performance in the IAT, which meant having a maximum of 30 % incorrect responses and meeting the response deadline in a sufficient number of trials. The actual number had not been given to the participants to make sure they would not take it as their aspiration level but rather do their best.

2.4.4.3 Explicit introduction of the second goal and second IAT

After the first IAT, the participants were explicitly introduced to the respective second goal, basically mirroring the introduction of the first goal. They had to answer the same questions and had to rate the same statements regarding their commitment on the same Likert scale as the respective other group in the very first part of the experiment. Immediately after that, the second IAT was conducted, which was identical in procedure to the first one.

2.4.4.4 Assessment of further variables

To assess intelligence, the shortened version of the Raven's Advanced Matrices Test and the MWT were the next step. In the Raven's Advanced Matrices, a three by three matrix of patterns is shown, with one pattern missing. Below the matrix, eight candidates are shown, and the participant has to pick the missing one. This has to be done for twelve matrices in the short version. The MWT consists of 37 trials of increasing difficulty, in which five words are shown in each trial. Only one of these words is an actual German word, and participants have to decide which one that is. In both tests, the score is essentially the accuracy rate, calculated by the number of correct answers over the number of items.

The MWT was followed by the self-discipline measures. There, the participants had to rate statements regarding their self-discipline using a Likert scale. The number of points on the scale could vary between 4 and 7, depending on the specific construct.

As the last step, the participants had to answer some additional questions about their studies and relationship status, and yet again rate statements using a 7-point Likert scale that was supposed to assess their satisfaction with the two goals. The individual scores for all questionnaires were calculated as averages of all ratings of a given concept. As a measure of academic performance, the participants were asked about their final high-school grade. In the end, they were allowed to leave comments and

were informed about their performance in the IAT as well as whether they had earned the additional 2 € (in case of a minimum of 80 % responses within the response deadline and 70 % accuracy) or not.

2.4.5 Results

The main hypothesis was tested in a 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) analysis of variance (ANOVA) with the association parameter as the dependent variable. The predicted interaction between relevance and time reached significance, $F(1, 57) = 2.803$, $p = .05$ (one-tailed[16]; see Figure 3). While the relevant goal increased in value (although not significantly), the irrelevant goal was devalued (almost significant in a one-tailed t-test). A direct comparison with t-tests revealed that at least the difference in evaluations between the relevant and irrelevant goal at t_2 was significant, $t(57) = 2.782$, $p = .004$ (one-tailed). There was also a significant main effect of relevance, $F(1, 57) = 3.587$, $p = .032$ (one-tailed), denoting an overall more positive implicit evaluation of the relevant than the irrelevant goal.

It was tested in a 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) × 2 (frame: academic goal first vs. social goal first) ANOVA with the association parameter as the dependent variable whether the observed relations were indeed independent of the specific combination of goal contents. As predicted, the three-way interaction between relevance, time, and the frame was not significant, $F(1, 56) < 1$, indicating that it does not matter for the dynamics of evaluative goal shielding which goal had been established as the relevant or irrelevant one.[17] Even though asking about relationship might invoke associations different between singles and people that are in a relationship, relationship status did not show any interaction with the effects.

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[16] An F-test with one degree of freedom basically corresponds to a t-test (see Maxwell & Delaney, 2004). If the hypotheses are directional—as it is the case here—one-tailed tests are to be used.
[17] See Appendix F for standard IAT analyses.
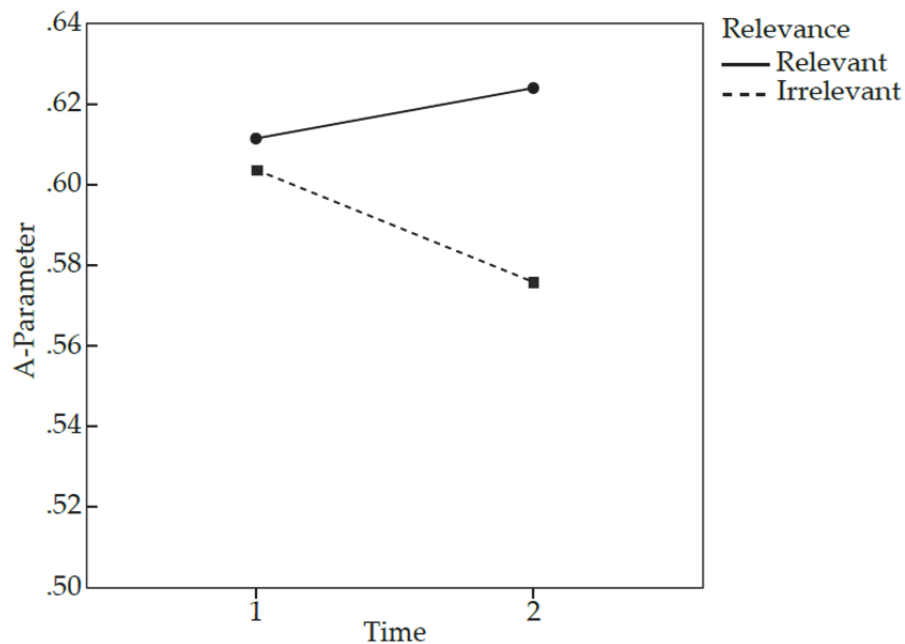
Figure 3:   Significant interaction between the relevance of the goals and the time of measurement. The difference of the evaluations of the goals, measured by the association parameters (.5 marks a neutral evaluation, values greater than .5 denote a positive association, and values smaller than .5 denote a negative association), is bigger at t_2 than t_1. Both goals are estimated to be associated positively.

2.4.5.1 Explanation of academic success by evaluative goal shielding

An attempt was made to find explanatory power of evaluative goal shielding for past academic performance when controlled for competing personality traits that should account for academic success. For that purpose, the final high-school grade was regressed on evaluative goal shielding[18] and its interaction with the framing condition as well as on intelligence and self-discipline. The interaction between evaluative goal shielding and the framing condition was included because of the conceptual difference that goal shielding implies in the two frames. In the academic frame, it protects the academic goal and inhibits the social one, whereas this is the other way around in the social frame. This will be discussed in more detail in Chapters 2.5 and 2.5.5.1 when this issue becomes even more relevant due to the data of Experiment 2. Most of the measures of self-discipline showed substantial positive

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[18] See Chapter 2.2 for the definition of evaluative goal shielding as one variable.

inter-correlations.[19] Thus, just the BSCS, as a more established instrument, was used in order to measure self-discipline in the analysis.

Since the variables included in the regression were measured on different scales, and since an interaction term is incorporated into the regression, all variables were z-standardized, so that the coefficients could still be compared and interpreted. There were only 46 observations for that analysis due to either missing or incorrectly entered values of the grade. The grade was inverted so that higher values represent better academic performance. The overall model failed to reach significance, $F(5, 40) = 1.272$, $p = .148$ (one-tailed), with self-discipline providing the only significant coefficient, $\beta = .329$, $SE = .151$, $p = .018$ (one-tailed); the implication being the more self-discipline, the better the final high-school grade. That was confirmed by a simple correlation between self-discipline and the final high-school grade, $r = .34$, $p = .01$.

2.4.5.2 Explorative analysis of goal conflict

Experiment 1 was not designed to capture the individual perception of the relation between the two goals. However, there is evidence that the relation between the goals is potentially interesting. For example, Fishbach and Shah (2006) report that temptations become more inhibited the stronger they actually are.

Since something like the strength of goal conflict was not directly measured in Experiment 1, an attempt was made to find an approximate operationalization. The best candidate for that purpose seemed to be satisfaction with or evaluation of the irrelevant goal, the rationale being that the happier one is with something, the more tempting it should be to spend time with it, resulting in a potential conflict with the

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[19] Even the items created to capture the understanding of explicit self-regulation positively correlated with both the items created for self-control, $r = .62$, $p < .001$, and the BSCS, $r = .442$, $p < .001$. This seems to suggest that people do not explicitly differentiate between the two concepts of self-regulation and self-control.

relevant goal. However, since people not in a relationship were asked about their satisfaction with being single, that operationalization is only straightforward for the evaluation of studies and satisfaction with an existing relationship. Because of that, the satisfaction measurement was inverted for singles, resulting in a measure of how unsatisfied they were with being single. This was supposed to approximate the motivation to actually search for a relationship.

So, goal conflict in the social frame was operationalized as the explicit evaluation of studies. In the academic frame, goal conflict was operationalized as the satisfaction with their relationship for people in a relationship and the dissatisfaction with being single for singles. The variable was then dichotomized by a median split[20] and used in a 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) × 2 (goal conflict: low vs. high) ANOVA with the association parameter as the dependent variable.

This revealed a significant three-way interaction between relevance, time, and goal conflict, $F(1, 56) = 3.173$, $p = .04$ (one-tailed), in the predicted direction (see Table 1 for descriptive statistics). The interaction between relevance and time only reached significance in case of high goal conflict, $F(1, 25) = 6.253$, $p = .001$ (one-tailed), showing a significant decrease in the evaluation of the irrelevant goal, $t(25) = 3.668$, $p < .001$ (one-tailed), but no change for the relevant one, $t(25) < 1$. The correlation between goal conflict and evaluative goal shielding also yielded a significant result, $r = .318$, $p = .008$ (one-tailed).[21]

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[20] In the present research, whenever a continuous variable was used as a dichotomous factor in an ANOVA, it had been dichotomized into "low" and "high" using a median split. Although this sometimes did not ensure that equal numbers of participants ended up in both groups (due to the clustering of people on the median itself), it was still used to follow the common practice in the literature. The ANOVA was used as the first analysis of choice for the sake of readability and clearer representation of interaction effects, and due to the theoretical considerations of a threshold model (see Chapter 2.5.5). Still, being aware of potential problems of variable dichotomization by median split (see MacCallum, Zhang, Preacher, & Rucker, 2002), a complementary correlation between the continuous variable and evaluative goal shielding was always conducted to capture the same interaction without the loss of information and also to test for a linear relationship.
[21] See Appendix G for additional moderator analyses.

Table 1

Means and standard deviations of the association parameters for the goals before (t₁) and after (t₂) the explicit introduction of the second goal, split into low and high goal conflict.

			Mean	Standard Deviation
Low Goal Conflict (*N* = 32)	Relevant Goal	t_1	.607	.1058
		t_2	.623	.1091
	Irrelevant Goal	t_1	.589	.1309
		t_2	.603	.1146
High Goal Conflict (*N* = 26)	Relevant Goal	t_1	.617	.1009
		t_2	.626	.0983
	Irrelevant Goal	t_1	.621	.1112
		t_2	.542	.1137

Notes: An association parameter of .5 marks a neutral evaluation, association parameters greater than .5 denote a positive association and smaller than .5 denote a negative association. Both goals are found to be evaluated positively. Goal conflict was dichotomized by a median split.

2.4.6 Discussion

The results of Experiment 1 support the idea of temporally dynamic evaluative goal shielding triggered by the explicit introduction of a second goal, independent of the specific goal contents: the irrelevant goal became devalued in relation to the relevant goal, confirming the main hypothesis; and this process was not further moderated by the framing condition, indicating that evaluative goal shielding operates in a generic fashion when an established goal is threatened by the introduction of a potentially distracting alternative. No evidence for an interaction with relationship status was found. This suggests that there was no essential difference in the conceptualization of relationship as a goal between singles and people who actually are in a relationship.

In addition, there was a main effect of relevance of the goal, basically replicating the often found "static" evaluative goal shielding effect in earlier research (e.g., Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach et al., 2010): the relevant goal was evaluated more positively than the irrelevant one. Interestingly, this difference in

implicit evaluations only appeared after the explicit introduction of the second goal but not before.

This observation underlines the importance of the discussed dynamics but also comes as a surprise, since existing literature seems to suggest that the difference in evaluations should exist after the activation of only one goal already. On the other hand, this might stem from the fact that existing literature confounds the specific contents of the goals with their roles as either an actual goal or a distractor, sometimes even using goals and their respective associated temptation. As the findings of Fishbach et al. (2010) indicate, those concepts might be activated simultaneously to begin with. In their experiments, the presentation of temptations elicits the activation of the respective over-arching goal, while the activation of a goal inhibits the perception of the respective temptation, suggesting that these concepts are related (even with the effects they have on each other being asymmetric).

In the present research, however, the target categories were both important goals that did not necessarily have much to do with each other perceptually when the focus was not directed at both within a short period of time, as it was the case at t_2 in the present study. More importantly, their role as either the relevant or irrelevant goal was counterbalanced. So, the possibility that potential evaluation differences are due to either the features of one of the goals or one specific combination of these goals as the actual goal and distractor was ruled out, which is not the case in the literature, thus allowing for an alternative explanation.

Perhaps one of the most intriguing results, guiding the direction of the following research, was the interaction between evaluative goal shielding with goal conflict. Fishbach and Shah (2006) and Fishbach et al. (2010) observe that implicit evaluation differences, i.e., "static" evaluative goal shielding, can be moderated by temptation strength in their designs, and Shah et al. (2002) find the interrelation of goals to be of importance for goal shielding. Hence, it is interesting to observe a similar effect in the

present study. Studies and relationship might not be perceived as conflicting with each other as such—and the operationalization of goal conflict in the present study was very rough indeed—but they certainly can be perceived as more or less conflicting or synergizing. So whether or not this finding is taken seriously, it definitely put some focus on the importance of the interrelation of goals, thereby inspiring the research question of Experiment 2.

2.5 Experiment 2

Encouraged by the results of Experiment 1, another experiment was conducted in order to substantiate and extend the findings. Most importantly, Experiment 2 was designed to examine the role of the interrelation of the goals in greater detail. It was hypothesized that evaluative goal shielding depends on the perceived conflict between the two goals, with higher conflict making evaluative goal shielding more important. This would essentially be a three-way interaction between relevance, time, and goal conflict.

Furthermore, another and greater effort was made to establish evaluative goal shielding as a variable with explanatory and predictive power with respect to goal success. After all, the establishment of evaluative goal shielding as a concept that can prove useful in everyday life and natural settings is an important endeavor that is often incorporated in evaluative goal shielding research, but so far mainly in the laboratory alone, and confounded with the initial implicit evaluations of the goals (see Ferguson, 2007; Fishbach & Shah, 2006). For the explanatory and/or predictive power of evaluative goal shielding to be of distinct usefulness, it has to explain and/or predict variation in a performance measure that goes beyond the variation that can be explained by competing concepts, such as intelligence and self-discipline.

Since no explanatory power of evaluative goal shielding for the final high-school grade was found in Experiment 1, academic performance measures in closer

temporal proximity were included. Evaluative goal shielding may in fact be more situational than personality traits like self-discipline or intelligence. As such, in Experiment 2 the objective measures for past academic performance were extended to the final high-school grade, the average grade in studies, and the grade in the most recent exam. In an attempt to explain performance in the social goal pursuit, the duration of the current relationship or the inverted duration of being single (depending on the relationship status; potential problems of this operationalization will be discussed in Chapter 2.5.63.5) was measured. In order to test the predictive validity of evaluative goal shielding for academic performance, a short follow-up study was conducted recording the grade in an exam following Experiment 2.

Evaluative goal shielding should be able to explain variation in the performance measures even if controlled for intelligence and self-discipline. However, its explanatory and/or predictive power could possibly be moderated by goal conflict, since it might only operate when actually necessary, i.e., in case of high goal conflict. Another moderator could be the goal frame. Depending on the framing condition, the conceptual implications of evaluative goal shielding differ. In the academic frame, evaluative goal shielding denotes that the academic goal becomes evaluated more positively relative to the social goal, which would promote academic but impede social performance. This is the other way around in the social frame where evaluative goal shielding denotes that the social goal becomes evaluated more positively relative to the academic goal, which would promote social but impede academic performance.

2.5.1 Participants

Again, participants were recruited from the subject pool of the Max Planck Institute of Economics and the Department for Empirical and Experimental Economic Research, resulting in a sample of 96 students of various fields of study of the

Friedrich Schiller University Jena. Nobody who participated in Experiment 1 was allowed to participate in Experiment 2. All participants seemed to have been following instructions precisely, resulting in no suspicious reaction times or error rates. Thus, there was no need to exclude any participants from the analyses. The participants were 24.22 years (SD = 3.16 years) old on average. Two thirds were female, one third were male, with 56 being in a relationship and 40 being single.

