

Motivational and volitional aspects of self-regulation

PhD Thesis

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SUMMARY

The present thesis investigated how people self-regulate their behaviour in order to achieve their goals. A starting point was the concept of intention, which is assumed to capture the motivational factors that influence behaviour. A meta-analysis of 30 studies revealed that a “medium” change to a person’s intentions led to a “small” change in his/her subsequent behaviour. Study 2 and Study 3 integrated concepts from goal theories both to investigate conceptual overlap between goal constructs and to add to the prediction provided by intentions. The results suggested that task focus, implementation intentions, social support, and subjective norm were also valuable additions to a model of goal achievement.

Study 4 and Study 5 examined the interplay between motivation and the volitional strategy of implementation intentions—a specific plan about when and where to perform behaviour. As expected, implementation intentions only influenced behaviour if a relevant goal was activated (i.e., the person was motivated to perform the behaviour). Finally, Studies 6 to 9 looked in more detail at how implementation intentions influence behaviour. Two processes were identified: First, planning led to heightened accessibility of the specified environmental cues which meant that good opportunities to act were detected swiftly and with precision. Second, forming implementation intentions strengthened the association between the environmental cue and the intended behaviour, such that, upon detection of the good opportunity to act, the behaviour was initiated automatically.

Overall, the present thesis demonstrates the importance of both motivational and volitional constructs in explaining goal achievement and delineates the mechanism that underlies the particular effects of implementation intentions. These findings have implications across health and social psychology and suggest a number of profitable avenues for future research.

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CHAPTER 1: INTRODUCTION

The present thesis is concerned with the self-regulation of behaviour—how do people direct their actions in order to achieve desired outcomes? For example, how does a person regulate their behaviour in order to lose weight, quit smoking, or improve their relationship with their partner? In a discussion of how and why people lose control, Roy Baumeister and colleagues (Baumeister, Heatherton, & Tice, 1994) attribute considerable importance to the concept of self-regulation. They argue that a failure to self-regulate underpins the majority of social problems affecting Western societies—teen pregnancy, drug abuse, alcoholism, binge eating, lack of exercise, financial debt, divorce, domestic violence, and crime. To understand self-regulation one needs the concept of goals, which have a long history in psychology (see e.g., Gollwitzer & Moskowitz, 1996; Pervin, 1989). Goals can be defined as;

“internal representations of desired states, where states are broadly construed as outcomes, events, or processes” (Austin & Vancouver, 1996, p. 338).

There is little controversy about the importance of goals in the study of human action. Indeed, Locke (1969) argued that goal-directedness is a cardinal attribute of the behaviour of living organisms—goals are the starting point of the wilful control of action (Gollwitzer & Moskowitz, 1996). However, the majority of research into goals has been concerned with goal setting and goal content rather than with goal striving (Gollwitzer & Moskowitz, 1996). For example, we have a great deal of research that contrasts different goals on a dimension of interest (e.g., specific vs. vague goals, proximal vs. distal goals, Locke & Latham, 1990), but far less information about what happens once a person has decided to pursue a goal. The usual answer is that people’s level of *motivation* (need or drive to attain the goal) will determine their success (e.g., Ajzen, 1991; Rogers, 1983). However, to date, there has been no systematic review of the causal relation between motivation and behaviour. Moreover, available correlational evidence suggests that motivation is not sufficient to ensure goal attainment. Research suggests that volitional processes such as *implementation intentions*

may be required to ensure that motivation is translated into action. However, previous research has assumed—but not tested—the discriminant validity of motivation and volition, and has failed to address the question of *why* such strategies may prove effective. The aim of the present thesis is to examine the causal role of goal intentions on behaviour, to determine the joint impact of goal intentions and implementation intentions on behaviour, and to investigate the mechanism by which implementation intentions influence behaviour.

1.1 THE INFLUENCE OF GOALS ON BEHAVIOUR

When considering the influence of goals on behaviour it is useful to distinguish between conscious and unconscious goals. Conscious goals are those which are expressed in the form of a *behavioural intention*—instructions that people give to themselves to perform a certain behaviour (Triandis, 1980). Consequently, a conscious intention is the expression of an internal goal representation. In contrast, if the person is unaware that a goal is active, or unaware of its potential impact on behaviour, then the goal is deemed to be unconscious (Bargh, 1990; Bargh & Gollwitzer, 1994).

