



This is a repository copy of *Does forming implementation intentions help people with mental health problems to achieve goals? A meta-analysis of experimental studies with clinical and analogue samples.*

White Rose Research Online URL for this paper:
<http://eprints.whiterose.ac.uk/94825/>

Version: Accepted Version

Article:

Toli, A., Webb, T.L. and Hardy, G.E. (2015) Does forming implementation intentions help people with mental health problems to achieve goals? A meta-analysis of experimental studies with clinical and analogue samples. *British Journal of Clinical Psychology*. ISSN 0144-6657

<https://doi.org/10.1111/bjc.12086>

This is the peer reviewed version of the following article: Toli, A., Webb, T. L. and Hardy, G. E. (2015), Does forming implementation intentions help people with mental health problems to achieve goals? A meta-analysis of experimental studies with clinical and analogue samples. *British Journal of Clinical Psychology*., which has been published in final form at <http://dx.doi.org/10.1111/bjc.12086>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Self-Archiving (<http://olabout.wiley.com/WileyCDA/Section/id-820227.html>).

Reuse

Unless indicated otherwise, fulltext items are protected by copyright with all rights reserved. The copyright exception in section 29 of the Copyright, Designs and Patents Act 1988 allows the making of a single copy solely for the purpose of non-commercial research or private study within the limits of fair dealing. The publisher or other rights-holder may allow further reproduction and re-use of this version - refer to the White Rose Research Online record for this item. Where records identify the publisher as the copyright holder, users can verify any specific terms of use on the publisher's website.

Takedown

If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.



eprints@whiterose.ac.uk
<https://eprints.whiterose.ac.uk/>

Does Forming Implementation Intentions Help People with Mental Health Problems to Achieve Goals? A Meta-Analysis of Experimental Studies with Clinical and Analogue Samples

Agoro Toli, Thomas L. Webb, & Gillian E. Hardy

University of Sheffield, UK

In press, British Journal of Clinical Psychology, <http://www.ncbi.nlm.nih.gov/pubmed/25965276>

doi: 10.1111/bjc.12086

Correspondence for this article should be addressed to Thomas L. Webb, Department of Psychology, University of Sheffield, Western Bank, S10 2TN, Sheffield.

Email: t.webb@sheffield.ac.uk

Abstract

Objective: People struggle to act on the goals that they set themselves and this gap between intention and action is likely to be exacerbated by mental health problems. Evidence suggests that forming specific if-then plans (or ‘implementation intentions’) can promote goal attainment and a number of studies have applied such techniques in clinical contexts. However, to date, the extent to which planning can help people with mental health problems has not been systematically examined.

Method: The present review used meta-analysis to investigate the effect of if-then planning on goal attainment among people with a DSM-IV/ ICD-10 diagnosis (i.e., clinical samples) or scores above a relevant cut-off on clinical measures (i.e., analogue samples). In total, 29 experimental studies, from 18 records, met the inclusion criteria.

Results: Excluding one outlying (very large) effect, forming implementation intentions had a large effect on goal attainment ($d_+ = 0.99$, $k = 28$, $N = 1,636$). Implementation intentions proved effective across different mental health problems and goals, and between studies with different methodological approaches.

Conclusions: Taken together, the findings suggest that forming implementation intentions can be a useful strategy for helping people with mental health problems to achieve various goals and might be usefully integrated into existing treatment approaches. However, further studies are needed addressing a wider range of mental health problems.

Word count: 216 words (max: 250)

Keywords: implementation intentions; if-then plans; goal setting; mental health; meta-analysis

Practitioner Points

This meta-analysis suggests that prompting people with mental health problems to form if-then plans (known as “implementation intentions”) specifying when, where, and how they will achieve their goals can be beneficial.

The findings proved robust across a range of methodologies, samples, and focal goals; suggesting that forming implementation intentions can help people with a range of mental health problems to achieve a range of different goals.

We provide guidance to researchers and practitioners in how to promote the formation of implementation intentions.

Does Forming Implementation Intentions Help People with Mental Health Problems to Achieve Goals? A Meta-Analysis of Experimental Studies with Clinical and Analogue Samples

Goal setting is the starting point of the willful control of action (Gollwitzer & Moskowitz, 1996) and dealing with the challenges posed by mental health problems is no exception (e.g., Havens & Dimond, 1976; Hill, 1969; Karoly, 2006; Michalak & Grosse Holtforth, 2006; Renninger, 2013; Watkins, 2011). Goals are mental representations of desired outcomes (Austin & Vancouver, 1996), and goal intentions are self-instructions to act towards those outcomes (Sheeran & Webb, 2011; Triandis, 1980). For example, people who are anxious might set the goal to relax (Varley, Webb, & Sheeran, 2011) and people who are depressed may intend to engage in more activities over the coming week (Jacobson, Martell, & Dimidjian, 2001). Grosse Holtforth, Wyss, Schulte, Trachsel, and Michalak (2009) coded the nature of patients' treatment goals and found that the goals of patients with anxiety primarily concerned symptom relief, while patients with depression had more heterogeneous goals. Therefore, goals are likely to differ between clinical presentations. Notwithstanding, it is clear that a key feature of many treatments for mental health problems is striving to obtain particular outcomes,

A number of reviews point to the features of effective goal setting (e.g., Doran, 1981; Latham & Locke, 1991). However, goal setting is not the same as goal striving – the process of moving toward the desired goal once set (Lewin, Dembo, Festinger, & Sears, 1944) – and, given the centrality of goals for everyday functioning and the management of mental health problems, an important question is how to promote effective goal striving among such populations. The present research addresses this question by drawing on translational approaches in which insights from behavioural science are used to improve the treatment of mental health difficulties (Bhui, 2014; Sung et al., 2003; Watkins, 2011). Specifically, we evaluate the extent to which a

technique borrowed from research and theorizing on self-regulation – namely, if-then planning, or ‘implementation intentions’ (Gollwitzer, 1993; 1999; 2014) – can be effective in clinical contexts.

Although a number of theoretical models suggest that goal attainment is a relatively direct function of the strength of a person’s intentions to act (e.g., Ajzen, 1991; Rogers, 1983), evidence suggests that intentions do not necessarily translate into action. For example, Webb and Sheeran (2006) found that even medium-to-large-sized changes in intentions led only to small-to-medium-sized changes in behaviour. Three broad types of difficulties have been proposed to explain why people struggle to enact their intentions (Sheeran, Milne, Webb, & Gollwitzer, 2005). The first is intention viability, which refers to the idea that people may lack the resources, abilities, or opportunities required for goal striving. For example, it is difficult to improve a relationship if the person in question refuses to meet or talk. A second type of difficulty reflects problems with intention activation, which refers to the idea that contextual demands can influence the salience, direction, or intensity of a focal intention in relation to other intentions (Johnson, Chang, & Lord, 2006; Kruglanski, Shah, Fishbach, Friedman, Chun, & Sleeth-Keppler, 2002). Consequently, competing goals could lead the focal intention to be forgotten or reprioritised (Einstein, McDaniel, Williford, Pagan, & Dismukes, 2003; McCulloch, Fujita, Aarts, & Bargh, 2008). For example, the goal to keep calm may be quickly forgotten in anxiety-provoking situations. The final set of difficulties concern problems with intention elaboration. The idea here is that goals need to be specified in a reasonable amount of detail (e.g., when, where, and how they will be carried out) in order to influence action (Heckhausen, 1987; Heckhausen & Gollwitzer, 1986; 1987). Poorly elaborated goals may prompt deliberation (e.g., how should I act?) rather than action, and can mean that good opportunities to act are missed.

For example, someone may miss a potential opportunity to apologise to someone for an indiscretion.

The volitional problems outlined above are likely to be exacerbated by the presence of mental health problems that can pose additional structural and personal challenges to goal striving. It is well known, for example, that mental health problems are often co-morbid with disadvantaged social circumstances and lack of social support (Murali & Oyebode, 2004), which may reduce the availability of resources for pursuing a goal (i.e., lead to problems with intention viability). In an illustrative study, Weinberger, Mateo, and Sirey (2009) found that older people with depression found accessing and paying for treatment a major barrier to achieving their goals of increased socialization and clinical improvement. Mental health problems also pose a number of cognitive challenges. For example, research into the cognitive functioning of adults with anxiety, posttraumatic stress, schizophrenia, and depression tends to find poorer memory and executive functioning among such groups than observed in the general population (Marvel & Paradiso, 2004; Robinson, Vytal, Cornwell, & Grillon, 2013; Schweizer & Dalgleish, 2011; Tan, 2009). Given that memory and planning skills are required to recognize opportunities and plan preparatory actions (Fishbach & Ferguson, 2007; Fuster, 2008; Miller & Cohen, 2001), decrements in these skills may reduce the likelihood of goal attainment and go some way toward explaining why people with depression and schizophrenia struggle to initiate action (Metzinger, 2006; Spence & Parry, 2006). Finally, mental health problems can also create additional challenges when monitoring progress toward goals and evaluating feedback. For example, evidence suggests that people with social anxiety struggle to accurately appraise their performance in social situations (Rapee & Lim, 1992). In sum, people with mental health

problems seem particularly likely to experience volitional difficulties that can hamper goal striving.