2.5.2 Design

At its core, the experiment consisted of the same simplified 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) within-subject design as the first experiment, with the frame (academic goal first vs. social goal first) as a possible between-subject factor, which determines which goal (i.e., academic vs. social; within) is established as the relevant and which as the irrelevant one. Perceived goal conflict was assessed via a questionnaire and transformed into a dichotomous factor (low vs. high) by a median split, resulting in a 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) × 2 (conflict: low vs. high) mixed design for the moderator analysis.

Other variables measured were commitment to each goal, satisfaction with each goal, explicit evaluation of each goal, relationship status, and perceived competence in each goal. Again, intelligence and self-discipline were taken as control variables for the explanation/prediction of performance.

2.5.3 Apparatus and material

The experiment was programmed in E-Prime 2.0 with the same presentation parameters as in Experiment 1. Following comments by some participants of the first experiment, select word stimuli of the attribute categories were changed as they seemed to have been perceived as overly ambiguous.

Furthermore, in Experiment 2—in comparison to Experiment 1—self-discipline measurements were reduced (only the items for self-regulation and self-control, and the BSCS were used) and the items for the goal satisfaction assessments were refined. Some items to assess explicit goal evaluation right after the goal commitment measurement, as well as additional items to assess perceived competence in the goal pursuits were included, and items for the assessment of perceived goal conflict were created. All Likert scales were homogenized to a standard 7-point format. The measurement of perceived goal conflict varied depending on the framing condition, always assessing the distracting nature of the irrelevant with respect to the relevant goal. The participants were also asked for their final high-school grade, their average university grade and their most recent exam grade. Those were meant to be objective measures for academic success while the duration of a relationship or the negative duration of being single was assessed as a potential measure for success regarding the social goal. Again, all additional stimuli, questionnaires, and items can be found in Appendices C, D, and E, next to the materials of Experiment 1.

2.5.4 Procedure

With a few exceptions, the procedure was identical to that of Experiment 1. In the instructions, more emphasis was put on the framing of the first goal in order to establish it as the relevant one for the session. This was done by framing either the academic or the social goal as the most critical component of the experiment. Accordingly, the introduction of the second goal did not mirror the introduction of the first goal anymore, but was instead brought up in a less pronounced way. The instructions read in rough translation, "Besides [THE RELEVANT GOAL] one usually has other, possibly even competing goals. Therefore, this next part shall be about [THE IRRELEVANT GOAL]." The words in capital letters were replaced with the corresponding goals.

In addition to goal commitment, explicit goal evaluation was measured in order to activate the respective goals. The Likert scales for measuring perceived goal conflict, perceived competence in goal pursuit, and goal satisfaction followed the second IAT, with goal conflict being assessed in the beginning of that questionnaire. For consistency, the participants in the academic frame were first asked about their studies and only then about their relationship/being single (depending on their relationship status). The participants in the social frame answered these questions in the reverse order. Afterwards, the shortened Raven's Advanced Matrices, the MWT-B, and the self-discipline measures followed. The questions about the grades and the duration of being single or of the current relationship were asked towards the end of the experiment. In addition, the participants had to write down a personal identification code[22], so their data could be anonymously matched with data of a short follow-up survey a few months later (description follows further below).

The reward for performance in the IAT and subsequently the overall payments were more gradual to further motivate the participants by endorsing a more performance-contingent reward scheme. The participants received 2.50 € as a show-up fee, 5.50 € for completing the experiment, and either no additional reward (in case of less than 70 % of responses within the response deadline or more than 30 % incorrect responses) or an additional payment of 2 € (in case of a minimum of 70 % but less than 80 % of responses within the response deadline and at least 70 % correct responses) or an additional payment of 4 € (in case of 80 % or more responses within the response deadline and at least 70 % correct responses). One session ran for approximately 60 to 70 minutes.

Additionally, the verbal instructions at the beginning of the experiment pointed out that the experiment would involve a task that could be perceived as challenging and

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[22] The code consisted of the third letter of the participant's place of birth, the second letter of his or her first name, the first letter of his or her mother's first name, the second number of his or her day of birth, and the second number of his or her month of birth.

possibly even exhausting by some people, and that participants should try not to become frustrated, since it was practically impossible to execute the task with 100 % accuracy. That information was added in order to mitigate any potential frustration. A number of frustrated comments in Experiment 1 referring to the difficulty of the IATs indicated that such frustration might be a problem for the execution of the task.

About six months later, an invitation to a short online survey was sent out to all participants of Experiment 2. The survey was built with Google Forms and included items to assess satisfaction with the academic and social goal, commitment to and explicit evaluations of those goals, as well as goal conflict. For all those assessments, the same items and Likert scale, as in Experiment 2, were used. Since neither a relevant nor an irrelevant goal was given, all items (ruling out overlaps) from both framing conditions were used for goal conflict. Most importantly, the participants were asked about their grade in the next exam following Experiment 2. To facilitate the recall of that exam, the participants were asked further questions about it (e.g., what the subject was; how many weeks after the experiment it took place) and were provided with temporal cues (e.g., the date of the experiment; the number of weeks between the experiment and Christmas as well as between the experiment and Easter).

Altogether, 38 out of 96 participants of Experiment 2 completed the online survey. However, only 23 of those both had a grade to report and managed to enter the same personal code as needed to match the experimental data.

2.5.5 Results

According to the main hypothesis of Experiment 2, perceived conflict was used in a 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) × 2 (conflict: low vs. high) ANOVA with the association parameter as the dependent variable. As predicted, it revealed a significant three-way interaction between relevance, time, and conflict,

$F(1, 94) = 4.068$, $p = .023$ (one-tailed), as well as a significant main effect of relevance, $F(1, 94) = 6.717$, $p = .006$ (one-tailed), showing more positive evaluations of the relevant than irrelevant goal.

Upon further inspection, the direction of the three-way interaction turned out to be as expected, with evaluative goal shielding lower in case of low conflict than in case of high conflict. The exact pattern of the underlying process happens to be very specific, though. The interaction between relevance and time was found significant, $F(1, 47) = 3.393$, $p = .036$ (one-tailed), only in case of low perceived goal conflict. The same was true for the main effect of relevance, $F(1, 47) = 6.282$, $p = .008$ (one-tailed). Figure 4 reveals that in case of low conflict, the evaluation of the relevant goal starts out significantly more positive than that of the irrelevant one, $t(47) = 3.321$, $p = .002$, but drops significantly in evaluation upon the explicit introduction of the irrelevant goal, $t(47) = 2.014$, $p = .05$, while the evaluation of the irrelevant goal remains virtually
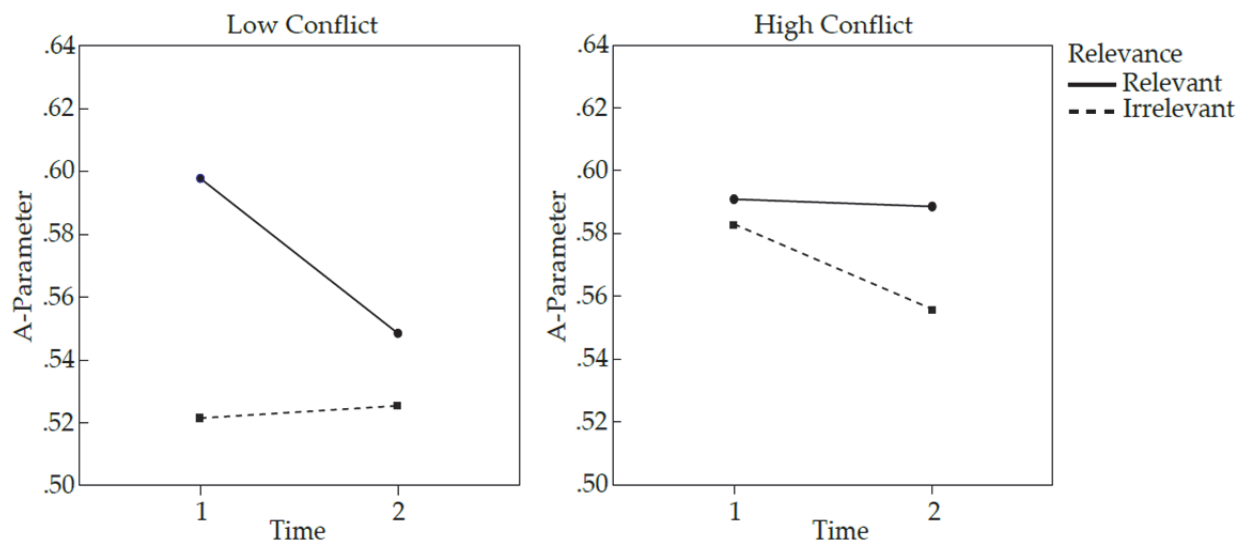

Figure 4:   Significant three-way interaction between the relevance of the goal, the time of measurement, and perceived goal conflict in Experiment 2. Evaluative goal shielding, measured by the change in the difference between the association parameters of the goals, is more pronounced in case of high conflict.

unchanged, $t(47) < 1$. In contrast, in case of high conflict, the irrelevant goal is devalued, while the evaluation of the relevant one stays the same, even though the interaction does not reach significance, $F(1, 47) < 1$.

Still, the pattern of the three-way interaction between relevance, time, and conflict is quite clear: evaluative goal shielding is more pronounced for high than for low goal conflict. This pattern is also independent of the framing condition, as no four-way interaction with the framing condition was found after its inclusion as an additional factor, $F(1, 92) < 1$.

Despite the significant interaction between relevance, time, and conflict in the ANOVA, the estimation of the correlation between the perceived goal conflict and evaluative goal shielding surprisingly did not yield a significant result, $r = .101$, $p = .164$ (one-tailed). In order to find an explanation for this discrepancy between the ANOVA and the correlation coefficient, the data were visualized using a scatter plot (see Figure 5) and examined for extreme values that might have biased the regression.[23] Indeed, some values were identified as outliers, which was especially true for goal conflict. To limit the heavy influence of outliers without excluding those observations, the data for goal conflict and evaluative goal shielding were winsorized, i.e., observations with values below the 5th percentile were recoded to have the value that corresponds to the 5th percentile, while observations with values above the 95th percentile were recoded to have the value that corresponds to the 95th percentile. Additional four observations showed an unduly influence on the regression as defined by a Cook's Distance $> (4 / (n - k - 1))$ (n = sample size, k = number of predictors; see Fox, 1991, pp. 30). After these four cases were excluded,

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[23] The median split used to transform perceived goal conflict into a dichotomous factor for the ANOVA has the inherent advantage of shielding against potential influence of outlying values. Thus, the discrepancy between the ANOVA and the correlation coefficient could potentially be explained by outlying values.
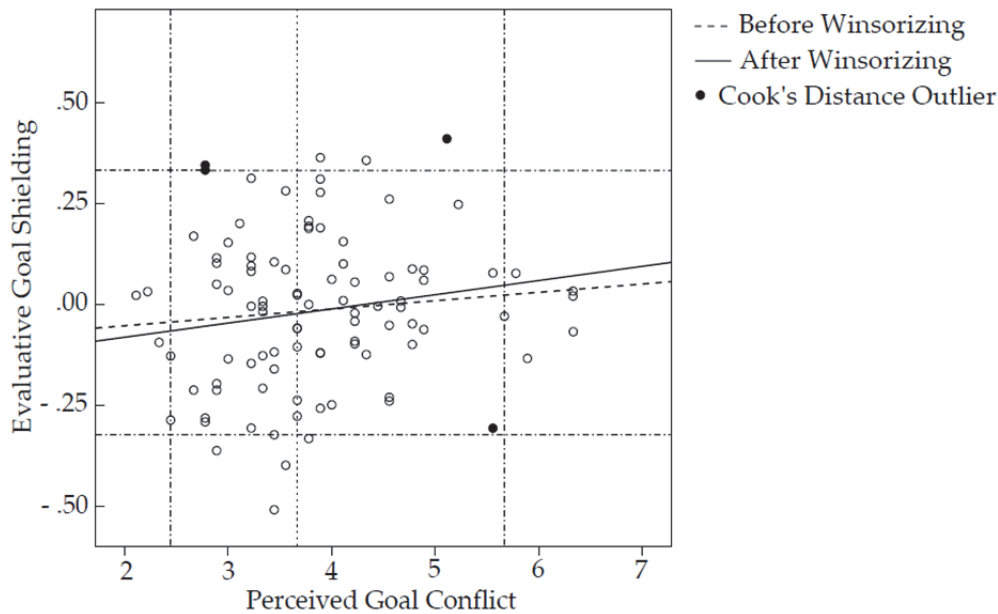
Figure 5:   Scatter plot showing correlation between perceived goal conflict and evaluative goal shielding with fitted regression lines. Evaluative goal shielding is coded as the change of the difference in evaluations between the relevant and irrelevant goal from before to after the explicit introduction of the irrelevant goal. The vertical dotted line represents the median score of goal conflict. The horizontal and vertical dot-and-dash lines denote the values, to which more extreme values have been winsorized.

the winsorized correlation coefficient reached significance, $r = .173, p = .049$ (one-tailed).[24]

While this resolved the discrepancy between the ANOVA and the correlation coefficient, it might be worthwhile to entertain another theoretical possibility. Perhaps the test of a strictly linear relationship between perceived goal conflict and evaluative goal shielding does not optimally capture the functional relation between these two constructs. It could be that goal conflict is a concept that has an individual switching point, below which the goals are perceived and categorized as non-conflicting or even facilitating each other, and above which this perception and categorization switches to that of actual goal conflict. The degree of evaluative goal

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[24] The pattern of results of the ANOVA was not affected, if the median split was applied after the exclusion of these cases, and the new dichotomized variable for goal conflict was used as a factor. If anything, the pattern became even clearer.

shielding might actually depend more on this qualitative categorization rather than on a continuous, quantitative degree of goal conflict. The likelihood of categorizing goals as conflicting with one another should increase with goal conflict, but not necessarily linearly, but instead in a logistic or step manner, which would explain why the ANOVA might be the more adequate analytical tool to capture the relation between goal conflict and evaluative goal shielding.

The overall evaluative goal shielding effect, as found in Experiment 1, was tested in a 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) ANOVA with the association parameter as the dependent variable. However, this time there was no trace of interaction between relevance and time, $F(1, 95) < 1$. The main effect of relevance was more pronounced than before, $F(1, 95) = 6.704$, $p = .011$, with the evaluation of the relevant goal being more positive than that of the irrelevant one. The inclusion of the framing condition as another factor did not show a significant three-way interaction between relevance, time, and the frame either. There was a significant interaction between relevance and the frame, $F(1, 94) = 10.764$, $p = .001$, indicating a greater difference in evaluations in the social rather than in the academic frame. This basically shows the difference in the evaluations of the academic and the social goal, implying more positive evaluations of the social than the academic goal, $t(95) = 3.176$, $p = .002$.[25] Again, relationship status interacted neither with relevance and time, nor with relevance, time, and goal conflict, suggesting that there was no substantial difference in the conceptualization of relationship as a goal between singles and people who actually are in a relationship.[26]

2.5.5.1 Explanation of academic and/or social success by evaluative goal shielding

It was tested whether evaluative goal shielding can explain academic success beyond what intelligence and self-discipline can (see, e.g., Duckworth & Seligman, 2005).

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[25] See Appendix F for standard IAT analyses.
[26] See Appendix G for additional moderator analyses.

Academic success was operationalized by the final high-school grade, the average university grade, and the most recent exam grade. All values for grades were inverted so that higher values represent better performance. Relationship success was approximated by the duration of the current relationship or the inverted duration of being single (depending on the relationship status). The BSCS was used as the self-discipline measure (the measures for self-control, explicit self-regulation, and the BSCS showed positive inter-correlations, $.398 < r < .671$, all $ps < .001$).

The main focus was on evaluative goal shielding and its interaction with perceived goal conflict as explanatory variables, and fluid intelligence and self-discipline as control variables. Furthermore, the framing condition was included, as it is potentially an interacting factor. While it is possible that evaluative goal shielding is a trait-like concept that predicts any kind of success independent of the type of measurement, it is also reasonable to expect that the difference in what evaluative goal shielding actually entails in the two framing conditions could determine its explanatory power. While it promotes the pursuit of the academic goal and impedes the pursuit of the social goal in the academic frame, it promotes the pursuit of the social goal and impedes the pursuit of the academic goal in the social frame (see Chapter 2.5).