1.1.1 Behavioural intentions

“Behavioural intentions are assumed to capture the motivational factors that influence a behaviour” and to indicate “how hard people are willing to try, or how much effort they would exert to perform a behaviour” (Ajzen, 1991, p. 181).

Behavioural intentions, therefore, encompass both the direction and intensity of a decision (Sheeran, 2002). Intentions are typically measured using items such as “I intend to do X”, “I plan to do X”, or “I will do X”, with the extremity of participants’ responses indicating the strength of their intention.

The role of intentions in determining behaviour is central to models of social and health behaviour. For example, the theory of reasoned action (TRA; Fishbein & Ajzen, 1975) and its extension, the theory of planned behaviour (TPB; Ajzen, 1985; 1991), suggest that intentions; (1) are the proximal determinant of behaviour, and (2) mediate the influence

of both the theories' predictors (attitudes and subjective norms) and extraneous variables (e.g., personality) on behaviour. Similarly, protection motivation theory (PMT; Rogers, 1983) assumes that intention (protection motivation) mediates the relationship between the putative predictors (threat appraisal and coping appraisal) and behaviour. Finally, Triandis's (1980) model of interpersonal behaviour argues that, given appropriate facilitating conditions, behaviour is determined by a combination of behavioural intention and habit.

Correlational studies show that intentions are reliably associated with behaviour. A meta-analysis of 10 meta-analyses by Sheeran (2002) found that, based on 422 studies and a sample size of 82,107, intentions accounted for 28% of the variance in behaviour ($r_+ = .53$). In the context of the TPB, Armitage and Connor's (2001) meta-analysis of 185 studies found that intentions accounted for 22% of the variance in behaviour ($r_+ = .47$). Calculation of fail-safe N indicated that 26,235 studies showing that intentions are not predictive of behaviour would be required to conclude that intention has no significant relationship with behaviour (for similar findings, see meta-analyses by Ajzen, 1991; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997; van den Putte, 1991).

However, a number of problems are encountered when attempting to infer causation from correlational studies. First, many studies employ cross-sectional designs which means that reports of intentions and behaviour may be subject to consistency or self-presentational biases that artificially inflate the relationship between intention and behaviour (cf. Budd, 1987). Second, correlational studies do not rule out the possibility that past behaviour caused intention. In other words, intentions may simply reflect how the person has behaved in the past rather than a behavioural decision. For example, if you usually exercise twice a week, when asked about your exercise intentions for next week, you may not actively engage in a decision making process. Instead your intention to exercise next week may be based on your previous exercise behaviour.

Third, although longitudinal designs that correlate intentions at time 1 with behaviour at time 2 preclude a path from past behaviour to intention, problems still arise when inferring causation. For example, longitudinal designs may be subject to the *third variable problem* whereby a third—unmeasured—variable influences both intention and behaviour and creates a spurious correlation between the two. Indeed, Wegner and Wheatley (1999) suggested that;

“we can never be sure that our thoughts cause our actions, as there could always be unconscious causes that have produced them both” (p.482)

To my mind, the best way to determine if a person’s intention *causes* their subsequent behaviour is to manipulate intention and observe whether there is a corresponding change in behaviour. Chapter 2 presents a quantitative review of 30 such studies in an attempt to quantify the causal impact of intention on behaviour.

1.1.2 Unconscious goal pursuit

Conscious decision making is not the only way that a person’s goals can influence their behaviour. For example, the auto-motive model (Bargh, 1990; Bargh & Gollwitzer, 1994) proposes; (1) that goals can be activated outside of awareness, and (2) that unconsciously activated goals can then guide behaviour in a similar way to conscious goals (see also, Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001). In other words;

“stimuli in the environment can directly activate a goal, which will then become operative and guide conscious and behavioural processes within that environment, without any need for conscious decision” (Bargh, 1997, p. 30).