Implementation intentions and goal pursuit

Forming implementation intentions (Gollwitzer, 1993; 1999; 2014) has been suggested as a useful technique for overcoming volitional difficulties and for bridging the gap between goal intentions and behaviour. Implementation intentions are ‘if-then’ plans, which specify good opportunities to act (in the ‘if-part’ of the plan), along with cognitive or behavioural responses to these opportunities (in the ‘then-part’ of the plan, e.g., “If situation Y occurs, then I will initiate goal-directed behaviour Z!”). For example, someone who is anxious might link an anxiety-provoking situation with the use of a relaxation exercise: “If I feel under pressure, then I will immediately use my breathing tactic to relax!” (Varley et al., 2011). Similarly, someone who is depressed may plan when and where they will exercise (Pomp, Fleig, Schwarzer, & Lippke, 2013). Forming implementation intentions serves to overcome the problem of poorly elaborated intentions by describing when, where, and how goal striving will take place. The consequence is that control of behaviour is delegated to specified cues that trigger goal-directed responses in a relatively automatic fashion (for a review and empirical demonstration, see Webb & Sheeran, 2008). If-then planning, therefore, means that good opportunities to act are swiftly and accurately identified (Aarts, Dijksterhuis, & Midden, 1999; Parks-Stamm, Gollwitzer & Oettingen, 2007; Webb & Sheeran, 2004; 2007; 2008; Wieber & Sassenberg, 2006). Furthermore, the anticipated opportunity becomes associated with the intended response (Aarts & Dijksterhuis, 2000; Webb & Sheeran, 2007; 2008). The consequence is that goal pursuit proceeds relatively immediately (Gollwitzer & Brandstätter, 1997), efficiently (Webb & Sheeran, 2003), and without the person necessarily being aware of the eliciting cue (Bayer, Achtziger, Gollwitzer, & Moskowitz, 2009).

Forming implementation intentions, therefore, can also help to overcome other volitional problems, such as those pertaining to the viability or activation of the focal goal (for reviews, see Gollwitzer, 2014; Gollwitzer & Sheeran, 2006; Sheeran et al., 2005).

A meta-analysis of 94 studies found that forming implementation intentions had a medium-to-large-sized effect on goal attainment, across a range of outcomes, samples, and focal behaviours (Gollwitzer & Sheeran, 2006). Recent meta-analyses focusing on specific behaviours (e.g., healthy eating or physical activity) have confirmed these positive effects (Adriaanse, Vinkers, De Ridder, Hox, & De Wit, 2011; Bélanger-Gravel, Godin, & Amireault, 2013). However, despite assertions that if-then plans may be particularly useful for ‘critical populations’ who have problems with action control (Gollwitzer, 1999), at the time of Gollwitzer and Sheeran’s review only three studies had examined the effect of forming implementation intentions among people with psychological problems: a study of participants with brain lesions (Lengfelder & Gollwitzer, 2001), a study with participants who had schizophrenia (Brandstätter, Lengfelder, & Gollwitzer, 2001), and a study which recruited participants who were addicted to opiates (Brandstätter et al., 2001). This preliminary evidence suggested that implementation intentions were effective in these contexts – all three of the studies reported large-sized effects, that were comparable to, if not larger than, those obtained among non-clinical samples.

Since Gollwitzer and Sheeran’s (2006) review, there has been a steady increase in the number of studies using and citing work on implementation intentions which has been accompanied by an increasing interest in the use of self-regulatory strategies – including implementation intentions – in mental health contexts (for reviews, see Michalak & Grosse Holtforth, 2006; Strauman, Goetz, Detloff, MacDuffie, Zaunmuller, & Lutz, 2013; Watkins, 2011). For example, recent studies have investigated whether forming implementation intentions

can help people with anxiety to complete relaxation exercises (Varley et al., 2011), people with social anxiety to control their attention (Webb, Ononaiye, Sheeran, Reidy, & Lavda, 2010), and people with mental health problems to attend psychotherapy appointments (Sheeran, Aubrey, & Kellett, 2007). Studies have also examined the effect of if-then planning in promoting memory among people with schizophrenia (Garrett, 2010) and those prone to schizoaffective personality disorder (Chen et al., 2014) and have asked children with ADHD to form implementation intentions designed to help them to inhibit responses (Gawrilow & Gollwitzer, 2008), delay gratification (Gawrilow, Gollwitzer, & Oettingen, 2011a), and improve executive functioning (Gawrilow, Gollwitzer, & Oettingen, 2011b). It is therefore both important and timely to systematically review this evidence in order to characterise the effectiveness of implementation intentions among people with mental health problems and to identify factors that can influence the effectiveness of such planning techniques.

The Present Review

The present review investigates the effect of forming implementation intentions on goal attainment among people with mental health problems. Our primary hypothesis was that the effect of forming implementation intentions in these contexts would be comparable to, if not larger than, the effects reported in studies focusing on non-clinical samples. To investigate this hypothesis, meta-analysis is used to integrate effect sizes from experimental studies that manipulated implementation intentions among clinical or analogue samples and assessed the effect of this manipulation on subsequent goal attainment. We adopted an inclusive approach and did not constrain the nature of the clinical problem or the focal goal. However, the impact of each of these features on effect sizes is examined using moderator analyses that compare, for example, effect sizes from studies focusing on different clinical problems (e.g., developmental

disorders vs. mental health problems), recruiting different samples (e.g., participants with clinically diagnosed mental health problems vs. symptoms, but not clinical diagnoses), or designed to promote the attainment of different goals (e.g., those pertaining to action initiation or emotion regulation). We did not have any a priori reasons to expect any differences in the effect of forming implementation intentions on goal attainment as a function of these moderators (indeed, Gollwitzer & Sheeran, 2006, reported that the effect of forming implementation intentions proved robust across a range of situations and samples); however, it seemed important to explore the possibility that effect sizes may differ, especially as such differences could inform clinical practice. For example, if forming implementation intentions proved to be particularly effective among people with anxiety or for dealing with emotional problems, then this would have implications for the recommendations that we might make on the basis of the findings.

In addition, the present review evaluates the impact of a number of methodological characteristics that could influence effect sizes, including publication status, sample size, and study design. It seemed important to consider publication status as evidence suggests that studies with large effect sizes have a better chance of publication compared with studies with small or non-significant effects (Fanelli, 2012; Rosenthal, 1979). Having said this, unpublished studies may use less rigorous procedures than published research so it is important to note that a difference between published and unpublished studies is not necessarily evidence of a reporting bias. Studies with larger samples tend to produce more reliable estimates of the true effect size and therefore, meta-analysis weights the effect sizes derived from the primary studies by the respective sample size. There have, however, been calls for systematic reviews to exclude studies with small samples (e.g., Kraemer, Gardner, Brooks, & Yesavage, 1998; Turner, Bird, & Higgins, 2013). However, we felt that an inclusive approach that empirically evaluates the impact of

sample size on effect sizes would be more informative. Finally, experimental studies examining the effect of forming implementation intentions among people with mental health problems have adopted both between-participants designs (where participants are randomly allocated to either form an implementation intention or to a control intervention) and within-participant or ‘repeated measures’ designs (where the same participant is randomly allocated to either form an implementation intention or to a control intervention at different phases of the study). There are advantages and disadvantages to both approaches (e.g., within-participant designs may lead to carryover effects, where participants continue to use a previously formed implementation intention in the control phase of the design, or vice versa; for a description, see Elmes, Kantowitz, & Roediger, 1999). It therefore seemed important to explore the possibility that effect sizes may differ as a function of study design.

Method

Inclusion criteria. There were four inclusion criteria: First, the studies had to involve the experimental investigation of the effect of forming implementation intentions through allocation of participants to a condition where they were asked to form implementation intentions, or a relevant comparison condition. In order to isolate the effect of forming implementation intentions, we required that this was the only difference between the experimental and comparison conditions. Second, participants had to meet the criteria for a DSM-IV or an ICD-10 diagnosis (including dementia, mood and neurodevelopmental disorders, and addictions) or score above the clinical cut-off on a standardised clinical measure (e.g., above 8 on the Hospital Anxiety and Depression Scale; HADS, Zigmond & Snaith, 1983). Third, studies had to report a measure of goal attainment following the manipulation of implementation intentions. Measures of goal attainment could include task performance (e.g., executive functioning), changes in

behaviour (e.g., levels of physical activity, attendance), or outcomes (e.g., levels of anxiety). Finally, descriptions of the relevant studies had to be written in English and published (or available) between January 1980 and March 2014.

Identification of studies. The following methods were used to identify relevant studies: (a) electronic searches of scientific databases (those indexed by Web of Science and ProQuest Dissertation and Theses) using the term implementation intention* or if-then plan* (records had to use one of the respective terms in the title, abstract, or keywords); (b) examination of the reference lists of relevant papers (ancestry approach; Johnson, 1993); (c) examination of records that had cited relevant papers; and (d) contacting authors to request unpublished or studies that were in press (11 authors were contacted, of whom 8 replied). In total, we identified 2,977 records that were potentially eligible for inclusion; of which 666 (63%) were evaluated in detail. Figure 1 shows the flow of records through the review.