In order to make coefficients comparable and interpretable, all dependent and independent variables were z-standardized. The fact that no explanatory power of evaluative goal shielding was found for the final high-school grade in Experiment 1 led to the consideration that evaluative goal shielding (or implicit self-regulation in general) might be less stable than personality traits but more dependent on situational factors (e.g., life circumstances). Therefore, the emphasis was put on the most recent exam grade first.

In order to find the best fitting model with evaluative goal shielding as the most important predictor, an initial regression of the most recent exam grade on

evaluative goal shielding only was conducted and then additional independent variables were introduced into the model in a series of regressions. Each regression was compared to the previous model. First, conflict and its interaction with evaluative goal shielding were added, then frame and its interactions with evaluative goal shielding and conflict were added, then intelligence and lastly self-discipline were added.

Each new introduction of explanatory variables increased R^2 significantly (all changes in $R^2 > .032$, all changes in $F > 3.186$, all ps $< .036$, one-tailed). Both coefficients for intelligence and self-discipline had the intuitive signs, i.e., the more one has of either, the better the grade becomes (see Table 2 for detailed regression statistics). The negative sign of the interaction between evaluative goal shielding and goal conflict was unintuitive at first sight, i.e., the higher the conflict was, the more the grade would suffer with more pronounced evaluative goal shielding. However, the interaction between evaluative goal shielding, conflict, and the framing condition was also found to be significant, indicating a difference between the two frames. Thus, the analyses were repeated for the framing sub-groups.

In the academic frame the only significant coefficient was self-discipline, i.e., the more self-discipline, the better the grade. In the social frame, on the other hand, the introduction of self-discipline did not increase the model fit significantly, but the interaction between evaluative goal shielding and perceived goal conflict, and intelligence did (changes in $R^2 > .069$, changes in $F > 4.07$, ps $< .026$, one-tailed). This indicated that a better grade is associated with higher intelligence. Since evaluative goal shielding shields the social goal from the academic one in the social frame, the negative coefficient for the interaction between evaluative goal shielding and conflict makes sense as well: the higher the goal conflict the more the exam grade suffers when the positivity of the social goal increases relative to that of the academic one.

In the model explaining the final high-school grade, the coefficients of intelligence, self-discipline, as well as the interaction between evaluative goal shielding, conflict and the framing condition were found to be significant. Accordingly, the analyses were repeated for the framing sub-groups. In the academic frame, the intuitive relations were observed: the more intelligence or self-discipline, the better the grade. Also, the higher the goal conflict, the better the grade becomes when evaluative goal shielding increases. In the social frame, only intelligence was found to have a positive relation to better grades (see Table 2).

When explaining the average university grade, the coefficients for intelligence and self-discipline were found to be positive, while the coefficient of interaction between evaluative goal shielding and conflict was found to be negative. Explorative analyses within the framing conditions revealed that this pattern was only present in the social frame again, where it would make sense, but the interaction that would qualify the difference between the framing conditions did not reach significance this time around (see Table 2).

Trying to explain success in pursuing the social goal yielded another peculiar result. As it turns out, the only significant model was the one with evaluative goal shielding as the only independent variable, $R^2 = .06$, $\overline{R}^2 = .049$, $F(1, 82) = 5.232$, $p = .025$, $\beta = -.241$, $SE = .105$, $p = .025$. The negative coefficient indicates that the success in the pursuit of the social goal actually suffers with higher evaluative goal shielding regardless of the framing condition. This seemed to be more pronounced in the academic frame, where evaluative goal shielding implies devaluation of the social goal relative to the academic one, but the interaction with the framing condition did not reach significance. Besides the lack of this interaction (that would qualify the difference between the frames), the operationalization of success in pursuing the social goal might be problematic. This will be discussed in detail in Chapter 2.5.6.

Table 2

Regressions explaining the most recent exam grade and final high-school grade, both for the full sample and for academic and social framing sub-groups separately, as well as the regression explaining the current average university grade for the full sample.

Dep. Variable	Model Summary	Indep. Variable	β	SE	p
Most Recent Exam Grade	$R^2 = .288$ $\bar{R}^2 = .205$ $F(9, 77) = 3.458$ $p = .004$ $N = 87$	(Constant)	.062	.098	.267
		EGS	.027	.099	.393
		Conflict	.120	.109	.137
		Frame	− .020	.099	.419
		EGS × Conflict	**− .322**	**.118**	**.004**
		EGS × Frame	.051	.097	.299
		Conflict × Frame	**.204**	**.108**	**.031**
		EGS × Conflict × Frame	**− .359**	**.119**	**.002**
		Intelligence	**.194**	**.100**	**.027**
		Self-discipline	**.219**	**.100**	**.016**
Most Recent Exam Grade (Academic Frame)	$R^2 = .257$ $\bar{R}^2 = .159$ $F(5, 38) = 2.623$ $p = .039$ $n = 44$	(Constant)	.065	.124	.301
		EGS	− .102	.126	.212
		Conflict	− .058	.128	.325
		EGS × Conflict	.081	.154	.300
		Intelligence	.132	.126	.150
		Self-Discipline	**.369**	**.121**	**.002**
Most Recent Exam Grade (Social Frame)	$R^2 = .359$ $\bar{R}^2 = .292$ $F(4, 38) = 5.328$ $p = .002$ $n = 43$	(Constant)	.021	.150	.444
		EGS	.094	.147	.262
		Conflict	.297	.176	.050
		EGS × Conflict	**− .664**	**.174**	**< .001**
		Intelligence	**.304**	**.151**	**.025**
Final High-School Grade	$R^2 = .236$ $\bar{R}^2 = .157$ $F(9, 86) = 2.960$ $p = .004$ $N = 96$	(Constant)	− .018	.096	.427
		EGS	.074	.100	.230
		Conflict	.108	.103	.147
		Frame	**.169**	**.097**	**.042**
		EGS × Conflict	.136	.118	.126
		EGS × Frame	.102	098	.151
		Conflict × Frame	.029	.103	.388
		EGS × Conflict × Frame	**− .234**	**.119**	**.026**
		Intelligence	**.342**	**.098**	**< .001**
		Self-Discipline	**.262**	**.098**	**.004**

Continued on the Next Page

Continuation of Table 2

Dep. Variable	Model Summary	Indep. Variable	β	SE	p
Final High-School Grade (Academic Frame)	$R^2 = .394$ $\bar{R}^2 = .322$ $F(5, 42) = 5.464$ $p < .001$ $n = 48$	(Constant)	− .206	.130	.061
		EGS	− .041	.135	.382
		Conflict	.146	.125	.124
		EGS × Conflict	**.418**	**.163**	**.007**
		Intelligence	**.461**	**.133**	**< .001**
		Self-Discipline	**.459**	**.125**	**< .001**
Final High-School Grade (Social Frame)	$R^2 = .120$ $\bar{R}^2 = .038$ $F(5, 42) = 1.462$ $p = .230$ $n = 48$	(Constant)	.140	.134	.150
		EGS	.201	.139	.078
		Conflict	.111	.159	.244
		EGS × Conflict	− .088	.164	.298
		Intelligence	**.261**	**.138**	**.032**
Current Average University Grade	$R^2 = .308$ $\bar{R}^2 = .209$ $F(9, 63) = 3.112$ $p = .004$ $N = 73$	(Constant)	.052	.107	.314
		EGS	− .098	.105	.179
		Conflict	− .005	.120	.483
		Frame	.091	.108	.201
		EGS × Conflict	**− .254**	**.123**	**.021**
		EGS × Frame	− .153	.103	.071
		Conflict × Frame	.170	.119	.079
		EGS × Conflict × Frame	− .145	.123	.122
		Intelligence	**.297**	**.108**	**.004**
		Self-Discipline	**.305**	**.113**	**.004**

Notes: The number of observations varies across regressions due to missing grades. $\bar{R}^2$ denotes the adjusted R^2, β denotes the observed coefficients, *SE* denotes the standard errors, and EGS denotes evaluative goal shielding. Grades have been inverted so that higher values represent better performance. All variables have been *z*-standardized. If the interaction term of evaluative goal shielding, perceived goal conflict, and the framing condition was found to be significant, individual regressions are presented for either framing condition. All tests of the coefficients are one-tailed.

2.5.5.2 Prediction of academic success by evaluative goal shielding

To attempt to predict academic performance, the grade in the exam following Experiment 2 was collected in a short follow-up survey about six month later. Unfortunately, not many participants responded and managed to fill out the survey appropriately, which resulted in a rather small number of observations ($N = 23$).

None of the variables measured by the Likert scales provided any sensible results. The most important analysis was of course the regression of the exam grade (again, inverted, so that higher values would represent better performance) on evaluative goal shielding, intelligence, self-discipline, as well as all possible interactions between evaluative goal shielding, perceived goal conflict, and the framing condition. The grade in the exam preceding Experiment 2 was used as another control variable. Again, the independent variables were introduced in the following order: evaluative goal shielding, goal conflict and its interaction with evaluative goal shielding, the framing condition as well as its interactions with goal conflict and evaluative goal shielding, intelligence, self-discipline, and finally, the grade in the exam preceding Experiment 2 (one participant dropped out of the analyses because of missing data).

Neither model reached significance.[27] Interestingly enough, upon the introduction of intelligence, both the coefficients of evaluative goal shielding and intelligence were found to be significant, $\beta = .785$, $SE = .381$, $p = .029$ (one-tailed), $\beta = .551$, $SE = .276$, $p = .033$, respectively. There was no significant interaction with either goal conflict or the framing condition. Because of that result the regressions were simplified. Only evaluative goal shielding, intelligence, self-discipline, and the grade in the exam preceding Experiment 2 were included step by step. Again, once intelligence was included, the model reached significance with no further improvements beyond that. Therefore, in the final specification, the grade in the exam following Experiment 2 was regressed on evaluative goal shielding, $\beta = .772$, $SE = .217$, $p = .001$, and intelligence, $\beta = .724$, $SE = .199$, $p < .001$; $R^2 = .463$, $\bar{R}^2 = .406$, $F(2, 19) = 8.179$, $p = .003$. Only one participant had failed his or her exam (i.e., the exam grade was equal to 5). If the exam grade is considered on a metric scale, that data point appeared an outlier.

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[27] In these analyses the old variable for goal conflict was used. When using the new variable for goal conflict, the general pattern turned out to be very similar.
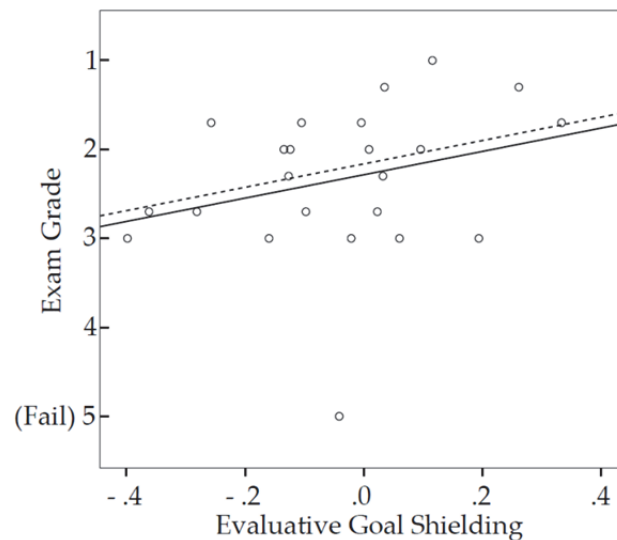
Figure 6:   Scatter plot of the linear regression of the grade in the exam following Experiment 2 on evaluative goal shielding. Again, evaluative goal shielding is coded as the change of the difference in evaluations between the relevant and irrelevant goal from before to after the explicit introduction of the irrelevant goal. The solid line fits all data points ($\bar{R}^2 = .037$), the dashed line represents the regression line in case the failing participant is neglected (i.e., the exam grade is equal to 5; $\bar{R}^2 = .109$). Technically, the distance between the grades of 4 and 5 cannot be defined, since anything worse than 4 is an automatic fail.

However, anything worse than a grade of 4 is a fail immediately without any further gradations, so this approach is technically incorrect. Still, a fail might justify the exclusion of the data point, since there is even less control over the exact performance and its source than for other grades. If it was indeed removed, the regression reached significance without the introduction of intelligence, $R^2 = .151$, $\bar{R}^2 = .109$, $F(1, 20) = 3.557$, $p = .037$ (one-tailed). In such case the coefficient of evaluative goal shielding was found to be positive, $\beta = .297$, $SE = .158$ (see Figure 6). Intelligence alone was not sufficient in any case but still improved the overall fit of the model.

2.5.6 Discussion

In Experiment 2, it was expected that perceived goal conflict between the two goals would moderate evaluative goal shielding, since more evaluative goal shielding is

needed in case of higher goal conflict. The significant interaction between relevance, time, and goal conflict, that was found, shows exactly that. The pattern happened to be rather peculiar: initially, the evaluation of the relevant goal was much more positive than that of the irrelevant goal, but the relevant goal was devalued upon the explicit introduction of the irrelevant goal in case of low conflict only. In case of high conflict, the evaluation of the relevant goal remained rather stable, while the evaluation of the irrelevant goal dropped (although not significantly so).

One difference in design between Experiment 2 and Experiment 1 was a stronger emphasis on the framing of the relevant goal, making either the academic or social goal more salient. Perhaps this already could have led to an initial conceptualization of the first goal as the relevant one and the second goal as a distractor, whereas in Experiment 1 such contrast was only stimulated once the second goal was explicitly introduced. This would explain the much more positive implicit evaluation of the relevant goal in comparison to the irrelevant goal that was present at t_1 (but not at t_2). This is in line with other studies, which do not have two points of measurement (e.g., Ferguson, 2008; Fishbach et al., 2010).[28]

So, the observed pattern of interaction between relevance, time, and goal conflict might reflect maintaining (or a slight increase of) evaluative goal shielding that is already in progress, in case of high goal conflict, or "letting go" of the goal, in case of low goal conflict. This can be interpreted as permission to be distracted or avoidance of distraction, respectively. If there is no conflict between the goals, there is no reason to shield the relevant goal from the irrelevant one, so evaluative goal shielding is not maintained. Switching to the irrelevant goal is not problematic for the pursuit of the

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[28] A t-test to compare the evaluation of the irrelevant goal at t_1 in Experiment 1 with its evaluation at t_1 in Experiment 2 showed that the irrelevant goal was evaluated more negatively in Experiment 2, $t(152) = 2.427$, $p = .016$. The evaluations of the relevant goal at t_1 did not differ between the experiments. However, the interaction that would qualify the difference between Experiment 1 and Experiment 2 with respect to the difference between evaluation of the relevant and irrelevant goal at t_1 did not reach significance, $F(1, 152) = 1.656$, $p = .2$.

relevant one. However, if the goals are perceived as conflicting and intrusion by the irrelevant goal can jeopardize the pursuit of the relevant one, the degree of evaluative goal shielding remains constant or even increases slightly, as the tendency to devalue the irrelevant goal would suggest (see Chapter 1.2).

Without any further moderation, the interaction between relevance and time, observed in Experiment 1, was not found in Experiment 2. One can only speculate about the source of this difference. A possible explanation is the difference between the ways the irrelevant goal was introduced in the experiments. In Experiment 1, both goals were introduced in a very balanced fashion, the only difference being the order of introduction. In Experiment 2, however, the relevant goal was emphasized as relevant, while the irrelevant goal was introduced as one of a number of other goals one might have that, critically for the phenomenon at hand, could potentially conflict with the relevant goal. While such wording was meant to further emphasize the conflicting nature of the goals, it might have actually focused the participants' attention onto the subtle dynamics between the goals, emphasizing either the presence of goal conflict or the lack thereof. Thus, the dependence of evaluative goal shielding as either desirable or undesirable on the participants' perception of this relation might have become stronger. This is possibly what is observed in the moderation by goal conflict in Experiment 2, and what might be the reason for the lack of interaction between just relevance and time.

