

Effects of Implementation Intentions on Eating Disordered Patients and the Role of Self-Efficacy

Masterthesis
Jolein van den Bogaart, s4786815
Mastervariant Gezondheidszorgpsychologie
Faculty of Social Sciences
Radboud University Nijmegen
Supervisors: Prof. dr. G.P.J. Keijsers (internal) & drs. J. Tanis (external)
July 4th, 2020, Nijmegen

Abstract

Implementation Intentions (IIs), also known as ‘If-then-plans’, are shown to be effective in achieving goals regarding eating healthy and dieting. IIs could be a welcome addition to the current treatment of Bulimia Nervosa (BN) and Binge Eating Disorder (BED), since IIs increase the likelihood of achieving goals due to the creation of a strong mental link between a particular situation and the goal-directed response. This study investigated the effect of three IIs sessions on the number of eating binges in patients with BN and BED. Secondary, the moderating effect of self-efficacy was investigated. Thirty-nine participants were divided into two groups and filled out a questionnaire about self-efficacy and kept a food diary for 28 days. Each participant received three treatment sessions. During these sessions, the control group formed only general goals regarding preventing eating binges, whilst the experimental group formed both general goals and IIs. Results showed a marginally significant effect of the IIs treatment on the number of eating binges, which indicates a trend. The power of the current research was too small to produce decisive results. In addition, results showed no significant moderating effect of self-efficacy on the relation between IIs and the number of eating binges. Since there is an ongoing discussion about self-efficacy, this may be partly due to the way the construct of self-efficacy has been interpreted. Further research should increase the power and take a pre and post measurement of a domain-specific self-efficacy questionnaire.

Setting goals and striving to achieve those goals takes up a big part of one's life. Although people have to deal with this on a daily basis, many goals remain unaccomplished (Webb & Sheeran, 2008). Research has shown that behavioral intentions have predictive value regarding reaching goals (Ajzen, 1991). However, these intentions are not always enacted upon. For instance, many purchase gym memberships and intend to commit to visiting the gym several times a week yet fail to show up. They intend to start eating healthy, still, the next thing they enjoy is ice-cream in the sun. Some tell us “the road to hell is paved with good intentions” (Bohn, 1855, p. 514).

This discrepancy between intentions and actual behaviors has motivated researchers to look more closely at the process of goal pursuit and strategies to enhance goal success (Dalton & Spiller, 2012; Gollwitzer & Sheeran, 2006; Powers et al., 2005). According to Gollwitzer (1999), it takes more than intentions to achieve goals, namely implementation intentions (IIs). This is a self-regulatory strategy in the form of an if-then plan which specifies the when, where, and how of responses leading to goal attainment. A general goal intention such as “I

intend to reach Z” merely focuses on the what, whilst the structure of IIs is as following: “If situation x arises, then I will perform response y” (Gollwitzer, 1999, p. 494).

Further research shined a light on the working mechanism of IIs and found that specifying a situation in the if-component appears to create a heightened activation of a mental representation of this particular situation. Additionally, specifying a response in the then-component enhances the automaticity of this response. When encountering the specified situation, the specified response is automatically provoked (Gollwitzer, 1999).

Subsequently, the effect of IIs was investigated by a meta-analysis of 94 studies conducted by Gollwitzer & Sheeran (2006). It was found that forming IIs across various life domains such as dieting, exercising, and New Year resolutions have an impressive effect on goal initiation ($d = .65$). In addition, Achtziger et al. (2008) focused on the shielding of ongoing goal striving in dieting and found that IIs enhanced the goal attainment rate. Thus, IIs increase the likelihood of achieving goals because of the creation of a strong mental link between a particular situation and the goal-directed response (Gollwitzer & Sheeran, 2006).