The majority of records (95%) were rejected because they did not recruit an analogue or clinical sample. Eleven records (17%) overlapped with those already under consideration. When there was an overlap between a thesis and a publication, the thesis was excluded, unless the publication referred to a conference abstract. One record was rejected because it did not include a measure of goal attainment (the outcome was intentions to use condoms, Nydegger, Keeler, Hood, Siegel, & Stacy, 2013). A further record was rejected because it was not possible to compute the effect of forming implementation intentions on goal attainment separately for the participants who met the criteria for having mental health problems (Patry, 2007). A final record was excluded because participants in the experimental condition received an intervention enhanced with implementation intentions, which was compared to a waiting list comparison group who received neither the intervention nor formed implementation intentions (Troyer,

Murphy, Anderson, Moscovitch, & Craik, 2008). It was not possible, therefore, to isolate the effect of forming implementation intentions in this study so it was not included. In total, $k = 29$ studies, from 18 records, met the criteria of the meta-analysis. An asterisk precedes each of these reports in the reference list.

Meta-analytic strategy. Effect sizes were estimated either by using the data reported in the studies or by obtaining the relevant data through correspondence with the authors. Cohen's d , representing the standardized difference in outcomes between experimental and comparison conditions (Cohen, 1988), was used to estimate the size of effects reported by the primary studies because it has been considered an unbiased estimator of effect sizes (Hedges & Olkin, 1985). According to Cohen's (1992) power primer, $d = 0.20$ should be considered a small effect size, $d = 0.50$ is a medium effect size, and $d = 0.80$ is a large effect size. Effect sizes were computed using Lyons and Morris' (2014) meta-analysis calculator. Due to the diversity of the designs employed by the primary studies, some rules were developed to maintain consistency in the calculation of the effect sizes. Specifically, when the studies reported both adjusted and unadjusted values, the adjusted values (typically with respect to baseline measures) were used in the calculations. When studies reported effects on multiple outcome measures (e.g., Shah, Hunt, Webb, & Thompson, 2014, examined the effect of forming implementation intentions on levels of anxiety, depression, and appearance-related concern), we computed an effect size for each measure and then averaged the effect sizes, weighting the estimate by the sample-size where appropriate. Where studies had multiple experimental conditions (e.g., Gawrilow et al., 2011b, compared conditions that formed task facilitating and distraction inhibiting implementation intentions, respectively) the sample size for the control condition was halved to ensure that participants were not double counted. Where studies had multiple comparison conditions (e.g.,

Webb et al., 2010, compared a condition in which participants were prompted to form implementation intentions with conditions that were asked to form goal intentions or given no instructions, respectively), the comparison condition that were asked to form goal intentions was selected over conditions that were not given any instructions, as goal intentions represent a more stringent comparison condition for the effect of forming implementation intentions (Webb, Schweiger Gallo, Miles, Gollwitzer, & Sheeran, 2012).

Study characteristics were coded by the first author and a second, independent coder. Reliabilities were acceptable ($\kappa = .80$) and disagreements were jointly resolved. Each study was coded for the following characteristics: (a) the nature of the sample (clinical diagnosis vs. no formal diagnosis), (b) the nature of the clinical problem (mental health problem vs. brain injury vs. developmental disability), identified by looking at the DSM-IV/ICD-10 diagnosis or the nature of the measure(s) that was used to select participants, and (c) the nature of the focal goal. Goals were divided into those pertaining to action initiation (e.g., exercising, Pomp et al., 2013, or attending an appointment, Sheeran et al., 2007), cognitive skills (e.g., memory, Chen et al., 2014, or attention, Webb et al., 2010), or emotion regulation (e.g., reducing anxiety, Shah et al., 2014; Varley et al., 2011). Finally, we coded (d) the nature of the study design (between- or within-participants), (e) publication status (published vs. unpublished), and (f) sample size: Following Coyne, Thombs, and Hagedoorn's (2010) recommendation, we compared effect sizes between studies with more than 35 participants per condition and those with less than 35 participants per condition. Computations were undertaken using the SPSS Macros developed by Wilson (2005) and a random effects model was chosen because studies were likely to be "different from one another in ways too complex to capture by a few simple study characteristics" (Cooper, 1986, p. 526).

Results

A total of $k = 29$ studies with $N = 1,652$ participants were integrated in the present review. Table 1 presents the characteristics and the effect sizes for each of the primary studies. Samples included participants with schizophrenia and schizoaffective disorder, forms of anxiety, depression, brain damage, addictions, or ADHD. The studies sought to promote the attainment of a range of goals including physical activity, attendance, the management of clinical symptoms, and cognitive functions such as inhibition, memory, and attention. Some studies used implementation intentions in combination with goal intention instructions or a specialised intervention, such as self-help for anxiety, orthopaedic rehabilitation, or goal-management training.¹ However, most studies explored the effect of forming implementation intentions on goal attainment simply by asking participants in the experimental condition to form if-then plans to support their goals.

Overall effect of Implementation Intentions on Goal Attainment.

Effect sizes ranged from $d = 0.00$ to 4.99 and had an (unweighted) standard deviation of 1.60 (see Figure 2). The effect of distraction inhibiting implementation intentions on executive functioning reported by Gawrilow et al. (2011b) ($d = 4.99$) was a statistical outlier (i.e., it was more than 3 standard deviations above the unweighted mean effect). We therefore excluded the effect size from subsequent analyses.² The sample-weighted average effect derived from the remaining studies was $d_+ = 0.99$ with a 95% confidence interval from 0.40 to 1.60 ($k = 28$; $N = 1,636$). These findings indicate that forming implementation intentions had a large-sized effect on goal attainment among clinical samples according to Cohen's (1992) criteria. The effect size

¹ Note that we only included such studies if participants in the control condition also received the other aspects of the intervention and, thus, could isolate the effect of forming implementation intentions on outcomes.

² The sample-weighted average effect including this outlier was $d_+ = 1.29$ with a 95% confidence interval from 0.69 to 1.89 .

was statistically significant, as indicated by the confidence interval, which did not include zero.

The homogeneity statistic was non-significant, $Q(27) = 15.26$, $p = 0.97$, suggesting that the effect sizes derived from the primary studies were relatively homogeneous.

Moderators of the effect of Implementation Intentions on Goal Attainment.

The impact of seven moderators was evaluated by computing the sample-weighted effect size (d_+) separately for studies comprising each level of the moderator (see Table 2).

Homogeneity Q was then used to evaluate whether the effect sizes associated with each level were significantly different. First, the impact of sample characteristics was explored. Effect sizes were not significantly different between studies recruiting participants with mental health symptoms ($d_+ = 0.96$), developmental disabilities ($d_+ = 0.39$), or brain injuries ($d_+ = 1.13$), $Q(2) = 0.39$, $p = 0.82$. In addition, the effect of forming implementation intentions on goal attainment in studies focusing on participants with a clinical diagnosis ($d_+ = 1.21$) was not significantly larger than the effect of if-then planning in studies focusing on participants without a formal diagnosis (i.e., analogue samples, $d_+ = 0.63$), $Q(1) = 0.87$, $p = 0.35$. Second, we explored whether the nature of the focal goal influenced effect sizes. Forming implementation intentions had similar effects in studies focusing on action initiation ($d_+ = 0.42$), cognitive skills ($d_+ = 1.22$) and emotion regulation ($d_+ = 0.65$), $Q(2) = 1.37$, $p = 0.50$.

Finally, the impact of study characteristics was explored. A funnel plot (see Figure 2) showed signs of asymmetry and an Egger's regression (Egger, Davey Smith, Schneider, & Minder, 1997) revealed significant bias ($p = .01$). However, this asymmetry seemed to be a function of a few studies with relatively large effects and relatively small samples, rather than missing studies for which trim and fill procedures would be applied (Duval & Tweedie, 2000). This conclusion is supported by the finding that publication status did not moderate the effect of

implementation intentions on goal attainment, $Q(1) = 0.37$, $p = 0.54$, with published studies reporting similar effect sizes ($d_+ = 1.11$) to unpublished studies ($d_+ = 0.70$). There was no difference between the effect sizes reported by studies which employed a between-participants design ($d_+ = 1.18$) and studies which used a within-participants design ($d_+ = 0.24$), $Q(1) = 1.48$, $p = 0.22$, nor between the size of effects reported by studies with relatively small samples (less than 35 participants per condition) ($d_+ = 1.07$) and studies with relatively large samples (more than 35 participants per condition) ($d_+ = 0.27$), $Q(1) = 0.61$, $p = 0.44$.

Discussion

The present review represents the first systematic integration of experimental studies investigating the effect of forming implementation intentions on goal attainment among people with mental health problems. A previous meta-analysis of the effect of forming implementation intentions by Gollwitzer and Sheeran (2006) included just three studies with clinical populations. The present review sought to characterise the average size of the effect found in such studies and therefore provide a scientific foundation for the integration of implementation intentions into psychotherapeutic interventions and clinical practice. The overall effect of forming implementation intentions on goal attainment among people with mental health problems was of large magnitude ($d_+ = 0.99$) and comparable to the effect of forming implementation intentions among samples with psychological problems found by Gollwitzer and Sheeran (2006) ($d_+ = 1.10$). It also seemed larger than the effect of forming implementation intentions among non-clinical samples reported by Gollwitzer and Sheeran ($d_+ = 0.66$), and in other recent meta-analytic reviews of the effects of forming implementation intentions on, for example, healthy eating ($d_+ = 0.51$ and 0.29 , for including healthy food and avoiding unhealthy food, respectively, Adriaanse et al., 2011) and physical activity ($d_+ = 0.31$ and 0.24 , for post-test and follow-up

effects, respectively, Bélanger-Gravel et al., 2013). Taken together, this finding confirms that if-then planning can be an effective technique for promoting goal attainment among people with mental health problems, who are likely to experience particular difficulties striving for goals.