To explain past academic performance, evaluative goal shielding worked when interacted with perceived goal conflict, further dependent on the framing condition. It was found that the degree, to which the most recent exam grade suffered from evaluative goal shielding of the social goal, was positively related to the perceived level of conflict between the social and academic goal. A similar pattern was observed when explaining the average university grade. Also, the higher the perceived goal conflict, the more beneficial evaluative goal shielding of the academic

goal for the final high-school grade in the academic frame was. The variation explained by evaluative goal shielding goes beyond that explained by intelligence and self-discipline (as it is usually found in the literature, these two coefficients are also individually significant and positive).

In addition, evaluative goal shielding was found to predict future academic performance (as measured by the grade in the exam following Experiment 2), the implication being the stronger evaluative goal shielding is, the better the grade becomes. Interestingly enough, this was especially pronounced when controlled for fluid intelligence, just as intelligence only predicted the exam grade when controlled for evaluative goal shielding. As found in explorative analyses, fluid intelligence interacted with evaluative goal shielding in a way that indicates more pronounced evaluative goal shielding for low rather than high intelligence, $F(1, 94) = 5.632$, $p = .02$ (this pattern was also observed in Experiment 1 but did not reach significance), and a small negative correlation between intelligence and evaluative goal shielding, $r = -.205$, $p = .045$, was observed. The two variables combined were able to predict more than 40 % of the variation in exam performance, while neither could predict even 5 % alone. This pattern of results seems to suggest an opposing or rather compensating relation between intelligence and evaluative goal shielding. Perhaps, people that score higher on intelligence are better at compensating for a lack of implicit self-regulation, or evaluative goal shielding, or do not have to rely on implicit self-regulation that much in order to achieve academic success. However, this should not imply any causality and is highly speculative anyway.

Interestingly enough, evaluative goal shielding predicted the grade in the exam following Experiment 2 independently from the framing condition, even though the actual goal shielded is different between the two frames. This opens up the possibility that evaluative goal shielding, or implicit self-regulation in general, is indeed a trait-like construct applicable to any goal pursuit, even if measured for

another goal. More research is needed to shed light on these findings and this intriguing possibility.

There was another surprising finding in regard to the explanation of relationship success. The correlation between evaluative goal shielding and approximation of success in pursuing the social goal was found to be negative. As noted in Chapter 2.5.5.1, this could stem from a potential problem in the way relationship success was operationalized. Instead of measuring actual relationship success by using the duration of the relationship or the inversed duration of being single as an approximation for success, perhaps it was the urgency for evaluative goal shielding that was measured indirectly. The shorter the relationship or the longer one is single (both reflecting poor relationship success in the present study), the more important it might actually be to shield against competing alternatives. There is some research pointing in this direction, indicating that implicit self-regulation processes (like evaluative goal shielding) are particularly pronounced when reciprocal romantic interest is shown by a potential partner or if an existing relationship is threatened (see Koranyi & Rothermund, 2012; Koranyi & Rothermund, 2012b). Although it might not be precisely the same (since the studies by Koranyi and Rothermund dealt with romantic alternatives instead of alternative goals), this mechanism could come close enough to offer an explanation for the pattern found in the present study.

3   General discussion

Overall, the experimental data provide support for the hypotheses. That is:

(1) There is clear indication of evaluative goal shielding being a temporally dynamic process that can be observed when an alternative is introduced to a goal that was activated before.

(2) Evaluative goal shielding is further moderated by the conflicting relation, in which the goals are perceived to be.

(3) As anticipated, both experiments showed the independence of evaluative goal shielding from the specific combination of the contents of the goal and the distractor.

(4) Evaluative goal shielding, when interacted with perceived goal conflict, was able to explain variation in past academic performance, and it could even predict variation in future performance beyond that explained by intelligence and self-discipline.

In the following chapters, these four results are discussed in greater detail one by one. Afterwards, limitations of the present research are acknowledged. That chapter also includes a discussion of further interesting and potentially relevant aspects that have not been part of the present studies. Finally, the last chapter outlines perspectives for future research.

3.1   Temporal dynamics of evaluative goal shielding: One thing at a time

The present studies examined implicit self-regulation as a change in the implicit evaluation of one goal relative to another, i.e. evaluative goal shielding. This temporal-dynamic change in the participants' perceptions or evaluations of the goals

constitutes an actual regulatory process as opposed to a mere difference in states of implicit evaluation between different stimulus categories. These states, mostly used as the implicit self-regulation measure in the literature, are confounded by the initial evaluations and perceptions of the goals, and the commonly used between-subject comparisons do not provide implicit self-regulation measures for individual cases.

In the domain of mental accessibility, Shah et al. (2002) use a priming study to provide some insight into the short-term inhibition of alternative goals. If a goal-related word is presented as a prime and milliseconds later a letter string is shown, this letter string is then easier recognized as a word in a lexical decision task when it does not represent an alternative goal (compared to a word that does represent an alternative goal), that is, words representing alternative goals are seemingly inhibited.

The present research substantially expands this finding by shedding light on how implicit goal evaluations change when a goal is activated and an alternative enters the picture shortly after, thereby showing the temporal-dynamic process of evaluative goal shielding for the very first time. This dynamic adaptation of implicit goal evaluations for a facilitated goal pursuit is observed when both goals are activated by having participants cognitively reflect on them over the course of multi-item questionnaires and with a temporal distance of up to 20 minutes from each other.

3.2 Moderating effects of goal conflict and other variables: Friend or foe

The response to the introduction of an alternative goal, i.e. temporally dynamic evaluative goal shielding, can be moderated by various factors. The literature offers a number of potential moderators for non-dynamic measurements of implicit self-

regulation (which might not be implicit self-regulation after all, as this thesis argues; see Chapter 1.5). Examples include factors like the experience of success or failure in goal pursuit (Ferguson & Bargh, 2004; Moore et al. 2011), temptation strength of the distractor/alternative goal (Fishbach & Shah, 2006, Fishbach et al., 2010), skill (Ferguson, 2008), or perceived self-regulatory success (Fishbach et al., 2003). Also, goal commitment and goal importance are being used as moderators in the literature (Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach et al., 2003; Fishbach et al., 2010). The examination of some of these variables in the present research can also be seen in Appendix G.

The present thesis puts an emphasis on the perceived conflict between the goals as a moderator for evaluative goal shielding. Evaluative goal shielding is particularly important if the goals at hand would otherwise interfere with each other. If no such conflict exists or if the goals are in a mutually reinforcing relation, there is no need to shield one against the other. The observed moderation goes in line with these expectations: i.e., evaluative goal shielding can be seen in situations, in which it is desirable (i.e., in case of high goal conflict) but it is absent when it is not needed (i.e., in case low goal conflict). This is also in line with the priming studies of Shah et al. (2002), who find the inhibition of alternatives perceived as facilitative to the goal at hand to be decreased.

Interestingly enough, the findings of Shah and Kruglanski (2002) seem to go against that. The authors do not directly measure any implicit self-regulation as such, but they observe that the priming of an alternative goal perceived as facilitative to a focal goal actually draws resources and persistence towards the focal goal whereas the priming of an unrelated alternative goal draws resources and persistence away from it. The finding is explained using the idea that a facilitative alternative might be perceived as a means to achieve the focal goal. The fact that means really activate the respective goal was later confirmed by Shah and Kruglanski (2003). However, the

findings of Shah and Kruglanski (2002) remain peculiar in light of the results of Shah et al. (2002) as well as of those of the present research. It is possible that Shah and Kruglanski (2002) assessed some other, non-facilitative relation, not a facilitative one, and the perception of a lack of relation could also reflect the absence of conflict. For example, if the tasks were perceived as substitutable, this would be in line with Shah et al. (2002) who found greater inhibition of alternatives if their relation to the goal was perceived as such. This remains speculative and perhaps only stresses the need to assess the relation between goals in an even more specific manner in future research.

3.3 Independence of goal contents: A rose is a rose is a rose

Earlier designs studying implicit self-regulation usually suffered from confounding the roles of a goal as either an actual goal or a distractor with its specific content. For example, Fishbach et al. (2003) contrast dieting with food, Fishbach and Shah (2006) contrast academia with nonacademic activities, Ferguson (2008) contrasts academia with socializing. However, it is never examined whether the same processes would still be observed if the categories were to be switched around. This does not devalue those studies but leaves one question open. Are the observations bound to features of specific goals or to certain combinations of goals as the goal and the distractor? In other words, are the specific contents of the goal and the distractor important? Or is there indeed an implicit self-regulation process that works in a general fashion independently of goal contents?

For that reason, the two goals in the present studies were counterbalanced with respect to their role as either relevant or irrelevant. And indeed, the implicit self-regulation process that was observed, i.e., evaluative goal shielding, was not dependent on the goal framing condition. It did not matter, whether the participants'

studies or a romantic relationship had been set as the relevant goal with the respective other goal introduced later as an alternative; the patterns observed in the two conditions were not significantly different. The relevant goal was shielded against the irrelevant one.

Of course, two experiments using the same two goals as target categories do not justify a complete generalization. There could still be cases where evaluative goal shielding or implicit self-regulation in general only works one way, i.e., one specific goal is protected against one specific temptation, regardless of circumstances and setup, not the other way around. But it can be argued that even in these cases, implicit self-regulation is moderated, for example, by goal conflict, goal commitment, goal importance, goal satisfaction, or the source of motivation. After all, if there is no commitment, no importance, no behavioral intention, it hardly makes sense to speak of a goal to begin with. In many cases, it might even be adaptive to disengage from a goal when the pursuit seems hopeless, is unreasonably costly, or its success does not yield the expected or desired outcomes. In this vein, Brandstätter and Rothermund (2002) suggest a two-process framework with an assimilative mode—wherein a person tries to alter the situation according to his or her goal pursuit—and an accommodative mode—wherein goals are adjusted to match personal resources and abilities better. So, an apparent failure in evaluative goal shielding and in goal pursuit might actually constitute an adaptive disengagement from a goal (see Rothermund, 2011). As discussed in Chapter 3.2, it is vitally important to take moderators into account.

If there is no goal, there is nothing to shield, and there can be no temptations (see Milyavskaya et al., 2015). So, as long as there are two true goals that can be activated, evaluative goal shielding should work in favor of one and against the other. Which is which, then depends on which one is currently pursued, whether the pursuit is

worthwhile, and whether goal shielding is needed (i.e., whether there is goal conflict or not). A goal is a goal is a goal.

3.4   Evaluative goal shielding and its explanatory and predictive power: What is it good for?

The search for predictive validation of implicit self-regulation (and implicit evaluations) has been going on more or less successfully for quite some time now. Fishbach and Shah (2006) report a positive relation between their implicit self-regulation measure and their participants' GPA scores in one study and between the implicit self-regulation measure and food choice in the laboratory in another study. In Ferguson (2007), a measure of implicit evaluations predicts subtle prejudice towards elderly people as well as how well participants can resist tempting foods when participants are on a diet. The degree of their resisting is assessed by asking participants how often they have been resisting eating tempting foods 7 to 9 days after the experiment. The present research adds to these findings by explaining/predicting more objective measures of performance, and doing so in a natural setting outside the laboratory. Most importantly, unlike in Ferguson (2007), it is the dynamic process of evaluative goal shielding, not a measure of implicit evaluations, that predicts such behavior.

The present research showed that evaluative goal shielding when interacted with conflict had explanatory power with respect to the most recent exam grade as well as the final high-school grade, even after controlling for self-discipline and intelligence, which are also considered to explain a lot of variation in academic success in the literature (e.g., Brody, 1997; Deary et al., 2007; Duckworth & Seligman, 2005). Moreover, evaluative goal shielding had predictive power with respect to the grade in the exam following Experiment 2 (as assessed in a longitudinal design), independently of the framing condition, and even more so when controlled for

intelligence. As already speculated, the independence of the frame might indicate that evaluative goal shielding is indeed a trait-like feature that can be identified regardless of goals used and whose measure is applicable to any goal pursuit. The pattern of interaction with intelligence seems to suggest a compensating nature of relation between the two that was also implied by their negative correlation. However, no final conclusions can be drawn in regard to these observations.

Self-discipline did not show any predictive power in the present study[29], neither did intelligence on its own. This seems to be in contrast with the literature that shows intelligence and self-discipline to be the best predictors for academic success, accounting for up to 58.6 % of variation in performance (e.g., Deary et al., 2005). It is difficult to get an exhaustive picture of all existing research on this topic. Still, there seems to be a tendency in that such studies are conducted over longer periods of time spanning months or even years (e.g., Deary et al., 2005; Duckworth & Seligman, 2005), or use aggregated measures of performance (e.g., Spinath et al., 2006). Experiment 2 of the present research, on the other hand, considered only one exam as a measure of future performance. So, it is possible that intelligence and self-discipline predict success better in the long run, which is also indicated by the fact that they did explain most variation in the final high-school grade as well as in the average university grade, which both are more aggregated measures of academic performance.

Perhaps the measure of evaluative goal shielding is actually able to capture situational fluctuations of performance. This would make sense if evaluative goal shielding had direct consequences for the amount of effort put into pursuing a goal. The relation between evaluative goal shielding and academic performance could be mediated, for example, by time spent on preparing for an exam. However, specific questions like that are beyond the scope of the present studies. For now, it is certainly

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[29] See Appendix H for a short discussion of the relation between implicit self-regulation and self-discipline in the present research and in general.

very interesting to see that temporally dynamic evaluative goal shielding has predictive power with respect to an objective performance measure in a real-life setting outside the laboratory.

3.5   Limitations of the present research

There are a few unanswered questions, unclear or ambiguous results, as well as difficult interpretations left. One issue is the rough operationalization of goal conflict in Experiment 1 that uses goal satisfaction (or dissatisfaction for singles) as an approximation, which might be problematic. Of course, it makes sense that one wants to spend time on something one feels good about, making conflict with other goals more likely. On the other hand, an argument can be made that when somebody is dissatisfied with something, he or she may be motivated to fix it, increasing time spent on it and in turn, making conflict more likely that way. So, satisfaction with the irrelevant goal might actually go either way. But whether or not the results regarding the moderation of evaluative goal shielding by goal conflict in Experiment 1 should be taken seriously, they certainly pushed the present research into a promising direction. The measurement of goal conflict was something actually intended and vastly improved upon in Experiment 2.

However, it has to be mentioned that the operationalization of goal conflict used in Experiment 2 might still be considered rather one-dimensional. The questionnaire for goal conflict mainly focused on the possible competitive relation between the two goals with only a few items examining their synergy. There was no clear middle point representing the absence of conflict, and the interpretation of the low extreme point remains ambiguous, since a rating of 1 (i.e., "do not agree at all") for an item like "My studies and my relationship conflict with each other" could be interpreted as just no conflict or as a facilitative relation.

Aggregated, "no conflict" could mean either that the goals are completely unrelated or that the individual items, some reflecting conflict and some synergy, counterbalance each other. As the discussion of the findings of Shah and Kruglanski (2002), Shah et al. (2002), and Shah and Kruglanski (2003) indicates (see Chapter 3.2), this distinction could be of importance, since self-regulation is found to be more pronounced for conflicting goals and/or inhibited for facilitative goals, but not for unrelated ones. A more specific assessment of the relation between the goals is suggested for any future research in this domain.

The source of motivation is another potential moderator of implicit self-regulation that recently gained additional attention. Goals can be differentiated into "want-to" and "have-to" goals (Milyavskaya et al., 2015; see also the self-determination theory by Deci & Ryan, 2000). Milyavskaya et al. (2015) found stronger implicit self-regulation for want-to rather than have-to goals. The general approach of the present research might therefore have neglected an important moderator. There are plenty of examples of students who have to prepare for an exam but go out of their way to find other activities instead. Especially for the academic goal in the form of studies, there might be a significant amount of people who perceive it as a have-to rather than a want-to goal. While in the present research, evaluative goal shielding was observed to be independent of goal content, differentiating among participants with respect to their perception of each goal being either extrinsic or intrinsic might very well result in differences in evaluative goal shielding. Unfortunately, no further statements about this interesting issue can be made.

People can further be differentiated by personality traits. Perhaps there are some features that make some switch as soon as an alternative goal is introduced. Besides intelligence[30], for which an interesting pattern of results was observed, other concepts, such as self-regulatory focus (Higgins, 1997) and implicit motives

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[30] See Appendix G for additional moderator analyses.