An impressive body of evidence supports the auto-motive hypothesis. In an early study, Bargh, Raymond, Pryor, and Strack (1995) demonstrated that the situational feature of power could unconsciously activate sexual goals amongst men likely to sexually aggress (as measured by the Attractiveness of Sexual Aggression [ASA] scale, Malamuth, 1989a; 1989b). In a word fragment completion task, one-half of the participants were primed with words related to power (e.g., influence, authority, and boss) and the other half were exposed to neutral words. Next, in an ostensibly unrelated experiment, participants were asked to rate

the attractiveness of a female confederate and the extent to which they desired future interaction with her. Consistent with the auto-motive model, high ASA participants who had been primed with constructs related to power thought the confederate was more attractive and wished to get to know her better than did controls. Moreover, these effects were automatic; debriefing revealed that participants did not notice any theme to the words in the priming task or any awareness of the influence of the primed goal on their judgment.

There is also evidence that unconscious goal activation can influence information processing and overt behaviour. Chartrand and Bargh (1996) replicated two well known experiments that demonstrated the influence of explicit goals on information processing (Hamilton, Katz, & Leirer, 1980). Hamilton et al. found that asking participants to form an impression of a target person led to a greater degree of thematic organization of the presented information than did asking participants to memorise the information. However, unlike the original studies, Chartrand and Bargh unconsciously activated the relevant goals using the Scrambled Sentence Test priming technique (Srull & Wyer, 1979). In this priming task, participants are asked to construct sentences out of words presented in a scrambled order (e.g., *them, tomato, evaluate, will, she*). Unbeknownst to participants, during the course of this task they were exposed to words related to either impression formation (e.g., *evaluate, judge*) or memorization (e.g., *retain, absorb*). Next, participants were exposed to behavioural information about a target person, which they were later asked to recall. Even though there were no differences in the explicit task instructions (i.e., participants' conscious intentions), the results replicated Hamilton et al.'s findings. Participants who had been exposed to impression-related stimuli showed greater clustering and recall of information than did participants exposed to memory-related stimuli. Importantly, extensive debriefing indicated that participants had no awareness either that there was any theme to the words presented during the priming task, or that the priming manipulation may have influenced their

performance on the subsequent task. In sum, features of the environment unconsciously activated a goal, which then influenced the way behavioural information was interpreted.

A more recent study by Bargh et al. (2001, Study 1) demonstrated that unconsciously activated goals could influence overt behaviour (see also Aarts, Gollwitzer, & Hassin, in press). Here, the priming task was designed to covertly activate the goal to perform well. For this purpose, participants were asked to complete a word search task. For one-half of the participants, achievement-related words (e.g., *achieve*, *succeed*) were embedded in the task whereas for the other half of the participants, the embedded words were neutral with respect to achievement. Next, participants undertook a second word search task. Consistent with predictions, participants who had been primed with the achievement goal found more words than did control participants. As before, participants reported no awareness of the impact of the goal on their performance during debriefing.

1.2 THE INTENTION-BEHAVIOUR “GAP” AND THE PROBLEM OF VOLITION

Given the centrality of intentions in models of health and social behaviour, one might expect that people’s decisions about how to behave would have a strong influence on their actual behaviour. However, intention-behaviour relations tend to be modest and up to 72% of the variance in behaviour is left unexplained. Sheeran (2002) and Sutton (1998) both note that research may underestimate the “true” relationship between intention and behaviour due to a variety of measurement artefacts including lack of compatibility between measures of intentions and behaviour in terms of the action, target, context, and time used to measure the construct. For example, if the aim is to predict whether people will use birth control pills, it may be inappropriate to inquire about their attitudes toward family planning (Davidson & Jaccard, 1975). Similarly, Courneya and McAuley (1993) found that 16 out of 17 studies on exercise behaviour violated scale correspondence. The majority of studies used a dichotomous-graded scale for intention (e.g., “Do you intend to exercise in the next week?”

[7-point scale, *likely-unlikely*]) and a continuous-open scale for physical activity (e.g., “How many times have you exercised over the last week?”, for a review, see Courneya, 1994).