It was also reassuring that effect sizes did not differ between published and unpublished studies, across different mental health problems, different types of goals (e.g., those pertaining to action initiation, cognitive skills, or emotion regulation), or between clinical and analogue samples or studies which adopted between or within-subjects design. Although there was evidence of asymmetry in the effect sizes that seemed to accrue from a number of very large effects reported by studies with relatively large samples, the relative lack of differences as a function of study design and focus, along with the homogenous nature of the effect sizes, suggest that the overall effect is robust and that if-then planning can be an effective way to promote the attainment of a range of different goals, across a range of different clinical problems. Examples in the present review include increasing attendance at treatment appointments (e.g., Hawes, 2007; Sheeran et al., 2007), reducing levels of anxiety (e.g., Varley et al., 2011; Webb et al., 2010), and improving cognitive functioning among people with schizophrenia (e.g., Brandstätter et al., 2001; Garrett, 2010) or ADHD (e.g., Gawrilow et al., 2011b). The implication is that implementation intentions could enhance current treatment approaches for people with mental health problems. Specifically, encouraging people to specify when, where, and how they will achieve their goals in an 'if-then' format is likely to improve outcomes. For example, if-then planning might be used to facilitate the completion of homework between therapy sessions (Kazantzis, Zealand, & Ronan, 2000; 2004) and for supporting the initiation of actions that could promote well-being (e.g., activity-scheduling, Cuijpers, van Straten, & Warmerdam, 2007).

So how might researchers and practitioners effectively promote the formation of implementation intentions? One of the advantages of implementation intentions as a therapeutic technique is that the opportunities and responses specified in the plan can be tailored to the particular volitional problem that the person confronts in striving for their goal – e.g., problems with the viability, activation, or elaboration of intentions. Identifying the nature of the volitional problem is, therefore, important. A first step in so doing might be to identify whether goal attainment requires that the person obtain a wanted response (e.g., engage in a pleasant activity, Cuijpers et al., 2007), control an unwanted response (e.g., fear in a social situation), or disengage from a failing course of action (e.g., safety behaviours, Wells, Clark, Salkovskis, Ludgate, Hackmann, & Gelder, 1995). Someone striving to obtain a wanted response may have problems initiating that response (e.g., because they do not feel confident about doing so), maintaining effort (e.g., because self-regulatory resources may be depleted, Baumeister, Bratslavsky, Muraven, & Tice, 1998), or shielding goal striving from distractions (Shah, Friedman, & Kruglanski, 2002). Fortunately, there is evidence that forming implementation intentions can help to overcome each of these volitional problems (e.g., Bayer & Gollwitzer, 2007; Bayer, Gollwitzer, & Achziger, 2010; Gollwitzer & Schaal, 1998; Parks-Stamm, Gollwitzer, & Oettingen, 2010; Webb & Sheeran, 2003; Wieber, Suchodoletz, Heikamp, Trommsdorff, & Gollwitzer, 2011). For example, deciding when, where, and how to act may help the person to initiate an intended response (e.g., “As soon as I finish my meal on Sunday evening, then I will go online and make a booking to attend the cinema later in the week!”), maintain effort (e.g., “If I feel reluctant to go to the cinema, then I will think about the last good film that I watched!”), and deal with distractions (“If my friends suggest going for a drink rather than the cinema, then I will politely decline – I’d rather not have a hangover!”).

Someone trying to control an unwanted response may be confronted by a different set of volitional problems, such as the need to overcome contextual threats that could deactivate the original intention or habitual responses that could render the goal not viable. Again, however, there is evidence that forming implementation intentions can be helpful in these contexts (Holland, Aarts, & Langendam, 2006; Webb, Sheeran, & Luszczynska, 2009; Webb et al., 2010), but a different set of if-then plans may be required. For example, the person may plan to normalise a habitual response that could otherwise derail goal pursuit (e.g., “If I feel anxious, then I will tell myself that this is perfectly understandable!”). Evidence suggests that people should not be encouraged to plan to ignore or negate the habitual response in these situations (e.g., “If I feel anxious, then I will ignore these feelings”) as this could, ironically, strengthen the habit and lead to rebound effects (Adriaanse, van Oosten, de Ridder, de Wit, & Evers, 2011).

Finally, disengaging from a failing course of action may present a new set of volitional problems such as identifying that the course of action is problematic, not ruminating on the implications of failure (van Randenborgh, Huffmeier, LeMoult, & Joormann, 2010), and reducing self-defensiveness (Brockner, 1992; Staw, 1981). Again, evidence suggests that implementation intentions might be tailored to these volitional problems and prove effective in promoting disengagement and, ultimately, goal attainment (e.g., Henderson, Gollwitzer, & Oettingen, 2007; Wieber, Thürmer, & Gollwitzer, in press, for a review, see Gollwitzer, Parks-Stamm, Jaudas, & Sheeran, 2008). For example, someone might plan to reflect on the outcomes of their actions (e.g., “If I receive disappointing feedback, then I’ll think about whether my approach is the best one!”).

As the discussion above illustrates, implementation intentions can take a number of different forms and, indeed, some of the studies in the present review directly compare different

types of implementation intentions. For example, Gawrilow et al. (2011b, Study 2) compared plans geared at (termed) ‘distraction inhibiting’ with plans geared at (termed) ‘task-facilitating’. Both types of planning proved effective in helping children with ADHD to complete math puzzles. While there are relatively few comparative studies like that conducted by Gawrilow et al., researchers have started to identify and categorise different forms of planning. For example, Prestwich, Sheeran, Webb, and Gollwitzer (in press) propose a taxonomy of implementation intentions that differentiates plans on a number of dimensions such as whether plans are self-generated or provided by a researcher or practitioner, and the nature of the if- and then-components. One type of planning described by Prestwich et al. that has yet to be studied in the context of mental health is collaborative planning, where pairs or groups of individuals identify critical opportunities and responses that they will enact together. Such plans have proved effective in promoting physical activity (Prestwich, Conner, Lawton, Ward, Ayres, & McEachan, 2012) and breast self-examination (Prestwich, Conner, Lawton, Bailey, Litman, & Molyneaux, 2005) and could help people with mental health problems to achieve their goals, perhaps as part of group therapies.

Practitioners intending to use implementation intentions to promote goal attainment among people with mental health problems might also benefit from being mindful of some of the factors that can influence the effectiveness of if-then planning. Although the present findings suggest that effects are robust across different goals and clinical problems, extant research has identified a number of conditions that are required for implementation intention formation to influence goal attainment (for reviews, see Gollwitzer, Wieber, Myers, & McCrea, 2010; Prestwich & Kellar, 2014). First, the person forming the plan needs to be motivated to pursue the respective goal. If the underlying motivation is weak or the person changes their mind about

what they want to achieve, then evidence suggests that planning is unlikely to have any effect (Sheeran, Webb, & Gollwitzer, 2005). Second, evidence suggests that people need to be committed to their plan (Achtziger, Bayer, & Gollwitzer, 2012). Therefore, practitioners might consider strategies for fostering strong commitment to plans, such as informing people that they are likely to be somebody who will benefit from sticking to plans (Achtziger et al., 2012) or ensuring that people form plans to support goals that reflect personal interests and values, rather than things that they feel compelled to do by external or internal pressures (i.e., that goals are self-concordant, Koestner, Lekes, Powers, & Chicoine, 2002; Koestner et al., 2006). Third, it is important that plans are formulated in the contingent if-then format that defines implementation intentions. Evidence suggests that plans providing exactly the same information, but formatted differently, are not as effective (e.g., Oettingen, Hönig, & Gollwitzer, 2000). Finally, there is evidence that forming implementation intentions can actually be counterproductive among people with high levels of perfectionism (Powers, Koestner, & Topciu, 2005) and so their use might be avoided among samples that might display such traits (e.g., those with obsessive compulsive disorder, Frost & Steketee, 1997).

Conclusion

The present review estimates the effect of forming implementation intentions on goal attainment among people with mental health problems. The findings suggest that if-then planning has a large-sized effect on goal attainment and are effective in promoting a range of different goals, across a range of different mental health problems. Further studies are, however, needed to explore the effects of if-then planning among some mental health problems, as well as how if-then planning might be integrated into existing treatment approaches. There is clearly considerable potential for examining the impact of different types of plans, on different types of

volitional problems, in different samples. A systematic programme of research in this regard would continue to build the evidence base in support of the use of if-then planning in clinical contexts and have both applied and theoretical value.

References

An asterisk precedes studies that were included in the meta-analysis.