(McClelland, Koestner, & Weinberger, 1989; see Müller, 2015) can be tied to evaluative goal shielding.[31] The present thesis had its focus on the moderation by perceived goal conflict, but examining such processes from the point of view of personality psychology could be interesting, too.

As mentioned in Chapter 2, the assumption that the first goal is taken as the relevant one and the second goal as the irrelevant one was considered to be most intuitive. Furthermore, it is something that could be extrapolated from the priming studies of Shah et al. (2002). The observed independence of evaluative goal shielding from the contents of the goals gives some credibility to the idea that it was indeed the order of introduction, not some other cues in the environment, that determined the perception of the goals. However, it remains unanswered, for how long these effects would have continued to persist. It is merely assumed that the duration of the goal activation correlates positively with the salience, intensity, duration and/or awareness of the goal introduction itself, and the present research cannot offer any proof of this assumption being correct. This question would have to be addressed by future research, which leads to the final chapter.

3.6   Future perspective

Besides mere replication studies and the possibilities already alluded to in Chapter 3.5, there is a great number of ways to continue and extend the present research. The duration of goal activation could be examined by varying the time between the introductions of the two goals. This could very well further depend on other factors like framing, having an intermediate task, or a change of context that is irrelevant to the task at hand (e.g., mere moving participants between two identical rooms).

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[31] See Appendix I for short descriptions and discussions of self-regulatory focus and implicit motives.

Many potentially moderating variables that were not included, or not perfectly operationalized in the present experiments[32] can further be examined within this new paradigm of measuring evaluative goal shielding as a temporal-dynamic process. For example, one can examine goal commitment (see Fishbach et al., 2003; Fishbach et al., 2010; Shah et al., 2002), goal importance (see Ferguson, 2008; Ferguson & Bargh, 2004), experience of success or failure (see Ferguson & Bargh, 2004; Moore et al., 2011), temptation strength (see Fishbach & Shah, 2006; Fishbach et al., 2010), skill/competence (see Ferguson, 2008), self-regulatory focus (see Shah et al., 2002), implicit motives (McClelland et al., 1989; see Müller, 2015), goal satisfaction, explicit goal evaluation, or the differentiation of goals as want-to or have-to goals (see Milyavskaya et al., 2015).

Another interesting and promising direction seems to be studying the relation between evaluative goal shielding (or implicit self-regulation in general) and intelligence. In the literature, this direction seems to have been ignored so far, and yet the present research alludes to a peculiar pattern of intelligence and evaluative goal shielding presumably working in a compensatory fashion. Moreover, the question remains unclear, whether evaluative goal shielding has a trait-like component that can be measured using any combination of goals and applies to the pursuit of any goal (as the lack of interaction between its predictive power and the framing condition suggests), or if its explanatory and/or predictive power is restricted to the goals, for which it has actually been measured (as initially expected and later indicated by the interaction between its explanatory power and the framing condition).

Another, very different direction using the presented design could be trying to increase internal validity by bringing back the whole goal setting into the laboratory. Instead of "real-life" goals, some artificial goals, basically represented by tasks, could

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[32] See Appendix G for additional moderator analyses.

be created in the laboratory. For example, Moore at al. (2011) use an anagram task, and Shah et al. (2002) use an anagram and an object-use[33] task as goals in one of their studies. This way, performance in goal pursuit could be assessed more reliably and possibly, more objectively. In order to make one goal/task more relevant than the other, different incentive-structures could be realized. For example, one task could pay more than another. One task could also be kept relevant and active during the execution of another by informing participants that the first task would be repeated once more after the completion of the second one (see Ferguson & Bargh, 2004). Participants could also be led to believe that the tasks are diagnostic for future success in pursuing real-life goals.[34] In this case, the manipulation (and counter-balancing) of the order of the tasks might be sufficient to make one task/goal more relevant than the other, as suggested by the present research.

There really is no shortage of starting points for future studies in the present thesis as well as in the literature on implicit self-regulation as a whole. Research on the phenomenon of implicit self-regulation, its role for self-control and success or failure in goal pursuit, as well as its relation to a multitude of goal features and personality traits has great potential. Searching for conditions for successful or unsuccessful self-regulation and goal pursuit, developing even more reliable measurements of implicit self-regulation on an individual level, predicting future decisions and performance with such a measure are just a few things that come to mind. The field offers a promising and valuable playground for the future indeed.

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[33] In an object-use task, participants have to name as many different functions for a given object (e.g., a box) as they can think of in a limited amount of time.

[34] Of course, there has to be an appropriate debriefing afterwards for such a design.

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Appendices

Appendix A: Source of motivation, and implicit self-regulation

The idea, that implicit self-regulation might be dependent on the type of motivation—intrinsic or extrinsic—that a person brings to the goal, was examined in a small pre-study before the Experiments 1 and 2 of the present thesis. In order to capture actual intrinsic motivation a scientific event was utilized to gather data. At this event, called "The Long Night of Sciences", which is held once every few years, anybody who is interested can come and look into the university's different research fields, and also voluntarily participate in experiments without any further incentives or rewards.

People who participated in the procedure at this event were therefore deemed intrinsically motivated. Roughly two months later the same procedure was conducted again, this time with a compensation for participating (2 €).

In the experiment participants had to watch and try to memorize a consecutive string of words written in brown, while ignoring words written in purple. There were always two words on screen at one time, one brown and one purple. They remained there for 3.5 seconds until the next two words appeared with another delay of 500 ms. This went on for 40 word pairs.

Afterwards 120 words were shown one after the other. Of those, 40 were the brown words participants were supposed to remember, 40 were the purple words they were supposed to ignore, and 40 were completely new words. Participants then had to decide for every word, if it was one of the brown words or if it was not. There were

also three between-subject conditions in order to balance the role of the specific words. Every list of words was once brown, purple, and new.

It was planned to observe the effects of implicit self-regulation in the amount of intrusion, i.e., how many purple words would be falsely identified as former brown words (there are vast amounts of literature on the different effects on memory that many variables and experiences have; this "reconstructive memory", see Loftus, 1979, is found under different names; see also Fiedler, Walther, Armbruster, Fay, & Naumann, 1996). The idea behind this was, whether implicit self-regulation and thus the focusing of attention to goal-relevant stimuli and away from goal-irrelevant ones would work better for intrinsically motivated people than for extrinsically motivated people. If this were the case this intrusion should be smaller for the intrinsically motivated, since they should be better able to ignore the purple words.

A first problem the study ran into was the fact, that even most of the people who were compensated for the participation and presumably came to the laboratory because of advertisement for the rewards, stated to be there out of intrinsic motivation, and that they had fun in the experiment. Even with a lot of goodwill the group of rather extrinsically motivated participants had only 27 people in it, compared to 89 that were rather intrinsically motivated. No significant differences in intrusion were found between the two groups, and the degree of intrinsic/extrinsic motivation had no relationship with any performance measure in the task.

As shown by Milyavskaya et al. (2015) it is possible to find differences in implicit self-regulation between intrinsically and extrinsically motivated people, at least with other measurements of implicit self-regulation and overall better designed experiments. Unfortunately this pre-study did not provide any indications for these differences and was not further followed up on, but fortunately in favor of the research question and design of the thesis at hand.

Appendix B: Measuring evaluative goal shielding with a masked evaluative priming paradigm

In a very first attempt to examine evaluative goal shielding for the present research, a masked subliminal evaluative priming paradigm was used. It was a concern that a conscious perception of goal-related primes might suffice to activate a goal, before it was finally decided to have the activation of two goals as a feature rather than a bug. Here also the implicit evaluations were assessed before and again after a goal activation (by the same questionnaire about goal commitment/importance).

In the procedure a forward mask was shown for 300 ms, followed by the prime for 43 ms, and then followed by a backward mask for 14 ms. The masks consisted of nonsense letter strings. This way the primes could presumably not be perceived consciously. Following the backward mask, the target was presented for 300 ms. After that an exclamation mark (!) was shown for 150 ms, indicating a (non-adaptive) response window. Participants were told to respond while the exclamation mark was on screen. This was done so that a considerable amount of variation would be bound to the error/accuracy rates. To give participants feedback that they managed to respond within the response window, the exclamation mark, which started out white, turned red upon response. The inter-trial-interval was 1300 ms. For the procedural parameters see also Draine and Greenwald (1998), and Wentura, Kulfanek, and Greve (2005).

The stimuli that were used as primes were: book, grade, learning, studies, seminar, exam, performance, lecture, library, and university for the goal category, and cinema, sports, partying, YouTube, shopping, lazing, leisure, television, video game, and swimming pool for the temptation category (translated from German). As usual the targets were clearly positive and negative words that were to be categorized as such. The same control variables were assessed as in Experiment 1 of the present thesis.

Altogether 96 people participated in the experiment, of whom 17 had to be dropped for analyses, because they were no native speakers of German (11; something that would be ruled out in the later Experiments 1 and 2), almost always responded with only one key (3) or did almost never respond in the evaluative priming in the first place (3). Even worse was the fact that despite the existing literature that would suggest otherwise, participants did not get used to the task at all, leading to an average accuracy rate of only 58.38 % (SD = 7.58 %).

In the 2 (prime: goal vs. temptation stimulus) × 2 (time: before vs. after goal activation) ANOVA there was a main effect indicating more positive evaluations of the temptation stimuli than the goal stimuli, using the implicit evaluation measured by the accuracy rate as the dependent variable, $F(1, 78) = 8.093$, $p = .006$. Nothing else reached significance. Only when a majority of participants were removed, that showed an accuracy rate lower than 55 % (leading to $N = 45$), the interaction between prime and time was significant both for implicit evaluations measured by accuracy rates, $F(1, 44) = 4.314$, $p = .044$, and measured by reaction times, $F(1, 44) = 5.217$, $p = .027$, indicating an evaluation increase of temptations compared to goals and an evaluation decrease of temptations compared to goals, respectively. It can hardly get any more inconsistent.

Because of the extraordinarily low accuracy rates, and consequently an inability to differentiate people who guessed or pressed keys randomly from people who really tried, no further efforts were made to look into any moderations. Instead it was focused on refining the research question and improving the procedure, leading to the use of the ReAL IAT and the slightly new focus in the present research's Experiments 1 and 2.

Appendix C: Stimuli for the ReAL IAT

German originals as well as English translations right below the corresponding item are provided. Two items were replaced in Experiment 2 due to comments by participants in Experiment 1. Those are accordingly marked by an asterisk (*).

<u>Target categories:</u>   <u>Attribute categories:</u>

Studium	*Partnerschaft*	*POSITIV*	*NEGATIV*
<u>Studies</u>	<u>Relationship</u>	<u>POSITIVE</u>	<u>NEGATIVE</u>
Buch	*Kuss*	*GOLD*	*MORD*
book	kiss	GOLD	MURDER
Lernen	*Treue*	*SEIDE*	*KRIEG*
learning	faithfulness	SILK	WAR
*Erfolg**	*Helfen**	*GEWINN*	*GEWALT*
success	helping	WIN	VIOLENCE
Bildung	*Ausgehen*	*KUCHEN*	*FEHLER*
education	going out	CAKE	MISTAKE
Karriere	*Vertrauen*	*FRIEDEN*	*SCHMUTZ*
career	trust	PEACE	DIRT
Kompetenz	*Nachgeben*	*PARADIES*	*GESCHWÜR*
competence	giving in	PARADISE	ULCER
Abschluss	*Kompromiss**	*EDELSTEIN*	*KRANKHEIT*
degree	compromise	GEM	DISEASE
Bibliothek	*Eifersucht*	*GESUNDHEIT*	*KAKERLAKE*
library	jealousy	HEALTH	COCKROACH

*The words "*Erfolg*", "*Helfen*", and "*Kompromiss*" were changed into "*Noten*" (grades), "*Lieben*" (loving), and "*Kuscheln*" (cuddling) for Experiment 2, respectively.

Appendix D: Questionnaires

If not otherwise noted the items were the same for Experiment 1 and Experiment 2 and were assessed with a 7-point Likert scale ranging from *"stimme überhaupt nicht zu"* ("do not agree at all") to *"stimme vollkommen zu"* ("agree completely"). Inverted items are marked by an "R" at the end.

Commitment/importance

Items for commitment to/importance of the academic goal:

Es ist mir wichtig, gute Studienleistungen zu erreichen.

Ich möchte mich mit den Inhalten meines Studienfachs sehr gut auskennen. (Experiment 1) / Mein Studium verleiht meinem Leben Sinn und Orientierung. (Experiment 2)

Verglichen mit anderen Lebensbereichen ist mir mein Studium nicht so wichtig. R

Ich fühle mich meinem Studium verpflichtet.

Es ist mir wichtig, als kompetent in meinem Studienfach wahrgenommen zu werden.

Gute Noten in Prüfungen zu schreiben, ist mir nicht so wichtig. R

Es ist eines meiner wichtigsten Ziele, mein Studium erfolgreich abzuschließen.

Mein Studium hat insgesamt einen hohen Stellenwert in meinem Leben.

Items for commitment to/importance of the social goal for people in a relationship:

Es ist mir wichtig, meine Partnerschaft zu pflegen.

Ich möchte mein Leben mit meinem Partner/meiner Partnerin teilen. (Experiment 1)/ Meine Partnerschaft verleiht meinem Leben Sinn und Orientierung. (Experiment 2)

Verglichen mit anderen Lebensbereichen ist mir meine Partnerschaft nicht so wichtig. R

Ich fühle mich meinem Partner/meiner Partnerin verpflichtet.

Es ist mir wichtig, als ein guter Partner/eine gute Partnerin wahrgenommen zu werden.

Eine gute Beziehung zu haben, ist mir nicht so wichtig. R

Es ist eines meiner wichtigsten Ziele, meine Partnerschaft aufrecht zu erhalten.

Mein Partner/Meine Partnerin hat insgesamt einen sehr hohen Stellenwert in meinem Leben.

Items for commitment to/importance of the social goal for singles:

Es ist mir wichtig, einen Partner/eine Partnerin zu finden.

Ich möchte mein Leben mit einem Partner/einer Partnerin teilen. (Experiment 1)/ Die Partnersuche verleiht meinem Leben Sinn und Orientierung. (Experiment 2)

Verglichen mit anderen Lebensbereichen ist mir das Finden eines Partners/einer Partnerin nicht so wichtig. R

Ich bin derzeit aktiv auf der Suche nach einem Partner/einer Partnerin für eine Beziehung.

Ich würde mich freuen, wenn mich potentielle Partner/Partnerinnen ansprechen würden.

Ich habe derzeit kein Interesse an einer Beziehung. R

Es ist eines meiner wichtigsten Ziele, einen Partner/eine Partnerin zu finden.

Das Finden eines Partners/einer Partnerin hat insgesamt einen sehr hohen Stellenwert in meinem Leben.

Items for satisfaction/explicit evaluation in Experiment 1

The measurement of these concepts was rather inconsistent in Experiment 1. All items were assessed with 7-point Likert scales, but with differing denotations of the extreme points due to the nature of the items. Because of that, the respective denotations are provided in brackets (only Experiment 1).

Explicit evaluation of studies:

Wie gefällt Ihnen Ihr Studium? (gar nicht - sehr gut)

Satisfaction with relationship:

Wie gut kommt Ihr Partner/Ihre Partnerin Ihren Bedürfnissen entgegen? (überhaupt nicht - vollkommen)

Wie zufrieden sind Sie insgesamt mit Ihrer Beziehung? (sehr unzufrieden - sehr unzufrieden)

Wie gut ist Ihre Beziehung verglichen mit anderen? (sehr schlecht - sehr gut)

Wie oft wünschen Sie sich, diese Beziehung nicht eingegangen zu sein? R (niemals - sehr oft)

In welchem Maße hat Ihre Beziehung Ihre ursprünglichen Erwartungen erfüllt? (überhaupt nicht - vollkommen)

Wie sehr lieben Sie Ihren Partner/Ihre Partnerin? (überhaupt nicht - vollkommen)

Wie viele Probleme gibt es in Ihrer Partnerschaft? R (sehr wenige - sehr viele)

<u>Satisfaction with being single:</u>

Wie zufrieden sind Sie damit, gegenwärtig Single zu sein? (sehr unzufrieden - sehr zufrieden)

Wie oft wünschen Sie sich, einen Partner/eine Partnerin zu finden? R (niemals - sehr oft)

Wie oft sind Sie traurig, keinen Partner/keine Partnerin zu haben? R (niemals - sehr oft)

Wie oft beneiden Sie Menschen in Beziehungen darum, dass diese in einer Beziehung sind? R (niemals - sehr oft)

Items for explicit evaluation, satisfaction, perceived competence and perceived goal conflict in Experiment 2

<u>Explicit evaluation of studies:</u>

Ich bin gerne Student in meinem Studienfach.