Notwithstanding these measurement artefacts intention-behaviour consistency is still likely to be far from perfect. Orbell and Sheeran (1998) suggest that there are four possible patterns of consistency between intentions and behaviour (see also McBroom & Reid, 1992). Participants who intend to perform the behaviour can be split into two categories: (1) those who act consistently with their intention—*inclined actors*, and (2) those who do not act despite their intentions to do so—*inclined abstainers*. Similarly, participants who do not intend to perform the behaviour may either act in accordance with this inclination and be characterised as *disinclined abstainers*, or if they act inconsistently, can be characterised as *disinclined actors*. Sheeran (2002) argues that the lack of intention-behaviour consistency is mainly due to inclined abstainers rather than disinclined actors. A review of six studies of intention-behaviour relations revealed that the median percentage of intenders who failed to act on their intentions was 47%. In contrast, the median percentage of non-intenders who subsequently performed the behaviour was just 7%. In sum, it is those participants who fail to act upon their positive intentions who are mainly responsible for the intention-behaviour gap.

One reason why *inclined abstainers* fail to act on their intentions might be that they simply forget them. In a study of breast self-examination (BSE) by Orbell, Hodgkins, and Sheeran (1997), 70% of participants who intended to perform BSE in the next month and failed to do so endorsed forgetting as the reason for their non-performance. Similarly, in a study of exercise behaviour by Milne, Orbell, and Sheeran (2002), 17% of inclined abstainers reported forgetting as their reason for failing to exercise (other reasons included ‘being too busy’ and ‘not getting around to it’).

Related to forgetting is the issue of competing action tendencies (Kuhl, 1984). For instance, achievement of one's goal to run a marathon requires that one balances training with competing social commitments. Shah and Kruglanski (2002) operationalised these ideas by repeatedly priming participants with an unrelated, secondary goal while they tried to pursue the primary or focal goal. Participants were told that they would complete two tasks; the first was an anagram task and the second required them to think of uses for a box. During a short practice session for the actual anagram task one-half of the participants were subliminally primed with the phrase "box use", while control participants were primed with the phrase "view it." Shah and Kruglanski then assessed participants' performance on the main anagram task. Consistent with expectations, increasing the accessibility of the competing goal had a detrimental effect on the amount of time participants spent pursuing the focal goal. However, these effects were only observed amongst participants who believed that the anagram and box use task were unrelated—that is, only for these participants did the goal to work on the box use task compete with their goal to complete the anagram task. In sum, people may fail to act on their intentions because alternative, competing goals interfere with the primary goal (see also Emmons & King, 1988).

An additional problem is that even people who successfully fend off competing goals may run into difficulty deciding *how* to attain the focal goal. As Gollwitzer (1999) notes;

"the flexibility of goal pursuit is a curse when it comes to swiftly acting on one's goals, because people have to decide how (i.e., when, where, and in what way) to implement their goals" (p. 494).

This issue is addressed in the Rubicon Model of action phases (Heckhausen, 1987; Heckhausen & Gollwitzer, 1986; 1987), which suggests that motivation is just the starting point for behavioural performance. The model delineates four distinct phases to goal striving. The first is the predecisional phase in which people deliberate over which goal to pursue and then form an intention. Second is the preactional, postintentional (i.e., volitional)

phase in which people decide when, where and how to act. The outcome of this deliberation is a specific behavioural plan, known as an *implementation intention* (see below). In the third stage of the model, the action is initiated and maintained if necessary. Finally, the outcome of the action is evaluated against what was desired. According to the model of action phases then, the key issue for the intention-behaviour relation is that motivation needs to be supplemented by volitional strategies in order to increase the likelihood of behavioural enactment.

Like the model of action phases, the Transtheoretical Model (TTM; Prochaska & DiClemente, 1983; 1984) identifies distinct stages in relation to behaviour change. Of interest to the present discussion is the transition from the preparation stage (where people prepare themselves to perform the behaviour) to the action stage (when individuals successfully perform the behaviour in question). A recent study by Armitage, Sheeran, Connor, and Arden (in press) found that although TPB constructs such as behavioural intention successfully predicted the majority of stage transitions, these constructs could not predict progression from the preparation stage. In other words, research into the TTM provides additional evidence that motivational constructs are not sufficient for understanding how a decision is translated into action.