Aarts, H., & Dijksterhuis, A. (2000). Habits as knowledge structures: automaticity in goal-directed behavior. *Journal of Personality and Social Psychology*, 78, 53-63.

doi:10.1037/0022-3514.78.1.1.53

Aarts, H., Dijksterhuis, A., & Midden, C. (1999). To plan or not to plan? Goal achievement or interrupting the performance of mundane behaviours. *European Journal of Social Psychology*, 29, 971-979. doi:10.1002/(SICI)1099-0992(199912)29:8<971::AID-EJSP963>3.3.CO;2-1

Achtziger, A. Bayer, U. C., & Gollwitzer, P. M. (2012). Committing to implementation intentions: Attention and memory effects for selected situational cues. *Motivation and Emotion*, 36, 287-300. doi:10.1007/s11031-011-9261-6

Adriaanse, M. A., van Oosten, J. M. F., de Ridder, D. T. D., de Wit, J. B. F. & Evers, C. (2011). Planning what not to eat: Ironic effects of implementation intentions negating unhealthy habits. *Personality and Social Psychology Bulletin*, 37, 69-81.

doi:10.1177/0146167210390523

Adriaanse, M. A., Vinkers, C. D. W., De Ridder, D. T. D., Hox, J. J., & De Wit, J. B. F. (2011). Do implementation intentions help to eat a healthy diet? A systematic review and meta-analysis of the empirical evidence. *Appetite*, 56, 183-193.

doi:10.1016/j.appet.2010.10.012

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179-211. doi:10.1016/0749-5978(91)90020-T

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin*, 120, 338-375. doi:10.1037//0033-2909.120.3.338

*Bandura, J. (2007). Implementation intentions / secondary behavioural initiation reinforcement among ADHD adults (Doctoral dissertation). Retrieved from ProQuest Dissertation and Theses database. (UMI no. 3278531)

Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74, 1252-1265. doi:10.1037/0022-3514.74.5.1252

Bayer, U. C., & Gollwitzer, P. M. (2007). Boosting scholastic test scores by willpower: The role of implementation intentions. *Self and Identity*, 6, 1-19.
doi:10.1080/15298860600662056

Bayer, U. C., Achtziger, A., Gollwitzer, P. M., & Moskowitz, G. B. (2009). Responding to subliminal cues: Do if-then plans cause action preparation and initiation without conscious intent? *Social Cognition*, 27, 183–201.

Bayer, U. C., Gollwitzer, P. M., & Achtziger, A. (2010). Staying on track: Planned goal striving is protected from disruptive internal states. *Journal of Experimental Social Psychology*, 146, 505-514. doi:10.1016/j.jesp.2010.01.002

Bélanger-Gravel, A., Godin, G., & Amireault, S. (2013). A meta-analytic review of the effects of implementation intentions on physical activity. *Health Psychology Review*, 7, 23-54.
doi:10.1080/17437199.2011.560095

Bhui, K. (2014). Translational research in psychiatry. *British Journal of Psychiatry*, 204, 89-90.
doi:10.1192/bjp.204.1.89

- * Brandstätter, V., Lengfelder, A., & Gollwitzer, P. M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology*, 81, 946-960.
doi:10.1037//0022-3514.81.5.946
- Brockner, J. (1992). The escalation of commitment to a failing course of action: Toward theoretical progress. *Academy of Management Review*, 17, 39–61.
doi:10.5465/AMR.1992.4279568
- *Chen, X. J., Wang, Y., Liu, L. L., Shi, H. S., Wang, J., Cui, J. F., ... Chan, R. C. K. (2014). The effect and mechanisms of implementation intentions on prospective memory in individuals with and without schizotypal personality features. *Memory*, 22, 349-359.
doi:10.1080/09658211.2013.792841
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155-159. doi:10.1037/0033-2909.112.1.115
- Cooper, H. M. (1986). *Integrating research: A guide for literature reviews*. London: Sage.
- Coyne, J. C., Thombs, B. D., & Hagedoorn, M. (2010). Ain't necessarily so: Review and critique of recent meta-analyses of behavioral medicine interventions in health psychology. *Health Psychology*, 29, 107-116. doi:10.1037/a0017633
- Cuijpers, P., van Straten, A., & Warmerdam, L. (2007). Behavioral activation treatments of depression: A meta-analysis. *Clinical Psychology Review*, 27, 318-326.
doi:10.1016/j.cpr.2006.11.001
- Doran, G. T. (1981). There's a S.M.A.R.T. way to write management's goals and objectives. *Management Review*, 70, 35-36.

- Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, 56(2), 455-463.
doi:10.1111/j.0006-341X.2000.00455.X
- Egger, M., Davey Smith, G., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, 315(7109), 629-634.
doi:10.1136/bmj.315.7109.629
- Einstein, G. O., McDaniel, M. A., Williford, C. L., Pagan, J. L., & Dismukes, R. K. (2003). Forgetting of intentions in demanding situations is rapid. *Journal of Experimental Psychology: Applied*, 9, 147-162. doi:10.1037/1076-898X.9.3.147
- Elmes, D. G., Kantowitz, B. H., & Roediger, H. L. (1999). *Research methods in psychology* (6th ed.). Pacific Grove, CA: Brooks/Cole.
- Fanelli, D. (2012). Negative results are disappearing from most disciplines and countries. *Scientometrics*, 90, 891-904. doi:10.1007/s11192-011-0494-7
- Fishbach, A., & Ferguson, M. F. (2007). The goal construct in social psychology. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (pp. 490-515). New York, NY: Guilford.
- Frost, R. O., & Steketee, G. (1997). Perfectionism in obsessive-compulsive disorder patients. *Behaviour Research and Therapy*, 35, 291-296. doi:10.1016/S0005-7967(96)00108-8
- Fuster, J. M. (2008). *The prefrontal cortex*. (4th Ed). San Diego, CA: Elsevier.
- *Garrett, C. (2010). Using implementation intentions as an intervention for negative and disorganised signs of schizophrenia (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI no U558032)

- *Gawrilow, C., & Gollwitzer, P. M. (2008). Implementation intentions facilitate response inhibition in children with ADHD. *Cognitive Therapy and Research*, 32, 261-280. doi:10.1007/s10608-007-9150-1
- *Gawrilow, C., Gollwitzer, P. M., & Oettingen, G. (2011a). If-then plans benefit delay of gratification performance in children with and without ADHD. *Cognitive Therapy and Research*, 35, 442-455. doi:10.1007/s10608-010-9309-z
- *Gawrilow, C., Gollwitzer, P. M., & Oettingen, G. (2011b). If-then plans benefit executive functions in children with ADHD. *Journal of Social and Clinical Psychology*, 30, 616-646.
- *Gawrilow, C., Morgenroth, K., Schultz, R., Oettingen, G., & Gollwitzer, P. M. (2013). Mental contrasting with implementation intentions enhances self-regulation of goal pursuit in schoolchildren at risk for ADHD. *Motivation and Emotion*, 37, 134-145. doi:10.1007/s11031-012-9288-3
- Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology*, 4, 141-185.
- Gollwitzer, P. M. (1999). Implementation intentions. Strong effects of simple plans. *American Psychologist*, 54, 493-503. doi:10.1037//0003-066X.54.7.493
- Gollwitzer, P. M. (2014). Weakness of the will: Is a quick fix possible? *Motivation and Emotion*, 38, 305-322. doi:10.1007/s11031-014-9416-3
- Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology*, 73, 186-199. doi:10.1037//0022-3514.73.1.186

- Gollwitzer, P. M., & Moskowitz, G. B. (1996). Goal effects on action and cognition. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 361–399). New York: Guilford Press.
- Gollwitzer, P. M., & Schaal, B. (1998). Metacognition in action: The importance of implementation intentions. *Personality and Social Psychology Review*, 2, 124-136.
- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, 38, 69-119. doi:10.1016/S0065-2601(06)38002-1
- Gollwitzer, P. M., Wieber, F., Myers, A. L., & McCrea, S. M. (2010). How to maximize implementation intention effects. In C. R. Agnew, D. E. Carlston, W. G. Graziano & J. R. Kelly (Eds.), *Then a miracle occurs: Focusing on behavior in social psychological theory and research* (pp. 137-161). New York, NY: Oxford University Press.
- Gollwitzer, P. M., Parks-Stamm, E. J., Jaudas, A., & Sheeran, P. (2008). Flexible tenacity in goal pursuit. In J. Shah & W. Gardner (Eds.), *Handbook of motivation science* (pp. 325-341). New York: Guilford Press.
- Grosse Holtforth, M., Wyss, T., Schulte, D., Trachsel, M., & Michalak, J. (2009). Some like it specific: the difference between treatment goals of anxious and depressed patients. *Psychology and Psychotherapy*, 82, 279-290. doi:10.1348/147608308X397040
- *Guderjahn, L., Gold, A., Stadler, G., & Gawrilow, C. (2013). Self-regulation in strategies support children with ADHD to overcome symptom-related behaviour in the classroom. *ADHD Attention Deficit and Hyperactivity Disorders*, 5, 397-407. doi:10.1007/s12402-013-0117-7

Havens, R. A., & Dimond, R. E. (1976). The clinical cube. *Professional Psychology*, 7, 403-405.

doi:10.1037/0735-7028.7.3.403

*Hawes, A. (2007). A randomised control study of the impact of implementation intentions and mental contrasting on attendance at a substance misuse service (Doctoral dissertation).

Retrieved from ProQuest Dissertations and Theses database. (UMI no. U493255)

Heckhausen, H. (1987). Wünschen-Wählen-Wollen [Wishing-weighing-willing]. In H.