Ich mag es, Zeit mit dem Studium zu verbringen.

Ohne mein Studium hätte ich in meinem Leben nur halb so viel Spaß.

Zeit, die ich mit dem Studium verbringe, ist schöne Zeit.

Ich fühle mich wohl in meinem Studium.

Ich empfinde mein Studium als negativ. R

<u>Explicit evaluation of existing relationship:</u>

Ich bin gerne mit meinem Partner/meiner Partnerin zusammen.

Ich mag es, Zeit mit meinem Partner/meiner Partnerin zu verbringen.

Ohne meinen Partner/meine Partnerin hätte ich in meinem Leben nur halb so viel Spaß.

Zeit, die ich mit meinem Partner verbringe, ist schöne Zeit.

Ich fühle mich wohl in meiner Partnerschaft.

Ich empfinde meine Partnerschaft als negativ. R

Explicit evaluation of being single/partner search:

Ich bin gerne auf Partnersuche.

Ich mag es, Zeit mit der Partnersuche zu verbringen.

Es macht mir Spaß, neue Leute anzusprechen und kennenzulernen.

Zeit, die ich mit der Partnersuche verbringe, ist schöne Zeit.

Ich fühle mich wohl bei der Partnersuche.

Ich empfinde die Partnersuche als negativ. R

Satisfaction with studies:

Ich bin alles in allem sehr zufrieden mit meinem Studium.

Ich wünsche mir oft, dieses Studienfach nicht gewählt zu haben. R

Ich mag mein Studium sehr.

Die Inhalte meines Studiums bedienen meine tatsächlichen Interessen sehr gut.

Satisfaction with existing relationship:

Ich bin alles in allem sehr zufrieden mit meiner Beziehung.

Ich wünsche mir oft, diese Beziehung nie eingegangen zu sein. R

Ich liebe meinen Partner/meine Partnerin sehr.

Meine Beziehung hat meine ursprünglichen Erwartungen vollkommen erfüllt.

Satisfaction with being single:

Ich bin alles in allem sehr zufrieden damit, Single zu sein.

Ich wünsche mir oft, einen Partner/eine Partnerin zu finden. R

Ich bin häufig traurig, keinen Partner/keine Partnerin zu haben. R

Ich genieße das Single-Leben sehr.

Perceived competence in studies:

Ich bin gut in meinem Studienfach.

Ich habe eine Begabung für das, was in meinem Studium von mir verlangt wird.

Ich kann die Anforderungen meines Studiums gut bewältigen.

Generell bekomme ich gute Noten in meinem Studium.

Meine Fähigkeiten im Studium sind überdurchschnittlich.

Das Feedback, das ich von Dozenten und Professoren in meinem Studium erhalte, ist generell positiv.

Ich bin bekannt dafür, gut in meinen Studienleistungen abzuschließen.

Meine Studienleistungen sind eher schlecht. R

In neue Aufgaben und Bereiche in meinem Studium kann ich mich schnell und gut einarbeiten.

Perceived competence in relationship:

Mein Partner/Meine Partnerin fühlt sich von mir geliebt.

Mein Partner/Meine Partnerin fühlt sich von mir verstanden.

Mein Partner/Meine Partnerin und ich führen eine harmonische Beziehung.

Verglichen mit Anderen habe ich eine sehr gute Beziehung mit meinem Partner.

Wenn mein Partner/meine Partnerin sich aufregt, kann ich ihn/sie sehr gut beruhigen.

In meiner Partnerschaft gibt es viele Probleme.

Wenn sich mein Partner/meine Partnerin und ich streiten, dann diskutieren wir die Sache aus bis wir zu einem befriedigenden Ergebnis kommen und uns beide besser fühlen.

Ich bin gut darin, mich in meinen Partner/meine Partnerin einzufühlen.

Wenn mein Partner/meine Partnerin traurig ist, kann ich ihn/sie sehr gut trösten.

Perceived competence in partner search:

Ich bin gut darin, fremde Leute anzusprechen, die ich attraktiv finde.

Ich kann bei Leuten, an denen ich Interesse habe, auch Interesse an mir wecken.

Im Gespräch mit für mich attraktiven Menschen, bin ich nur schlecht dazu in der Lage, das Gespräch interessant zu halten. R

Wenn ich Interesse an einer attraktiven Person habe, kann ich gut steuern, ob sich etwas zwischen uns entwickelt.

Ich kann gut einschätzen, ob eine andere Person zu mir passt oder nicht.

Ich bin attraktiv für potentielle Partner/Partnerinnen.

Ich kann mich sehr gut in Andere hineinversetzen.

Ich bin gut im Flirten.

Wenn ich will, dann ist es sehr wahrscheinlich, dass ich bald einen festen Partner/eine feste Partnerin habe.

Perceived goal conflict:

These items differed depending on the frame (assessed was the distracting/conflicting nature of the irrelevant goal for the relevant one) and relationship status of the participant. All four combinations follow.

Academic frame, in relationship:

Meine Partnerschaft stellt eine Ablenkung für mein Studium dar.

Mein Studium verlangt mir viel Aufmerksamkeit ab.

Ich verbringe lieber Zeit mit meinem Partner/meiner Partnerin anstatt mich mit meinem Studium auseinanderzusetzen.

Meine Partnerschaft und mein Studium stehen im Konflikt zueinander.

Ich muss aktiv darauf achten, nicht zu viel Zeit mit meinem Partner/meiner Partnerin zu verbringen, um mein Studium nicht zu vernachlässigen.

Mein Partner unterstützt mich in meinem Studium, sodass es mir tatsächlich leichter fällt, darin erfolgreich zu sein. R

Durch meine Partnerschaft kann ich mich schlechter auf mein Studium konzentrieren.

Meine Partnerschaft verlangt mir viel Aufmerksamkeit ab.

Meine Partnerschaft und mein Studium profitieren voneinander. R

Social frame, in relationship:

Mein Studium stellt eine Ablenkung für meine Partnerschaft dar.

Meine Partnerschaft verlangt mir viel Aufmerksamkeit ab.

Ich setze mich lieber mit meinem Studium auseinander anstatt Zeit mit meinem Partner/meiner Partnerin zu verbringen.

Mein Studium und meine Partnerschaft stehen im Konflikt zueinander.

Ich muss aktiv darauf achten, nicht zu viel Zeit mit meinem Studium zu verbringen, um meinen Partner/meine Partnerin nicht zu vernachlässigen.

Mein Studium unterstützt mich in meiner Partnerschaft, sodass es mir tatsächlich leichter fällt, darin erfolgreich zu sein. R

Durch mein Studium kann ich mich schlechter auf meine Partnerschaft konzentrieren.

Mein Studium verlangt mir viel Aufmerksamkeit ab.

Mein Studium und meine Partnerschaft profitieren voneinander. R

Academic frame, single:

Die Partnersuche stellt eine Ablenkung für mein Studium dar.

Mein Studium verlangt mir viel Aufmerksamkeit ab.

Ich verbringe lieber Zeit mit der Partnersuche anstatt mich mit meinem Studium auseinanderzusetzen.

Die Partnersuche und mein Studium stehen im Konflikt zueinander.

Ich muss aktiv darauf achten, nicht zu viel Zeit mit der Partnersuche zu verbringen, um mein Studium nicht zu vernachlässigen.

Die Partnersuche unterstützt mich in meinem Studium, sodass es mir tatsächlich leichter fällt, darin erfolgreich zu sein. R

Durch die Partnersuche kann ich mich schlechter auf mein Studium konzentrieren.

Die Partnersuche verlangt mir viel Aufmerksamkeit ab.

Die Partnersuche und mein Studium profitieren voneinander. R

Social frame, single:

Mein Studium stellt eine Ablenkung für die Partnersuche dar.

Die Partnersuche verlangt mir viel Aufmerksamkeit ab.

Ich setze mich lieber mit meinem Studium auseinander anstatt Zeit mit der Partnersuche zu verbringen.

Mein Studium und die Partnersuche stehen im Konflikt zueinander.

Ich muss aktiv darauf achten, nicht zu viel Zeit mit meinem Studium zu verbringen, um die Partnersuche nicht zu vernachlässigen.

Mein Studium unterstützt mich in der Partnersuche, sodass es mir tatsächlich leichter fällt, darin erfolgreich zu sein. R

Durch mein Studium kann ich mich schlechter auf die Partnersuche konzentrieren.

Mein Studium verlangt mir viel Aufmerksamkeit ab.

Mein Studium und die Partnersuche profitieren voneinander. R

Self-control measures

In Experiment 1 the number of points on the Likert scale varied to maintain the form that they have in the original surveys, from which the items were taken (because of that the number of points on the scale in Experiment 1 is noted, if it is not 7). This was changed for consistency in Experiment 2, wherein it is always a 7-point Likert scale. Furthermore "tenacity" and the urgency subscale were only used in Experiment 1. The urgency subscale is basically an inverted self-control measure. The denotation of inverted items always follows a self-control logic, i.e., also the urgency subscale is treated as if high values denote high self-control.

Items for tenacity (see Shah et al., 2002; only Experiment 1):

Ich habe oft die Tendenz, meine gegenwärtige Zielverfolgung abzubrechen, wenn sich die Möglichkeit bietet, ein anderes Ziel zu verfolgen. R

Ich verschiebe häufig meine Aufmerksamkeit zwischen verschiedenen Zielen. R

Ich finde es schwierig, ein anderes Ziel zu verfolgen bevor ich mit meinem gegenwärtigen Ziel fertig bin.

Urgency subscale by Whiteside and Lynam (2001; only Experiment 1; 4-point scale):

Ich habe Schwierigkeiten, meine Impulse zu kontrollieren. R

Ich habe Schwierigkeiten, dem Verlangen nach bestimmten Dingen zu widerstehen (z.B. Zigaretten, Speisen, etc.). R

Ich bin oft in Dinge verwickelt, aus denen ich später schwer herauskomme. R

Um mich besser zu fühlen, unternehme ich oft Dinge, die ich später bereue. R

Wenn ich mich schlecht fühle, bin ich manchmal nicht in der Lage, bestimmte Handlungen, die meinen Zustand noch verschlimmern, zu unterlassen. R

Wenn ich verärgert bin, handle ich oft ohne darüber nachzudenken. R

Wenn ich mich zurückgewiesen fühle, sage ich oft Dinge, die ich später bereue. R

Es fällt mir schwer, der Versuchung zu widerstehen, mich von meinen Gefühlen leiten zu lassen. R

Wenn ich mich aufrege, mache ich Sachen oft nur noch schlimmer, weil ich über meine Handlungen nicht nachdenke. R

In einer hitzigen Debatte sage ich oft Dinge, die ich später bereue. R

Ich bin immer in der Lage, meine Gefühle zu kontrollieren.

Manchmal tue ich spontan Dinge, die ich später bereue. R

Brief Self-Control Scale by Tangney et al. (2004; 5-point scale in Experiment 1):

Ich kann Versuchungen gut widerstehen.

Schlechte Angewohnheiten kann ich mir nur schwer abgewöhnen. R

Ich bin fleißig.

Ich sage Dinge, die unangebracht sind. R

Ich tue Dinge, die Spaß machen, auch wenn sie schlecht für mich sind. R

Ich lehne Dinge ab, die schlecht für mich sind.

Ich wünschte, ich hätte mehr Selbstdisziplin. R

Andere würden sagen, dass ich eine eiserne Disziplin habe.

Vergnügen und Spaß halten mich nicht davon ab, meine Arbeit zu erledigen.

Es fällt mir schwer, mich zu konzentrieren. R

Ich kann erfolgreich auf langfristige Ziele hinarbeiten.

Bestimmte Dinge kann ich nicht sein lassen, obwohl ich weiß, dass sie falsch sind. R

Manchmal handle ich, ohne alle Alternativen abzuwägen. R

Created items for self-control:

Auch wenn es mir schwer fällt, einer Versuchung oder einem ablenkenden Impuls zu widerstehen, bringe ich trotzdem die nötige Selbstbeherrschung auf, um nicht nachzugeben.

Wenn ich auf etwas absolut keine Lust habe, kann ich mich selbst mit großer Mühe nicht dazu bringen, es zu tun. R

Selbst wenn ich eine Aufgabe nicht mag, kann ich mich zwingen, sie zu erledigen.

Wenn ich mich nur genug zusammenreiße, kann ich beinahe jedes Ziel erreichen.

Ich habe eine hohe Selbstkontrolle.

Selbst wenn ich alle meine Kräfte zusammennehme, habe ich große Schwierigkeiten, sehr unliebsame Aufgaben anzugehen. R

Created items for (an explicit understanding of) self-regulation:

Wenn ich etwas tun muss, sehe ich schnell Gründe, warum es gut ist, es zu tun.

Wenn mich eine ansonsten nicht so interessante Sache in einem meiner Ziele voranbringt, dauert es nicht lange bis ich Spaß an dieser Sache finde.

Ich finde, dass die Bearbeitung einer unschönen Aufgabe wesentlich weniger schlimm ist, wenn die Aufgabe einem übergeordneten Zweck dient.

Es gibt fast nichts, was ich so langweilig fände, dass ich mich nicht damit beschäftigen könnte, wenn ich müsste.

Ich habe kaum Mühe damit, Pflichten nachzugehen.

Es kostet mich große Anstrengung, meine Ziele zu verfolgen. R

Die Dinge, die mir wichtig sind, bereiten mir auch Spaß und Vergnügen.

Wenn ich ein Ziel vor Augen habe, dann gehe ich voll und ganz darin auf.

Ich freue mich, wenn ich merke, dass ich in meinem Leben vorankomme.

Wenn ich etwas erreichen will, bin ich voller Tatendrang.

Ich fühle mich gut, wenn ich etwas tun kann, das mir hilft, meine Ziele zu erreichen.