Chapter 3 of the present thesis extends this work to provide a direct test of the sufficiency of motivation as an explanation of behaviour. In addition, the research examines the distinction between motivational and volitional constructs and investigates which variables are needed to understand the process of goal achievement.

1.3 IMPLEMENTATION INTENTIONS

Implementation intentions (Gollwitzer; 1993; 1996; 1999) are subordinate to goal intentions and involve specifying when, where, and how one will perform behaviour(s) that lead to goal attainment. This specification usually takes the format “If situation X is

encountered, then I will perform behaviour Y!” For example, whereas a goal intention might state, “I intend to exercise twice a week”, the corresponding implementation intention might be “If it is Monday after work, then I will go for a run.” Thus, implementation intentions create a mental link between a specified future situation and a goal-directed behaviour (Gollwitzer, 1999). In this way, the individual has an if-then plan that may provide an answer to some of the volitional difficulties described above. Recall that in the study by Orbell et al. (1997) 70% of inclined abstainers failed to perform BSE because they simply forgot. Amongst participants who had formed an implementation intention, however, nobody reported that they had forgotten to perform the behaviour (see also Milne et al., 2002). Similarly, evidence suggests that implementation intentions can be used to ward off distractions from competing goals. For example, in an experiment by Schaal (1993, cited in Gollwitzer & Schaal, 1998) participants were asked to complete a strenuous and boring task (Düker’s, 1953, Concentration Achievement Test, KLT) while being repeatedly exposed to highly attractive distractions (award winning commercials). Mean time taken to perform the KLT served as the dependent variable. As expected, when participants planned to ignore the distractions (“As soon as I see moving pictures or hear sounds, I will ignore them”) they fared better than did participants who simply intended to do so (“I will not let myself get distracted”).

There is now considerable evidence to suggest that implementation intentions are effective in promoting goal achievement over and above behavioural intentions in isolation. A meta-analysis of 15 studies by Sheeran (2002) found that implementation intentions had a “medium” effect size on behaviour ($r_+ = .33$). Moreover, effectiveness has been demonstrated for a range of behaviours, from infrequently performed behaviours such as attendance for cervical cancer screening (Sheeran & Orbell, 2000) to repeated behaviours that

are performed daily such as vitamin supplement use (Sheeran & Orbell, 1999), and across a range of samples and measures of behaviour (Sheeran, 2002).

However, the question of *when* implementation intentions influence behaviour has received less attention. Given that implementation intentions are formed in the service of a goal intention one might expect that plans are especially, or only, effective in promoting performance when a relevant goal is active. For example, in the study by Orbell et al. (1997) 64% of participants who formed implementation intentions subsequently performed BSE whereas this figure rose to 100% amongst participants who strongly intended to perform BSE. Gollwitzer (1993; Bargh & Gollwitzer, 1994) acknowledged that the interplay between goals and implementation intentions is not well understood and that evidence to date on this issue has been equivocal. Chapter 4 reviews this evidence and presents the results of two studies that aim to provide a direct test of the goal-dependency of implementation intentions using unconscious goal activation.

Implementation intentions are thought to be effective in promoting goal attainment on the basis of psychological processes that relate to both the anticipated situation and the specified behaviour (Gollwitzer, Bayer, & McCulloch, in press). First, Gollwitzer and Schaal (1998) argue that the mental representation of the anticipated situational cue becomes highly accessible when implementation intentions are formed. Furthermore, this heightened accessibility serves to improve detection of good opportunities in which to act (Steller, 1992, cited in Gollwitzer & Schaal, 1998). Second, forming an implementation intention is thought to create a strong association between the critical situation and the intended behaviour. Thus, once the specified cue is encountered the intended behaviour should be initiated automatically (Gollwitzer, 1999). This is because control of the behaviour is passed to the specified cue and the need for conscious, effortful control is circumvented—a process referred

to as “strategic automatization” (Gollwitzer & Schaal, 1998, p. 124). This thesis will examine processes related to both the anticipated cue and the situation-behaviour relation.