Heckhausen, P. M. Gollwitzer, & F. E. Weinert (Eds.), *Jenseits des Rubikon: Der Wille in den Humanwissenschaften* (pp. 3-9). Heidelberg: Springer-Verlag.

Heckhausen, H., & Gollwitzer, P. M. (1986). Information processing before and after the formation of an intent. In F. Klix, & H. Hagendorf (Eds.), *In memoriam Hermann*

Ebbinghaus: Symposium on the structure and function of human memory (pp. 1071-1082).

Amsterdam: Elsevier.

Heckhausen, H., & Gollwitzer, P. M. (1987). Thought contents and cognitive functioning in motivational versus volitional states of mind. *Motivation and Emotion*, 11, 101-120.

doi:10.1007/BF00992338

Hedges, L., & Olkin, I. (1985). *Statistical methods for meta-analysis*. New York, NY: Academic Press.

Henderson, M. D., Gollwitzer, P. M., & Oettingen, G. (2007). Implementation intentions and disengagement from a failing course of action. *Journal of Behavioral Decision Making*,

20, 81-102. doi:10.1002/bdm.553

Hill, J. A. (1969). Therapist goals, patient aims and patient satisfaction in psychotherapy.

Journal of Clinical Psychology, 25, 455-459. doi:10.1002/1097-

4679(196910)25:4<455::AID-JCLP2270250435>3.0.CO;2-N

- Holland, R., Aarts, H., & Langendamb, D. (2006). Breaking and creating habits on the working floor: A field experiment on the power of implementation intentions. *Journal of Experimental Social Psychology*, 42, 776-783. doi:10.1016/j.jesp.2005.11.006
- Jacobson, N. S., Martell, C. R., & Dimidjian, S. (2001). Behavioral activation treatment for depression: Returning to contextual roots. *Clinical Psychology: Science and Practice*, 8, 255-270. doi:10.1093/clipsy.8.3.255
- Johnson, B. T. (1993). DSTAT. Software for the meta-analytic review of research literatures (rev. ed.). [Computer software]. Hillsdale, NJ: Erlbaum.
- Johnson, R. E., Chang, C.-H., & Lord, R. G. (2006). Moving from cognition to behavior: What the research says. *Psychological Bulletin*, 132, 381–415. doi:10.1037/0033-2909.132.3.381
- Karoly, P. (2006). Tracking the leading edge of self-regulatory failure: Commentary on “Where do we go from here? The goal perspective in psychotherapy”. *Clinical Psychology – Science and Practice*, 13, 366-370. doi:10.1111/j.1468-2850.2006.00049.x
- Kazantzis, N., Zealand, N., & Ronan, K. R. (2000). Homework assignments in cognitive and behavioral therapy: A meta-analysis. *Clinical Psychology – Science and Practice*, 7, 189-202. doi:10.1093/clipsy/7.2.189
- Kazantzis, N., Deane, F. P., & Ronan, K. R. (2004). Assessing compliance with homework assignments: Review and recommendations for clinical practice. *Journal of Clinical Psychology*, 60, 627-641. doi:10.1002/jclp.10239
- Koestner, R., Lekes, N., Powers, T.A., & Chicoine, E. (2002). Attaining personal goals: self-concordance plus implementation intentions equals success. *Journal of Personality & Social Psychology*, 83, 231-244. doi:10.1037//0022-3514.83.1.231

Koestner, R., Horberg, E. J., Gaudreau, P., Powers, T., Di Dio, P., Bryan, C., ... Salter, N. (2006).

Bolstering implementation plans for the longhaul: the benefits of simultaneously boosting self-concordance or self-efficacy. *Personality and Social Psychology Bulletin*, 32, 1547-1558.

Kraemer, H. C., Gardner, C., Brooks, J. O., & Yesavage, J. A. (1998). Advantages of excluding underpowered studies in meta-analysis: Inclusionist versus exclusionist viewpoints.

Psychological Methods, 3, 23–31.

Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D.

(2002). A theory of goal systems. *Advances in Experimental Social Psychology*, 34, 311–378. doi:10.1016/S0065-2601(02)80008-9

Latham, G. P., & Locke, E. a. (1991). Self-regulation through goal setting. *Organizational*

Behavior and Human Decision Processes, 50, 212–247. doi:10.1016/0749-5978(91)90021-K

*Lengfelder, A., & Gollwitzer, P. M. (2001). Reflective and reflexive action control in patients with frontal lobe lesions. *Neuropsychology*, 15, 80-100. doi:10.1037//0894-4105.15.1.80

Lewin, K., Dembo, T., Festinger, L., & Sears, P. S. (1944). Level of aspiration. In J. M. Hunt (Ed.), *Personality and the behaviour disorders* (Vol. 1, pp. 333–378). New York: Ronald Press.

Lyons, L. C., & Morris, W. A. (2014). The meta-analysis calculator. Retrieved 4th December 2014 from <http://www.lyonsmorris.com/ma1/>

Marvel, C. L., & Paradiso, S. (2004). Cognitive and neurological impairment in mood disorders.

Psychiatric Clinics in North America, 27, 19-36. doi:10.1016/S0193-953X(03)00106-0

- McCulloch, K. C., Fujita, K., Aarts, H., & Bargh, J. A. (2008). Inhibition in goal systems: a retrieval-induced forgetting account. *Journal of Experimental Social Psychology*, 44, 857-865. doi:10.1016/j.jesp.2007.08.004
- Metzinger, T. (2006). Conscious volition and mental representation: Towards a more fine-grained analysis. In N. Sebanz, & W. Prinz (Eds.). *Disorders of volition*. Cambridge, MA: MIT Press.
- Michalak, J., & Grosse Holtforth, M. (2006). Where do we go from here? The goal perspective in psychotherapy. *Clinical Psychology – Science and Practice*, 13, 346-365. doi:10.1111/j.1468-2850.2006.00048.x
- Miller, E. K., & Cohen, J. D. (2001). An integrative theory of prefrontal cortex function. *Annual Review of Neuroscience*, 24, 167-202. doi:10.1146/annurev.neuro.24.1.167
- Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA Statement. *PLoS Medicine*, 6(6): e1000097. doi:10.1371/journal.pmed1000097
- Murali, V., & Oyebode, F. (2004). Poverty, social inequality and mental health. *Advances in Psychiatric Treatment*, 10, 216-224. doi:10.1192/apt.10.3.216
- Nydegger, L. A., Keeler, A. R., Hood, C., Siegel, J. T., & Stacy, A. W. (2013). Effects of a one-hour intervention on condom implementation intentions among drug users in Southern California. *AIDS Care*, 25, 1586-91. doi:10.1080/09540121.2013.793271
- Oettingen, G., Hönl, G., & Gollwitzer, P. M. (2000). Effective self-regulation of goal attainment. *International Journal of Educational Research*, 33, 705-732. doi:10.1016/S0883-0355(00)00046-X

Patry, B. N. (2007). Event-based prospective memory following adult traumatic brain injury.

(Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database.

(UMI no. NR28291)

Parks-Stamm, E. J., Gollwitzer, P. M., & Oettingen, G. (2007). Action control by

implementation intentions: Effective cue detection and efficient response initiation.

Social Cognition, 25, 248–266. doi:10.1521/soco.2007.25.2.248

Parks-Stamm, E. J., Gollwitzer, P. M., & Oettingen, G. (2010). Implementation intentions and

test anxiety: Shielding academic performance from distraction. *Learning and Individual*

Differences, 20, 30-33. doi:10.1016/j.lindif.2009.09.001

*Paul, I., Gawrilow, C., Zech, F., Gollwitzer, P., Rockstroch, B., Odenthal, G., Kratzer, W., &

Wienbruch, C. (2007). If-then planning modulates the P300 in children with ADHD.

Neuroreport, 18, 653-657.

*Pomp, S., Fleig, L., Schwarzer, R., & Lippke, S. (2013). Effects of a self-regulation

intervention on exercise are moderated by depressive symptoms: A quasi-experimental

study. *International Journal of Clinical and Health Psychology*, 13, 1-8.

Powers, T. A., Koestner, R., & Topciu, R. A. (2005). Implementation intentions, perfectionism,

and goal progress: Perhaps the road to hell is paved with good intentions. *Personality and*

Social Psychology Bulletin, 31, 902–912. doi:10.1177/0146167204272311

Prestwich, A., & Kellar, I. (2014). How can the impact of implementation intentions as a

behaviour change intervention be improved? *European Review of Applied Psychology*, 64,

35-41. doi:10.1016/j.erap.2010.03.003

- Prestwich, A., Conner, M., Lawton, R., Bailey, W., Litman, J., & Molyneaux, V. (2005). Individual and collaborative implementation intentions and the promotion of breast self-examination. *Psychology & Health, 20*, 743-760. doi:10.1080/14768320500183335
- Prestwich, A., Conner, M., Lawton, R., Ward, J., Ayres, K., & McEachan, R. (2012). Randomized controlled trial of collaborative implementation intentions targeting working adults' physical activity. *Health Psychology, 31*(4), 486-495. doi:10.1037/a0027672
- Prestwich, A., Sheeran, P., Webb, T. L., & Gollwitzer, P. M. (in press). Implementation intentions. In M. Conner & P. Norman (Eds.) *Predicting and changing health behaviour: Research and practice with social cognition models (3rd Edition)*. Milton Keynes, UK: Open University Press.
- Rapee, R. M., & Lim, L. (1992). Discrepancy between self- and observer ratings of performance in social phobics. *Journal of Abnormal Psychology, 101*, 728-731. doi:10.1037/0021-843X.101.4.728
- Renninger, S. (2013). Clinical application of meta-concepts that are essential to client change. *Psychotherapy, 50*, 302-306. doi:10.1037/a0032154
- Robinson, O. J., Vytal, K., Cornwell, B. R., & Grillon, C. (2013). The impact of anxiety upon cognition: Perspectives from human threat of shock studies. *Frontiers in Human Neuroscience, 7*, 203. doi:10.3389/fnhum.2013.00203
- Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In J. T. Cacioppo & R. E. Petty (Eds.), *Social psychophysiology: A sourcebook*. London: Guilford.
- Rosenthal, R. (1979). The "file drawer problem" and tolerance for null results. *Psychological Bulletin, 86*, 638-641.