Appendix E: Tests

Shortened form of the Raven's Advanced Progressive Matrices Test by Arthur & Day (1994):

Participants have to pick the correct image that is missing in the bottom right corner of the matrix according to the pattern present. The correct solution for each matrix is shown in brackets.
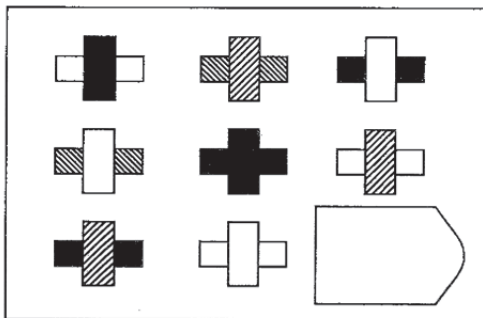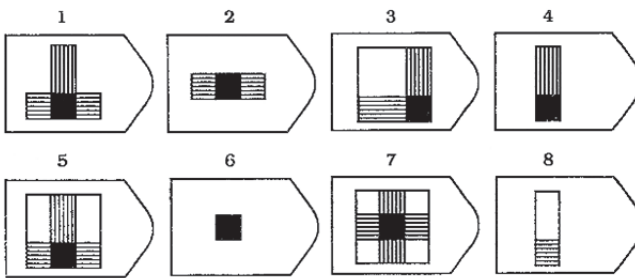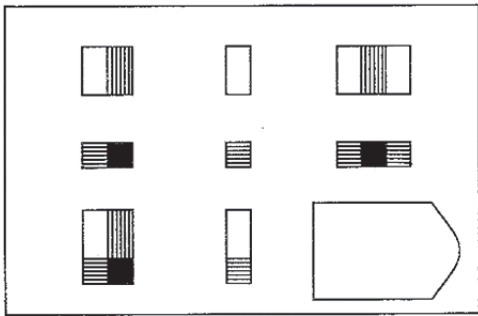
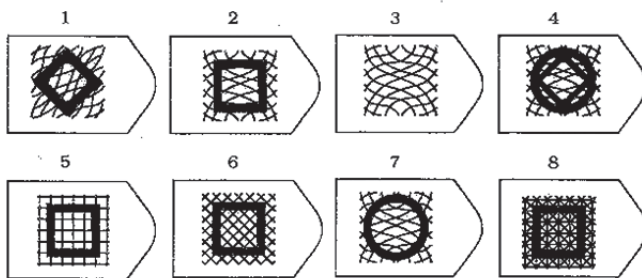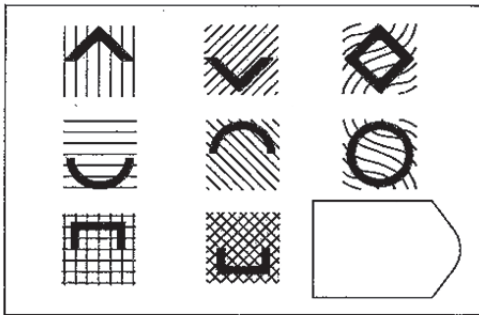matrix 1 (correct solution: 5)
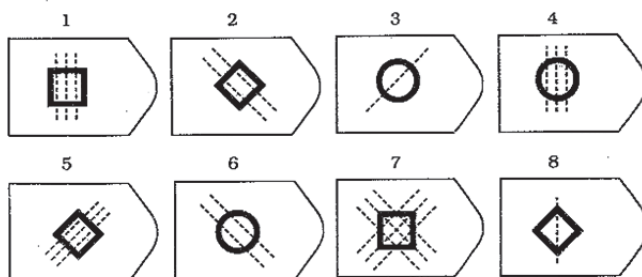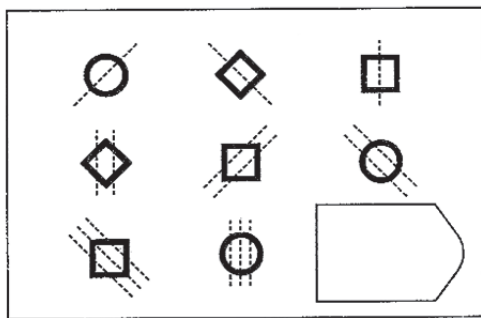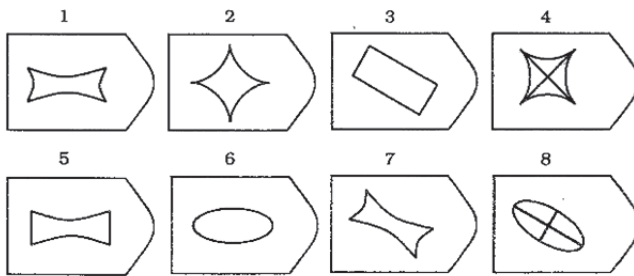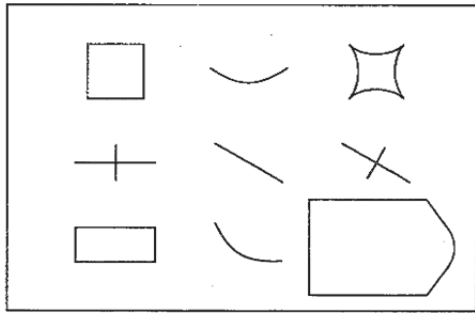
matrix 2 (correct solution: 4)
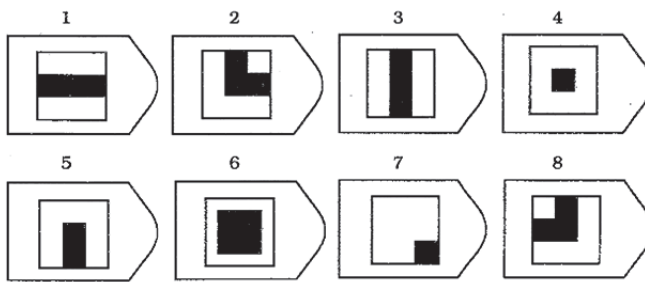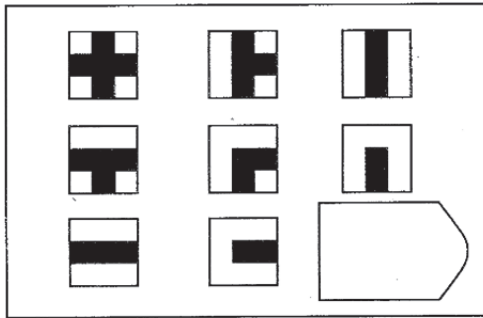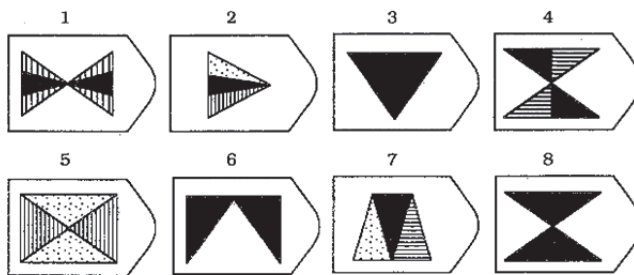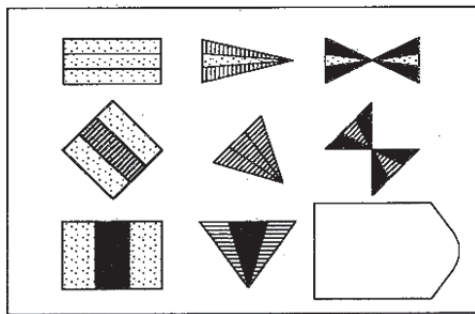

matrix 3 (correct solution: 1)
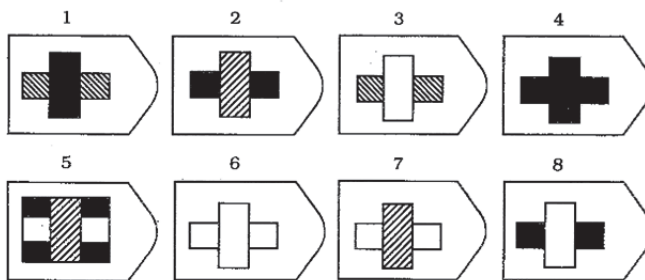
matrix 4 (correct solution: 5)
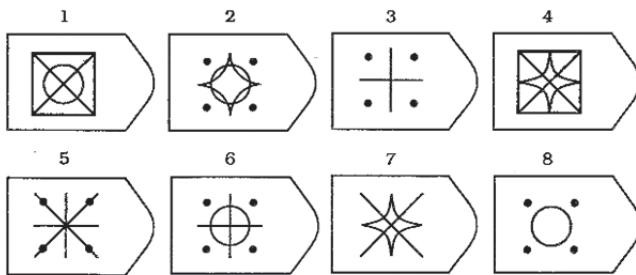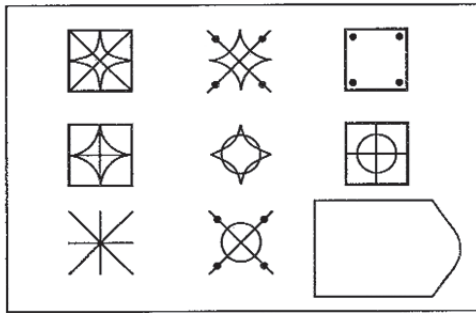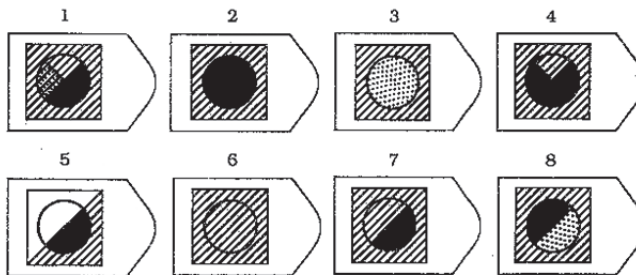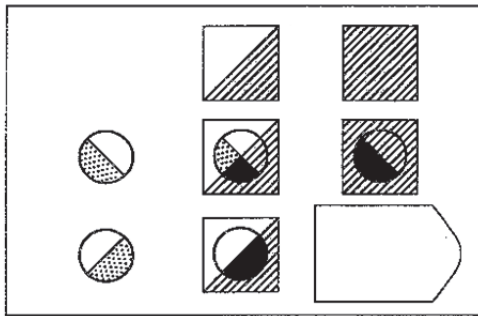

matrix 5 (correct solution: 2)

matrix 6 (correct solution: 7)

matrix 7 (correct solution: 8)

matrix 8 (correct solution: 6)

matrix 9 (correct solution: 7)

matrix 10 (correct solution: 5)

matrix 11 (correct solution: 4)

matrix 12 (correct solution: 3)
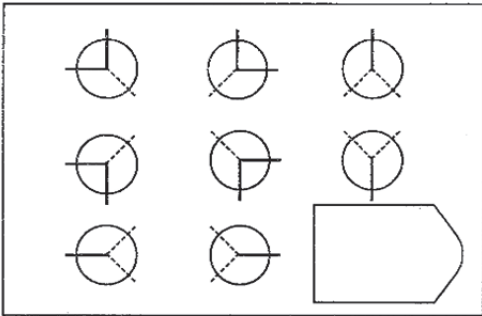
MWT-B by Lehrl (2005)

Participants have to decide which one (if any) of the five presented letter strings in a row resembles an actual word. The correct solution is underlined.

Nale	Sahe	<u>Nase</u>	Nesa	Sehna
<u>Funktion</u>	Kuntion	Finzahm	Tuntion	Tunkion
Struk	<u>Streik</u>	Sturk	Strek	Kreik
Kulinse	Kulerane	<u>Kulisse</u>	Klubihle	Kubistane
Kenekel	Gesonk	Kelume	<u>Gelenk</u>	Gelerge
siziol	salzahl	sozihl	sziam	<u>sozial</u>
Sympasie	Symmofeltrie	Symmantrie	<u>Symphonie</u>	Symplanie
Umma	Pamme	Nelle	Ampe	<u>Amme</u>
Krusse	Surke	Krustelle	<u>Kruste</u>	Struke
Kirse	Sirke	<u>Krise</u>	Krospe	Serise
Tinxur	Kukutur	Fraktan	<u>Tinktur</u>	Rimsuhr
Unfision	Fudision	<u>Infusion</u>	Syntusion	Nuridion
Feudasmus	Fonderismus	<u>Föderalismus</u>	Födismus	Föderasmus
Redor	<u>Radium</u>	Terion	Dramin	Orakium
<u>kentern</u>	knerte	kanzen	kretern	trekern
<u>Kantate</u>	Rakante	Kenture	Krutehne	Kallare
schalieren	waschieren	wakieren	schackieren	<u>kaschieren</u>

Tuhl	Lar	Lest	Dall	<u>Lid</u>
<u>Dissonanz</u>	Diskrisanz	Distranz	Dinotanz	Siodenz
Ferindo	<u>Inferno</u>	Orfina	Firanetto	Imfindio
Rilkiase	Kilister	Riliker	<u>Klistier</u>	Linkure
kurinesisch	<u>kulinarisch</u>	kumensisch	kulissarisch	kannastrisch
Rosto	<u>Torso</u>	Soro	Torgos	Tosor
<u>Kleiber</u>	Beikel	Keibel	Reikler	Biekerl
Ralke	Korre	Ruckse	<u>Recke</u>	Ulte
Lamone	Talane	<u>Matrone</u>	Tarone	Malonte
Tuma	Umat	<u>Maut</u>	Taum	Muta
Sorekin	Sarowin	Rosakin	Narosin	<u>Kerosin</u>
beralen	gerältet	anälteren	untären	<u>verbrämen</u>
<u>Kapaun</u>	Paukan	Naupack	Aupeck	Ankepran
Sickaber	Bassiker	<u>Kassiber</u>	Sassiker	Askiber
Pucker	<u>Keuper</u>	Eucker	Reuspeck	Urkane
Spirine	Saprin	Parsin	<u>Purin</u>	Asprint
Kulon	Solgun	Koskan	Soran	<u>Klonus</u>
<u>Adept</u>	Padet	Edapt	Epatt	Taped
Gindelat	Tingerat	<u>Indigenat</u>	Nitgesaar	Ringelaar
Berkizia	<u>Brekzie</u>	Birakize	Brikazie	Bakiria

Appendix F: Standard IAT analyses

Although not built for this purpose, the design of the ReAL IAT (Meissner & Rothermund, 2013) allows for the testing of standard IAT effects (Greenwald et al., 1998), in case one is interested in them. In order to see how the standard measures compared to the association parameters of the ReAL model, standard IAT effects were examined in explorative analyses. In the present studies, a standard IAT effect for reaction times is calculated by subtracting the average reaction time in compatible blocks—in which the relevant goal category and "positive" share a key and the irrelevant goal category and "negative" share a key—from the average reaction time in incompatible blocks—in which the irrelevant goal category and "positive" share a key and the relevant goal category and "negative" share a key. Thus, positive values denote a relative preference for the relevant goal category over the irrelevant one. As a common practice, trials in which the participant responded incorrectly, faster than 300 ms, or slower than three times the interquartile range above the 75th percentile (far-outlier) were removed for this purpose. Similarly, the standard IAT effect for the error rates is calculated by subtracting the error rate in the compatible blocks from the error rate in the incompatible blocks, again resulting in positive values to denote a preference for the relevant over the irrelevant goal.

In Experiment 1, the 2 (compatibility: compatible vs. incompatible) × 2 (time: t_1 vs. t_2) ANOVA with reaction time as the dependent variable did not show a significant interaction between compatibility and time, $F(1, 57) < 1$, which would have indicated that the magnitude of the IAT effect changes from t_1 to t_2. The only significant effect was the main effect of time, $F(1, 57) = 64.48$, $p < .001$, basically indicating a common practice effect with much faster responses in the second than the first IAT. Judging from an interaction between compatibility and frame after the inclusion of frame as an additional factor into the ANOVA, participants seemed to be more comfortable

with the task when the social goal and "positive" shared a key, regardless of the relevant goal set by the framing, $F(1, 56) = 8.189$, $p = .006$.

In the 2 (compatibility: compatible vs. incompatible) × 2 (time: t_1 vs. t_2) ANOVA with error rate as the dependent variable, no effect reached significance. Furthermore, neither the calculated IAT effect for reaction times nor the one for error rates correlated with evaluative goal shielding (relative evaluation change shown by the association parameters).

In Experiment 2, the same 2 (compatibility: compatible vs. incompatible) × 2 (time: t_1 vs. t_2) ANOVA with reaction time as the dependent variable was conducted. The interaction between compatibility and time was not significant, and was in the wrong direction as far as tendency (decreasing IAT effect from t_1 to t_2), $F(1, 95) = 3.314$, $p = .072$, with a main effect of compatibility, $F(1, 95) = 6.197$, $p = .015$, and the to be expected main effect of time, $F(1, 95) = 150.907$, $p < .001$, signifying a practice effect. The same ANOVA with error rate as the dependent variable did not show any significant results.

There was a significant interaction between compatibility and frame, $F(1, 94) = 48.388$, $p < .001$, when including frame as a factor, showing the pairing of the social goal and "positive" as the easier constellation, regardless of the framed relevant goal. The interaction between compatibility and time seemed to depend on the framing condition, $F(1, 94) = 5.034$, $p = .027$, with a decreasing compatibility effect only being present in the social frame, $F(1, 47) = 8.057$, $p = .007$.

To have an analogues comparison with regards to moderation, the ANOVA with reaction time as the dependent variable was tested with perceived goal conflict as an additional factor. No four-way interaction with the framing condition was found, but there was a three-way interaction between time, relevance, and conflict, $F(1, 94) = 3.811$, $p = .027$ (one-tailed), showing a decreasing compatibility effect for

low conflict only, $F(1, 47) = 8.412$, $p = .006$; the overall compatibility effect was significant, $F(1, 47) = 7.524$, $p = .009$. This denotes a similar finding as for the analyses with the association parameters, i.e., more implicit self-regulation in case of high conflict. There is also no compatibility effect in case of high conflict, $F(1, 47) < 1$. Whether there is a compatibility effect to begin with, depends significantly on conflict, $F(1, 94) = 4.165$, $p = .044$.