1.3.1 Accessibility of the specified cue

Several studies have provided evidence that forming an implementation intention serves to improve detection of the specified cue. For example, Steller (1992, cited in Gollwitzer & Schaal, 1998) used the embedded figures test (Gottschalldt, 1926; Witkin, 1950) in which small geometrical figures (a-figures) are hidden within larger figures (b-figures). Stellar found that participants who formed implementation intentions using the a-figure as the critical situation showed enhanced detection of these figures. Planning also has consequences for recall of the specified cue. For example, Seehausen, Bayer, and Gollwitzer (1994, cited in Gollwitzer, 1996) asked participants to form an implementation intention specifying when, where, and how they wanted to play games prepared by the experimenter. The results indicated that options specified in the implementation intention were recalled more effectively than were non-specified options both immediately after the experiment and 48 hours later.

Thus, evidence indicates that implementation intentions improve detection and recall of the specified cue. However, two issues still require empirical examination and are addressed in Chapter 5 of the present thesis. First, in order to accurately represent situations in which participants fail to translate their goal intentions into action, the cue should be extremely hard to detect without implementation intentions. Second, previous research has been concerned with cue detection and has neglected the issue of cue *discrimination*. For example, the heightened accessibility of situational cues as a consequence of implementation intentions might mean that people incorrectly identify an ambiguous cue as a good opportunity to act.

1.3.2 Strength of the cue-behaviour association

In addition to heightened cue accessibility, research also suggests that implementation intentions serve to strengthen the association between the specified cue and the intended behaviour. As a consequence, when the environmental cue is encountered, the intended behaviour is initiated automatically. In other words, action initiation under implementation intentions proceeds swiftly, efficiently, and without conscious intent (Gollwitzer et al., in press).

Gollwitzer and Brandstätter (1997, Study 3) demonstrated the *immediacy* of action initiation in a study concerned with counteracting racial prejudice. Participants were asked to take a convincing counter position towards xenophobic remarks made by a confederate presented on videotape. In addition, one group of participants was asked to form an implementation intention to commit themselves to counter-argue at preselected suitable opportunities. The results suggested that participants who formed an implementation intention seized suitable opportunities to express themselves more immediately (i.e., closer to the specified time) than did participants who had familiarised themselves with these favourable opportunities and participants who were simply told that they would have to counter-argue (see also Brandstätter, Lengfelder, & Gollwitzer, 2001, Studies 2 and 3).

Numerous experiments have also considered the *efficiency* of action initiation as a function of implementation intentions. For example, Webb and Sheeran (2003) investigated the relationship between implementation intentions and ego-depletion. Ego-depletion refers to the temporary depletion of self-regulatory capacity by an initial act of self-control. In other words, when people perform a task requiring self-control (e.g., thought suppression, affect regulation, co-ordinating a dual task, etc.) their self-regulatory capacity is diminished and they are less able to exert self-control in a subsequent task. Webb and Sheeran exploited this depletion of self-control to test if implementation intentions required self-control

resources to be effective. Participants completed a balance-and-maths dual task under ego-depletion versus control conditions and subsequently completed a Stroop task (Stroop, 1935). As expected, ego-depleted participants performed worse on the Stroop task. However, ego-depleted participants who formed implementation intentions in relation to the Stroop task (“As soon as I see the word, I will ignore its meaning and name the ink colour it is printed in”) performed as well as non-depleted controls. In other words, with the help of implementation intentions, the intended behaviour can be performed even when people have few conscious self-regulatory resources available. Brandstätter et al. (2001) looked at cognitive load in a different way, but reached the same conclusion about the efficiency of implementation intentions. Cognitive load was manipulated either through choice of sample (schizophrenic patients or heroin addicts under withdrawal) or by using a dual task paradigm in experiments with college students. In each case, implementation intentions proved to be effective even though the participant could not devote cognitive resources to the task.