Schweizer, S., & Dalgleish, T. (2011). Emotional working memory capacity in posttraumatic stress disorder (PTSD). *Behaviour Research and Therapy*, 49, 498-504.

doi:10.1016/j.brat.2011.05.007

* Shah, R., Hunt, J., Webb, T. L., & Thompson, A. R. (2014). Starting to develop self-help for social anxiety associated with vitiligo: using clinical significance to measure the potential effectiveness of enhanced psychological self-help. *British Journal of Dermatology*, 171, 332-337. doi:10.1111/bjd.12990

Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: On the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology*, 83, 1261-1280. doi:10.1037//0022-3514.83.6.1261

Sheeran, P., & Webb, T. L. (2011). From goals to action. In H. Aarts & A. Elliott (Eds.), *Frontiers in social psychology: Goal-directed behaviour* (pp. 175-202). Psychology Press.

*Sheeran, P., Aubrey, R., & Kellett, S. (2007). Increasing attendance for psychotherapy: Implementation intentions and the self-regulation of attendance-related negative effect. *Journal of Consulting and Clinical Psychology*, 75, 853-863. doi:10.1037/0022-006X.75.6.853

Sheeran, P., Milne, S., Webb, T. L., & Gollwitzer, P. M. (2005). Implementation intentions and health behaviour. In M. Conner & P. Norman (Eds.), *Predicting health behaviour. Research and practice with social cognition models.* (pp. 276-323). Berkshire, UK: Open University Press.

Sheeran, P., Webb, T. L., & Gollwitzer, P. M. (2005). The interplay between goal and implementation intentions. *Personality and Social Psychology Bulletin*, 31, 87-98. doi:10.1177 / 0146167204271308

- Spence, S. A., & Parry, C. (2006). Schizophrenic avolition: Implications from functional and structural neuroimaging. In N. Sebanz, & W. Prinz (Eds.), *Disorders of volition* (pp. 207-232). London, England: The MIT Press.
- Staw, B. M. (1981). The escalation of commitment to a course of action. *Academy of Management Review*, 6, 577–587. doi:10.5465/AMR.1981.4285694
- Strauman, T. J., Goetz, E. L., Detloff, A. M., MacDuffie, K. E., Zaubmuller, L., & Lutz, W. (2013). Self-regulation and psychotherapy: A theory-based translational perspective. *Journal of Personality*, 81, 542-553. doi:10.1111/jopy.12012
- Sung, N. S., Crowley, W., Genel, M., Salber, P., Sandy, L., Sherwood, L., ... Rimoin, D. (2003). Central challenges facing the national clinical research enterprise. *Journal of the American Medical Association*, 289, 1278-1287. doi:10.1001/jama.289.10.1278
- Tan, B.-L. (2009). Profile of cognitive problems in schizophrenia and implications for vocational functioning. *Australian Occupational Therapy Journal*, 56, 220–228. doi:10.1111/j.1440-1630.2008.00759.x
- Triandis, H. C. (1980). Values, attitudes, and interpersonal behavior. In H. E. Howe, Jr. & M. Page (Eds.), *Nebraska symposium of motivation* (Vol. 27, pp. 195–259). Lincoln: University of Nebraska Press.
- Troyer, A. K., Murphy, K. J., Anderson, N. D., Moscovitch, M., & Craik, F. I. M. (2008). Changing everyday memory behaviour in amnesic mild cognitive impairment: A randomised controlled trial. *Neuropsychological Rehabilitation*, 18, 65-88. doi:10.1080/09602010701409684

- Turner, R. M., Bird, S. M., & Higgins, J. P. T. (2013). The impact of study size on meta-analyses: Examination of underpowered studies in cochrane reviews. *PLoS ONE*, 8, e59202. doi:10.1371/journal.pone.0059202
- van Randenborgh, A., Huffmeier, J., LeMoult, J., & Joormann, J (2010). Letting go of unmet goals: Does self-focused rumination impair goal disengagement? *Motivation and Emotion*, 34, 325-332. doi:10.1007/s11031-010-9190-9
- *Varley, R., Webb, T. L., & Sheeran, P. (2011). Making self-help more helpful: An RCT of the impact of augmenting self-help. *Journal of Consulting and Clinical Psychology*, 79, 123-128. doi:10.1037/a0021889
- Watkins, E. (2011). Dysregulation in level of goal and action identification across psychological disorders. *Clinical Psychology Review*, 31, 260-278. doi:10.1016/j.cpr.2010.05.004
- Webb, T. L., Schweiger Gallo, I., Miles, E., Gollwitzer, P. M., & Sheeran, P. (2012). Effective regulation of affect: An action control perspective on emotion regulation. *European Review of Social Psychology*, 23, 143-186. doi:10.1080/10463283.2012.718134
- *Webb, T. L., Ononaiye, M. S., Sheeran, P., Reidy, J. G., & Lavda, A. (2010). Using implementation intentions to overcome the effects of social anxiety on attention and appraisals of performance. *Performance and Social Psychology Bulletin*, 36, 612-627. doi:10.1177/0146167210367785
- Webb, T. L., & Sheeran, P. (2003). Can implementation intentions help to overcome ego-depletion? *Journal of Experimental Social Psychology*, 39, 279-286. doi:10.1016/S0022-1031(02)00527-9

- Webb, T. L., & Sheeran, P. (2004). Identifying good opportunities to act: Implementation intentions and cue discrimination. *European Journal of Social Psychology*, 34, 407-419. doi:10.1002/ejsp.205
- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological Bulletin*, 132, 249-268. doi:10.1037/0033-2909.132.2.249
- Webb, T. L., & Sheeran, P. (2007). How do implementation intentions promote goal attainment? A test of component processes. *Journal of Experimental Social Psychology*, 43, 295-302. doi:10.1016 / j.jesp.2006.02.001
- Webb, T. L., & Sheeran, P. (2008). Mechanisms of implementation intention effects: The role of intention, self-efficacy, and accessibility of plan components. *British Journal of Social Psychology*, 47, 373-395. doi:10.1348/014466607X267010
- Webb, T. L., Sheeran, P., & Luszczynska, A. (2009). Planning to break unwanted habits: Habit strength moderates implementation intention effects on behaviour change. *British Journal of Social Psychology*, 48, 507-523. doi:10.1348/014466608X370591
- Weinberger, M. I., Mateo, C., & Sirey, J. A. (2009). Perceived barriers to mental health care and goal setting among depressed, community-dwelling older adults. *Patient Preference and Adherence*, 3, 145-149. doi:10.2147/PPA.S5722
- Wells, A., Clark, D. M., Salkovskis, P., Ludgate, J., Hackmann, A., & Gelder, M. (1995). Social phobia – the role of in-situation safety behaviors in maintaining anxiety and negative beliefs. *Behavior Therapy*, 26, 153-161. doi:10.1016/S0005-7894(05)80088-7

Wieber, F., & Sassenberg, K. (2006). I can't take my eyes off of it – Attention attraction effects of implementation intentions. *Social Cognition*, 24, 723–752.

doi:10.1521/soco.2006.24.6.723

Wieber, F., Suchodoletz, A. v., Heikamp, T., Trommsdorff, G., & Gollwitzer, P. M. (2011). If-then planning helps school-aged children to ignore attractive distractions. *Social Psychology*, 42, 39-47. doi:10.1027/1864-9335/a000041

Wilson, D. B. (2005). Meta-analysis macros for SAS, SPSS, and Stata. Retrieved 5th December 2014 from <http://mason.gmu.edu/~dwilsonb/ma.html>

Wieber, F., Thürmer, J. L., & Gollwitzer, P. M. (in press). Attenuating the maintenance of commitment to faltering organizational projects in decision making groups: A self-regulation perspective. *Social Psychological and Personality Science*.