Altogether, the parametrization of the ReAL model (Meissner & Rothermund, 2013) appeared to be of better use than the standard IAT analyses, providing a much clearer and straightforward picture. Although the standard IAT analyses seemed to go in a similar direction, the overall impression was muddled by some interactions with the framing condition and an unclear dependence of the compatibility effect on the goal conflict. Its complete interpretation is therefore difficult, but not the main venture of this research anyway. Of course, the standard IAT measures in general cannot be judged based on the present results, since the present design of the IAT is tailor-made for the ReAL model parameter estimation and there is no control group with a common IAT. But the present results show another instance of the practical usefulness of the ReAL IAT and its possibility to actually get a hold of associations and therefore actual implicit evaluations, disentangled from other processes, like recoding.

Appendix G: Additional moderator analyses

While not being the focus of the present research, other variables than goal conflict appear as moderators of implicit self-regulation in the literature, which is why some of them were also assessed and tested in the experiments of the present research. Looking at the operationalization of goal commitment and goal importance in the literature, it becomes clear that these concepts share considerable conceptual overlap, and both are repeatedly found to moderate implicit self-regulation (e.g., Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach et al., 2003; Fishbach et al., 2010; Shah et al., 2002). Therefore, a measurement that resembles both goal commitment and goal importance in different aspects was used in both Experiment 1 and Experiment 2, and was aggregated into one variable, henceforth just called "commitment". In Experiments 1 and 2, both the commitment to the relevant and the commitment to the irrelevant goal were examined in 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) × 2 (commitment: low vs. high) ANOVAs with the association parameter as the dependent variable. In Experiment 2, the variables goal satisfaction, explicit goal evaluation, and perceived goal competence both for the relevant and irrelevant goal were examined additionally by including them as factors and testing them in a series of 2 (relevance: relevant vs. irrelevant) × 2 (time: t_1 vs. t_2) × 2 (goal variable: low vs. high) ANOVAs.

For the variables commitment to, explicit evaluation of and satisfaction with the relevant goal, similar result patterns were expected as for goal conflict. More evaluative goal shielding should be observed for higher values on these variables, since evaluative goal shielding should be the most adaptive in these cases (see Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach et al., 2010). Predictions for perceived competence are more difficult. On the one hand, it might be that evaluative goal shielding is not needed in cases of high competence, on the other hand perceived competence is an indicator of how much fun an activity is, and is

possibly confounded with success and failure in goal pursuit. The experience of success and failure has been found to be ambiguously related to implicit self-regulation. They can be indicators for the need of less or more self-regulation, respectively, or reasons to either stick with the goal or disengage from it, respectively. Ferguson and Bargh (2004) find increased implicit self-regulation in case of the experience of a failure, while Moore et al. (2011) find contrasting effects. As also pointed out by Moore et al. (2011), whether self-regulation is adaptive in case of success or failure, depends on whether the goal in question is either infinite and indeterminate, as in their case, or finite as in case of Ferguson and Bargh (2004). When a goal is easily judged as accomplished and finished after success, failure might lead to higher efforts to achieve the goal, while failure in an indeterminate goal could trigger disengagement to "wait for a better opportunity" (Moore et al., 2011, p. 461).

Both in Experiment 1 and Experiment 2, no significant interactions with commitment to the relevant or irrelevant goal were discovered. Also, the correlations of the commitment variables with evaluative goal shielding did not reach significance. It can only be speculated about the reason for the lack of moderating effects by goal commitment/importance in the present research. Studies that find the effect (e.g., Ferguson, 2008; Ferguson & Bargh, 2004; Fishbach et al., 2010) used goals and respective temptations as target categories (or a goal vs. a non-goal category), manipulated the importance/commitment into low and high, or used groups with a priori differences in goal importance/commitment. In the present studies, however, two goals are used that are not necessarily natural antagonists and arguably two of the most important goals of students. The goals were furthermore counterbalanced in their role as either the relevant or irrelevant goal. In fact, there was no significant difference in the participants' commitment to studies and relationship, or commitment to the relevant and irrelevant goal. So, perhaps participants did not vary enough in their reported goal commitment/importance, or the contrast between

the two goals was not big enough to trace the moderation (perhaps commitment can only make a difference, if there actually is a perceived difference).

Without the complicating inclusion of the framing condition as an additional factor, the analyses for the other variables did not show interesting and significant results, with the exceptions of the ANOVA with the satisfaction with the relevant goal, and the ANOVA with the explicit evaluation of the relevant goal. The three-way interaction between relevance, time, and satisfaction with the relevant goal, and the three-way interaction between relevance, time, and explicit evaluation of the relevant goal showed very similar results, perhaps not surprisingly, given the conceptual similarity and correlation between these two constructs ($r = .661$, $p < .001$). In case of high satisfaction or explicit evaluation evaluative goal shielding appeared to be more pronounced compared to low satisfaction or explicit evaluation respectively (see Table 3 for an overview of the analyses with the variables satisfaction with and explicit evaluation of the relevant goal).

These patterns appear as they would be expected. It makes sense that evaluative goal shielding occurs especially in situations when it can be considered adaptive (i.e., in case of high goal satisfaction/evaluation), and is absent when it would be maladaptive (i.e., in case of low goal satisfaction/evaluation). Only if the relevant goal is "worth protecting", it is actually protected. If one dislikes or is unsatisfied with something, there might be less motivation to avoid distraction by alternatives.

The following statistics are provided rather for completeness sake more than anything else, since the pattern is complicated, not very coherent, and partly hard to interpret for these variables: When the framing condition was included as an additional factor in the analyses there was a significant three-way interaction between commitment to the relevant goal, relevance, and framing condition, $F(1, 92) = 3.275$, $p = .037$ (one-tailed), signifying a higher evaluation of the irrelevant

Table 3

Analyses to examine satisfaction with the relevant goal, and explicit evaluation of the relevant goal as possible moderators of evaluative goal shielding in Experiment 2.

Relevance × Time × Goal Satisfaction	$F(1, 94) = 3.727$	**$p = .028$**
Relevance × Time (High Goal Satisfaction)	$F(1, 50) < 1$	$p = .233$
Relevance × Time (Low Goal Satisfaction)	$F(1, 44) = 4.352$	**$p = .021$**
Relevant Goal at t_1 vs. t_2 (Low Goal Satisfaction)	$t(44) = 1.861$ $M_{t1} = .612$ (.1289) $M_{t2} = .574$ (.1158)	**$p = .035$**
Irrelevant Goal at t_1 vs. t_2 (Low Goal Satisfaction)	$t(44) < 1$ $M_{t1} = .549$ (.1497) $M_{t2} = .565$ (.1387)	$p = .266$
Relevance × Time × Explicit Goal Evaluation	$F(1, 94) = 4.592$	**$p = .017$**
Relevance × Time (High Explicit Goal Evaluation)	$F(1, 50) < 1$	$p = .189$
Relevance × Time (Low Explicit Goal Evaluation)	$F(1, 44) = 4.784$	**$p = .017$**
Relevant Goal at t_1 vs. t_2 (Low Explicit Goal Evaluation)	$t(44) = 1.866$ $M_{t1} = .607$ (.1263) $M_{t2} = .569$ (.1078)	**$p = .034$**
Irrelevant Goal at t_1 vs. t_2 (Low Explicit Goal Evaluation)	$t(44) < 1$ $M_{t1} = .538$ (.1397) $M_{t2} = .558$ (.1512)	$p = .224$
Correlation Between Evaluative Goal Shielding and Goal Satisfaction ($N = 95$)	$r = .192$	**$p = .031$**
Correlation Between Evaluative Goal Shielding and Explicit Goal Evaluation ($N = 93$)	$r = .186$	**$p = .037$**

Notes: The association-parameters are the dependent variable in the ANOVAs; satisfaction and explicit evaluation are used as dichotomous factors with the values "low" and "high" (created by median split). Means (and standard deviations) of the association parameters are provided for the direct comparisons in *t*-tests. For the correlations the measure for evaluative goal shielding (double difference of the implicit evaluations of the relevant minus the irrelevant goal at t_2 minus t_1) and the continuous goal variable were used, and outliers defined by a Cook's Distance $> (4 / (n - k - 1))$ were removed to mitigate unduly influence. All tests are one-tailed.

than the relevant goal in case of low commitment to the relevant goal, and a lower evaluation of the irrelevant goal than the relevant goal in case of high commitment to the relevant goal, in the academic frame only. Also, the interaction between perceived competence in the relevant goal, time, and framing condition reached significance, $F(1, 92) = 3.147$, $p = .04$ (one-tailed), indicating an increase of evaluations in case of high perceived competence in the relevant goal, and a decrease of evaluations in case of low perceived competence in the relevant goal, in the academic

frame only. Furthermore, the four-way interaction between perceived competence in the irrelevant goal, time, relevance, and framing condition was significant, $F(1, 92) = 3.729$, $p = .028$ (one-tailed). Only in the academic frame, the three-way interaction between perceived competence in the irrelevant goal, time, and relevance reached significance, $F(1, 46) = 3.56$, $p = .033$, showing a relative decrease in the evaluation of the irrelevant goal in case of low perceived competence in the irrelevant goal, and a relative increase in the evaluation of the irrelevant goal for high perceived competence in the irrelevant goal.

Appendix H: Self-discipline and implicit self-regulation

The relationship of evaluative goal shielding and self-discipline was not discussed in the text in greater detail. More recent literature suggests that the understanding of self-control/self-discipline actually involves implicit self-regulation and other mental strategies. People might basically not distinguish between implicit self-regulation and self-control. Hofmann, Baumeister, Förster, and Vohs (2012) conducted an experience sampling study, in which they used the same measurement for self-control as the present research—the BSCS (Tangney et al., 2004). Therein, they found that people that scored high on self-discipline simultaneously reported to experience fewer temptations. This seems to suggest that high self-control in everyday life is associated with the strategic avoidance of temptation or maybe its automatic down-regulation (see also Gillebaart & de Ridder, 2015) rather than just overcoming temptation by exerting effortful self-discipline. Avoiding temptations can include the application of implementation intentions (Brandstätter et al., 2001; Gollwitzer, 1999), the building of habits (Galla & Duckworth, 2015), or the directed use of mental strategies (Hofmann, Deutsch, Lancaster, & Banaji, 2010), meant to automate specific behaviors in order to either focus on the relevant things or avoid irrelevant distracting things. The abovementioned down-regulation of temptations is basically what is described as implicit self-regulation or (evaluative) goal shielding in the present and earlier research.

This is consistent with the descriptive pattern in Experiment 2. As far as tendency, evaluative goal shielding was higher when self-discipline was high as well (three-way interaction between relevance, time, and self-discipline, $F(1, 94) = 3.069$, $p = .083$). The present research's data also supports the notion that people do not necessarily distinguish between these two concepts strictly. As mentioned in Chapter 2.4.3 two scales were developed that aimed at the conceptual differences of conscious self-control and the consequences of implicit self-regulation specifically. The items for

self-control put the emphasis on the aversive or resource-demanding nature of a task that has to be met with effort and troublesome overcoming (e.g., "Even if it is very hard for me to resist a distracting or tempting impulse, I muster the necessary self-discipline to not give in."; "Even if I dislike a task, I can force myself to do it."; translated from German), whereas the items for self-regulation emphasized the changing perception of a task as more pleasant, and the easygoing and effortless process of working on it (e.g., "If an otherwise not very interesting task supports me in one of my goals, it does not take a lot of time until I enjoy doing it."; "I have to make almost no effort to carry out my duties."). These two measures were correlated in both experiments (Experiment 1: $r = .61$, $p < .001$; Experiment 2: $r = .592$, $p < .001$).

It can be asked whether the concept of self-control as an effortful resource-demanding process can really be treated as distinct from other mental strategies and implicit self-regulation (like evaluative goal shielding). This possibly boils down to the definition of self-control one employs (see also Milyavskaya et al., 2015). It could be acknowledged that the current definition of and approach towards self-control is lacking its inherent element of implicit self-regulation and other mental strategies, as Gillebaart and de Ridder (2015) try to argue (see also de Ridder et al., 2012); or it is assumed that the definition of self-control in terms of a resource-demanding reflective process has its merit and should remain separate from implicit self-regulation and other mental strategies as a distinct personal trait (Baumeister et al., 1998; Hofmann et al., 2009) but that lay-people may confuse these concepts in everyday language and understanding. In the latter case, it would have to be acknowledged that there is apparently no good way to clearly dissociate the measurement of conscious self-control from implicit self-regulation yet. Instead of assessing self-control with questionnaires that often have a focus on outcomes, it might be necessary to find a direct measurement of the self-control resources a person has access to (if self-control is a limited resource at all; e.g., Job et al., 2010), if the distinction from other self-regulatory processes is supposed to stay.

Appendix I: Self-regulatory focus and implicit motives

The self-regulatory focus describes whether the self-regulation is more focused on accomplishments and aspirations (promotion focus) or safety and responsibilities (prevention focus). Shah et al. (2002) attempt to examine this in one of their studies by having participants provide a goal they felt to be a responsibility/duty, and a goal they felt to be an ideal. They find increased inhibition of an alternative, when it is presented after "duties", and less inhibition of alternatives after "ideals". On the surface, this seems to contradict newer research by Milyavskaya et al. (2015) who find higher implicit self-regulation for want-to than have-to goals, but one should be aware that the source of motivation (intrinsic versus extrinsic) is not the same as the focus one adopts in pursuit of a goal (promotion versus prevention). One can deliberately want to pursue a goal either to gain something or to prevent the loss of something. Finding and maintaining a relationship, respectively, could be examples that are easy to imagine. On the other hand, one can have the feeling to be expected to do something either in order to gain (e.g., education) or in order to avoid losing something (e.g., a professional position).

Implicit (as well as explicit) motives are classically divided into the achievement, affiliation, and power motive. They basically describe what kind of success a person experiences as the most fulfilling. Without going into great detail (they can each be further subdivided into a component of hope for success and a component of fear of failure), people with a strong achievement motive aim at experiencing personal achievement and improvement, while people that have a strong power motive seek to have influence (positive or negative) on other people. People with a strong affiliation motive draw satisfaction from social interactions and harmony. Research by Müller (2015) indicates that implicit self-regulation is enhanced when people's explicit goals and implicit motives fit each other, and that implicit self-regulation is diminished when goals and implicit motives are incongruent.

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Conference Contributions (first authorships only)

Werner, B., & Rothermund, K. (2011, March). Affektives Priming in einer Valent-Neutral-Entscheidungsaufgabe. Presentation held at the 53rd meeting of the Division General Psychology of the German Psychological Association (TeaP), Halle, Germany.

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Ehrenwörtliche Erklärung

Hiermit erkläre ich, dass mir die geltende Promotionsordnung der Fakultät für Sozial- und Verhaltenswissenschaften der Friedrich-Schiller-Universität Jena bekannt ist. Ich habe die Dissertation selbst angefertigt und habe keine Textabschnitte eines Dritten oder eigener Prüfungsarbeiten ohne Kennzeichnung übernommen. Alle von mir benutzten Hilfsmittel, persönliche Mitteilungen und Quellen habe ich angegeben. Ich habe nicht die Hilfe eines Promotionsberaters in Anspruch genommen und Dritte haben weder unmittelbar noch mittelbar geldwerte Leistungen von mir für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen.

Erstbetreuer der Arbeit war Prof. Dr. Klaus Rothermund, Zweitbetreuer war Prof. Dr. Oliver Kirchkamp. Bei der Datenerhebung für die empirischen Untersuchungen wurde ich durch Hilfskräfte des Max-Planck-Instituts für Ökonomik, Jena, und der Abteilung für Allgemeine Psychologie II des Instituts für Psychologie der Friedrich-Schiller-Universität Jena unterstützt. Die Arbeit wurde weder im In- noch Ausland für eine staatliche oder andere wissenschaftliche Prüfung, oder in gleicher oder ähnlicher Form bei einer anderen Hochschule bzw. anderen Fakultät als Dissertation eingereicht. Ich versichere, dass ich nach bestem Wissen die reine Wahrheit gesagt und nichts verschwiegen habe.

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