The final criterion for classifying a response as automatic is to demonstrate that it operates in the absence of conscious intent. Using a retaliation paradigm, Malzacher (1992) provided evidence that participants need not be aware of the environmental cue driving the behaviour for implementation intentions to be effective. All participants were asked to respond to an insult from the experimenter by complaining directly to her. In addition, half the participants were asked to form an implementation intention: “As soon as I see the experimenter again, I will tell her what an unfriendly person she is!” Next, in an ostensibly unrelated experiment, participants responded to a series of positive or negative adjectives presented on a computer. However, less than 100ms before some of these adjectives the unfriendly experimenter’s face (the cue) was subliminally presented. Presenting the environmental cue very quickly, and directly prior to presentation of the target word, precludes any role of conscious processes in determining participants’ responses to the words

(Bargh & Chartrand, 2000). The results suggested that implementation intentions influenced performance despite the fact that participants did not even realise the experimenter's face had been presented. Participants who had formed implementation intentions responded faster to the negative words (and slower to the positive words) when they were preceded by the unfriendly experimenter's face. This pattern of data was not found amongst participants who had the goal intention to complain about the unfriendly experimenter. In sum, the study by Malzacher (1992) demonstrates that participants need not be aware of the cue driving the behaviour (see also Bayer, Moskowitz, & Gollwitzer, 2002, cited in Gollwitzer et al., in press).

However, no research to date has considered whether participants need to be aware of the underlying goal that is served by the implementation intention. For example, all participants in Malzacher's study had the conscious goal intention to comment on the experimenter's hostility, but would implementation intentions have influenced responses without this explicit instruction? This question is addressed in Chapter 4. It is important to note that attempting to eliminate the mediating role of conscious intention from the implementation intention-behaviour relation does not imply that implementation intentions influence behaviour regardless of the person's current goals. Indeed, Chapter 4 of this thesis will argue that goals (conscious or unconscious) can have a *moderating* effect on the success of implementation intentions, such that implementation intentions only influence behaviour when that behaviour is consistent with the person's objectives.

In sum, by forming implementation intentions, people can strategically switch from conscious and effortful action initiation (guided by goal intentions) to having their goal-directed actions effortlessly elicited by the specified situational cues (Gollwitzer et al., in press). Two processes appear to be responsible for the success of implementation intentions; heightened accessibility of the situational cue and a strengthened association between the cue

and the behaviour. However, research to date has been concerned primarily with the consequences of associative strength (i.e., the features of automaticity described above) and has failed to directly examine whether the strength of association between situation and action mediates the impact of implementation intentions on behaviour. Chapter 5 describes this important test.

1.4 PLAN OF THE THESIS

The present thesis will address four important questions in the domain of self-regulation. First, what is the causal impact of intentions on behaviour and is motivation a *sufficient* explanation of behaviour? Second, what processes are encompassed by the construct of motivation and is the discriminant validity of motivation and volitional processes supported? Third, what is the relation between motivation and volition and in particular, is the success of implementation intentions goal-dependent? Finally, what mechanism underlies the beneficial effects of implementation intentions?

Chapter 2 presents a quantitative review of studies that manipulate intention and assess the effect of this manipulation on the person's subsequent behaviour. In doing so, the study provides the first assessment of the causal impact of intention on behaviour, as well as examination of a number of moderators of this effect. Chapter 3 presents two studies designed to test whether motivation is a sufficient cause of behaviour and, if not, which other constructs are needed to explain behaviour. Furthermore, Chapter 3 investigates conceptual overlap amongst theories of goal achievement. For example, on the basis of current experimental research we have no direct evidence for the discriminant validity of implementation intentions and concepts such as self-efficacy.

Chapter 4 investigates the relationship between motivation and volition. Specifically, two studies test the hypothesis that the success of an implementation intention will be dependent upon activation of a relevant goal. Finally, Chapter 5 presents four studies

designed to investigate aspects of the mechanism that underlies the success of implementation intentions. Three studies investigated whether implementation intentions make people better able to discriminate a good opportunity in which to enact the intended behaviour. One study compares cue accessibility and cue-behaviour association strength as mediators of the success of implementation intentions.

Finally, Chapter 6 reviews the evidence presented in Chapters 2 to 5 and relates these findings to the process of goal achievement as a whole. The discussion focuses on: (1) the importance of motivation, both as a determinant of behaviour itself and as a moderator of the success of volitional strategies, and (2) how implementation intentions influence behaviour once people are motivated. In addition, the implications of the findings for future research will be discussed.