*Wood, A. (2011). Rehabilitation of executive function deficits following acquired brain injury: An RCT of goal management and implementation intentions for the improvement of prospective memory (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database. (UMI no. U575195)

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica*, 67, 361-370. doi:10.1111/j.1600-0447.1983.tb09716.x

Table 1

Characteristics and Effect Sizes for Studies Included in the Meta-Analysis

Author(s)	Measure of goal attainment	Sample	N _C	N _E	Effect size (d)
Bandura (2007) ^b	Action initiation	Adults with ADHD	12	12	0.13 ^a
Bandura (2007) ^c	Action initiation	Adults with ADHD	12	12	0.14 ^a
Brandstätter et al. (2001) Study 1	Action initiation	Heroin-dependent inpatients	21	20	1.75****
Brandstätter et al. (2001) Study 2	Action initiation	Adults with schizophrenia		20	0.31*
Chen et al. (2014)	Prospective memory	Students prone to SPD	26	25	0.23*
Garrett (2010) Study 2	Executive functions	Adults with schizophrenia / SPD	8	9	2.68 ^a
Garrett (2010) Study 4	Memory	Adults with schizophrenia		7	0.12
Gawrilow & Gollwitzer (2008) Study 1	Response inhibition	Children with ADHD	15	15	1.45****
Gawrilow & Gollwitzer (2008) Study 2	Response inhibition	Children with ADHD	10	10	0.19
Gawrilow et al. (2011a) Study 1	Delay of gratification	Children with ADHD	15	15	1.49****
Gawrilow et al. (2011a) Study 2	Delay of gratification	Children with ADHD	16	16	0.66*
Gawrilow et al. (2011b) Study 1	Executive functions	Children with ADHD	15	12	0.47*
Gawrilow et al. (2011b) Study 2 ^d	Executive functions	Children with ADHD	6 ^e	11	3.99*

Gawrilow et al. (2011b) Study 2 ^f	Executive functions	Children with ADHD	5 ^e	11	4.99***
Gawrilow et al. (2013)	Management of school-related activities	Children at risk of ADHD	56	60	0.16
Guderjahn et al. (2013)	Self-regulation	Children with ADHD	35	22	0.04
Hawes (2007) ^g	Attendance	Adults referred to substance misuse services	61	61	0.08
Hawes (2007) ^h	Attendance	Adults referred to substance misuse services	59	63	0.19
Lengfelder & Gollwitzer (2001) Study 2	Dual task performance	Adults with frontal lobe lesions		34	0.62*
Paul et al. (2007)	Inhibition / Response time / ERP (P300)	Children with ADHD		13	0.12 ^a
Pomp et al. (2013)	Physical activity	Depressed adults in orthopaedic rehabilitation	22	14	0.00
Shah et al. (2014)	Levels of social anxiety	Adults with vitiligo and social anxiety	25	24	0.68 ^a
Sheeran et al. (2007)	Attendance	Adults referred for psychotherapy	191	199	0.26**
Varley et al. (2011)	Depression and anxiety	Students with high HADS scores	81	90	0.58 ^a
Webb et al. (2010) Study 1	Attention	Students with high SAD scores	12	12	2.53*
Webb et al. (2010) Study 2	Attention	Students with high SAD scores	39	38	0.35*
Webb et al. (2010) Study 3	Attention	Students with high SAD scores	17	17	0.75*

Webb et al. (2010) Study 4	Performance appraisal	Students with high SAD scores	16	15	0.61
Wood (2011)	Executive function	Adults with acquired brain injury	9	11	0.22 ^a

Notes. N_C = number of participants in the comparison group, N_E = number of participants in the experimental group, ERP = Event related potential, Instr. Exp.= Instruction experiment, HADS = Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983), SAD = Social Avoidance and Distress Scale (Watson & Friend, 1969), SPD = Schizo affective Personality Disorder.

* $p < .05$, ** $p < .01$, *** $p < .001$.

^a Indicates that the overall effect size was averaged from effect sizes with different significance levels, so the statistical significance of the overall effect cannot be computed.

^b Conditions where reinforcement was stated in advance.

^c Conditions where reinforcement was not stated in advance.

^d Task facilitating implementation intention condition.

^e N for the control condition divided between two experimental conditions for this study.

^f Distraction inhibiting implementation intention condition.

^g Implementation intention versus Theory of Planned Behaviour condition.

^h Mental contrasting and implementation intention versus mental contrasting condition.

Table 2

Moderators of the Effect of Forming Implementation Intentions on Goal Achievement

Moderator	Level	N	k	Q	95% CI	d ₊
Sample characteristics						
Nature of the sample	Clinical diagnosis	365	14	11.85	0.46 to 1.97	1.21
	No formal diagnosis	1271	14	2.53	-0.35 to 1.60	0.63
Nature of the clinical problem	Mental health problem	1192	15	5.25	0.10 to 1.81	0.96
	Brain injury	54	2	0.03	-1.79 to 2.58	0.39
	Developmental disorder	390	11	9.59	0.23 to 2.04	1.13
Goal characteristics						
Focal goal	Action initiation	810	9	0.83	-0.75 to 1.59	0.42
	Cognitive skills	606	17	13.06	0.51 to 1.94	1.22
	Emotion regulation	220	2	0.00	-2.27 to 3.57	0.65
Study characteristics						
Publication status	Published	1300	21	11.52	0.40 to 1.81	1.11
	Unpublished	336	6	3.37	-0.42 to 1.82	0.70
Design	Between	1562	24	13.71	0.51 to 1.84	1.18
	Within	171	4	0.07	-1.10 to 1.59	0.24
Sample size	Large (> 35 per cell)	998	6	0.03	-1.66 to 2.19	0.27
	Small (< 35 per cell)	638	22	14.63	0.44 to 1.70	1.07

Notes. * $p < .05$, ** $p < .01$ *** $p < .001$.

Figure 1

Flow of Papers through the Review (adapted from Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009).

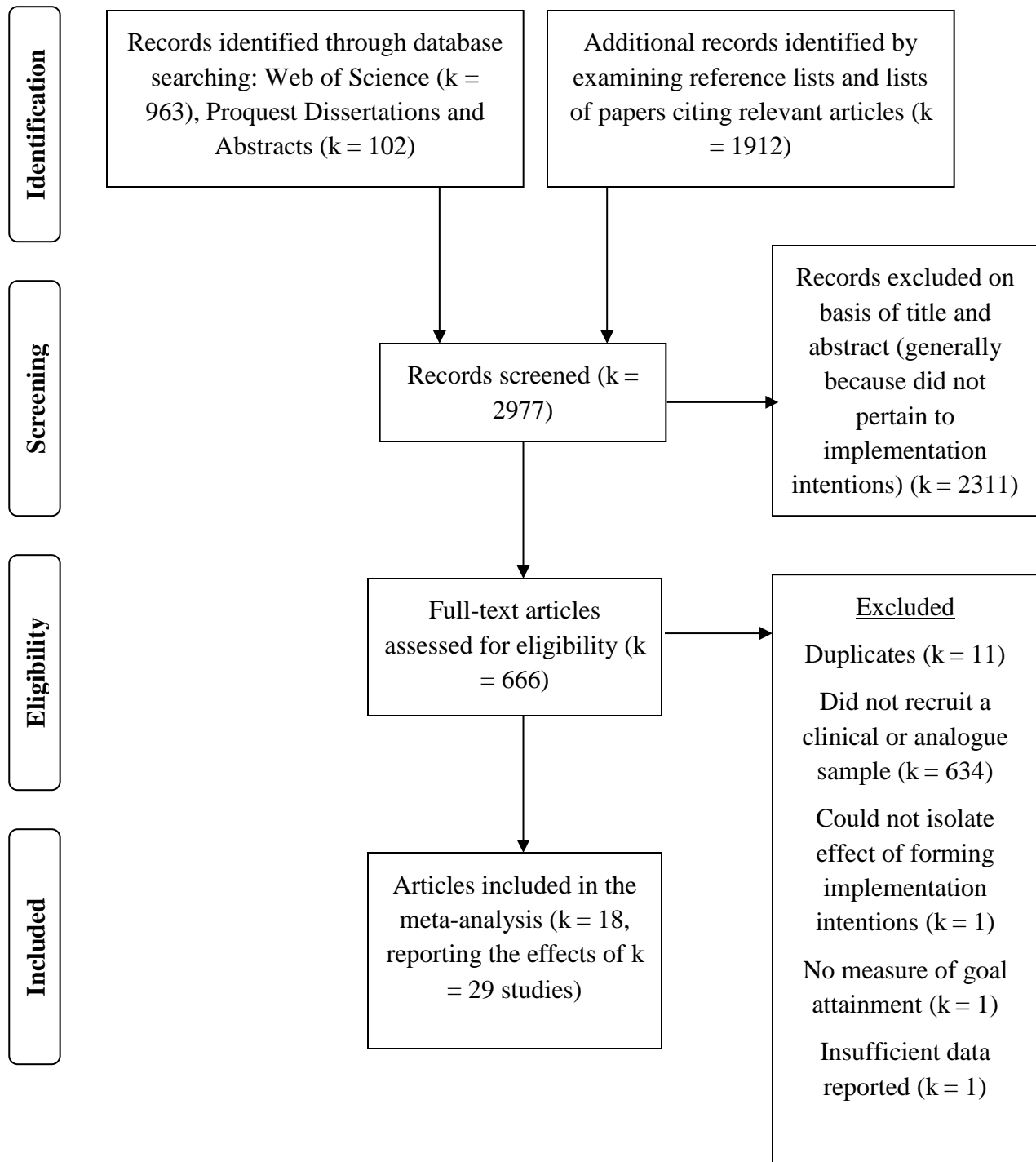


Figure 2

Funnel Plot of Effect Sizes from the Primary Studies