Since IIs have a positive influence on unhealthy eating habits, applying this strategy may also be beneficial for patients suffering from eating disorders, such as Bulimia Nervosa (BN) and Binge Eating Disorder (BED). Nowadays, eating healthy and reaching or maintaining a healthy body weight is a relevant topic for many people and a considerable amount of research has been conducted regarding the effect of IIs on altering eating habits (Adriaanse et al., 2011). The world is filled with easily accessible, unhealthy, attractive foods making it difficult for people to choose healthier options (Rodrigues et al., 2017). A meta-analysis of 49 studies examined the effects of IIs on eating habits indicating that IIs are effective in decreasing unhealthy eating habits ($d = .29$) and even more effective in increasing healthy eating habits ($d = .51$; Adriaanse et al., 2011).

Promising research has already been conducted in subclinical populations regarding the effect of IIs techniques on goal attainment (Tanis et al., 2019; Tanis et al., 2020a, 2020b). However, there is a need for similar research in clinical populations, such as patients suffering from BN and BED. Both are characterized by a disordered eating pattern with binge eating. Eating binges are episodes of uncontrollable eating during which an excessive quantity of food is rapidly consumed within a maximum of two hours, and feelings of loss of control are experienced (Mitchell et al., 2007). Eating binges can cause weight gain and eventually obesity. To prevent gaining weight, patients with BN will show compensating behaviors, such as vomiting after an eating binge, restricting their food intake, and exercising. Long term, these compensation behaviors can be harmful to the body.

Patients get strangled in a vicious circle of eating binges and destructive cognitions, which results in conflicts within themselves. This could be a possible reason for the high suicide risk for BN. According to Wade (2019), BN patients are seven times more likely to die by suicide than the general population, due to the lifetime suicidal ideation of 26 to 38%. Additionally, the relapse rates for the standard Cognitive Behavioral Therapy (CBT) for BN and BED are 30 to 50% (Wade, 2019). Consequently, there is room for improvement (Slade et al., 2018; Smink et al., 2012). To improve CBT so that patients may recover faster and permanently, it seems of great importance to investigate IIs as a possible additional treatment strategy to decrease eating binges.

Although there is a substantial amount of research showing the positive effects of IIs on goal attainment, the specific factors of influence are less investigated. Gaining more insight into these factors may further enhance the effects of this strategy. A possible factor of influence is self-efficacy (Webb & Sheeran, 2008). Originally, Bandura (1982) proposed the concept as a personal judgment of “how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, pp. 122). In addition, Bandura thought of it to be a cause of behavior across multiple life domains. In response, Hawkins (1995) argued that self-efficacy is a predictor of behavior, not a cause. Today, the debate on the definition of self-efficacy continues, but a widely supported definition and therefore used in this thesis is the following: “People's beliefs about their ability to produce desired outcomes through their own actions” (Maddux, 2016, pp. 41).

Self-efficacy has been investigated as a potential moderating factor of IIs effects on goal attainment. Several studies' results indicated that high self-efficacy enhances the effects of IIs (Webb & Sheeran, 2008; Wieber et al., 2010; Guillaumie et al., 2012). However, all implicated samples consisting of subclinical populations. Even though the results cannot be generalized to other populations, it seems plausible that self-efficacy has some influence on the effects of IIs.

Furthermore, self-efficacy has proven to play an important role in the recovery of BN and BED, for instance, high self-efficacy correlates positively to decreases in vomiting frequency, to controlling eating binges in various emotional states, and to acceptance of the current body shape (Schneider et al., 1987; Bardone-Cone et al., 2006; Steele et al., 2010). Consequently, the next step was to investigate whether self-efficacy is a positive moderating factor in the IIs treatment of eating binges in patients suffering from BN and BED.

Therefore, the effect of a short II-treatment on eating binges in patients suffering from BN or BED was investigated. Secondary, the moderating effect of self-efficacy was

investigated. It was hypothesized that BN and BED patients who formed goals plus IIs, would experience fewer eating binges after completion of the treatment compared to the control condition in which only goals were formed. The second hypothesis was that the effects of IIs in patients with a higher self-efficacy would be stronger than the effects of IIs in patients with a lower self-efficacy.

We studied the research questions with a three-session treatment study, in which participants kept a food diary for four weeks.

Method

Participants

The participants were on the waiting list for treatment at GGNet Amarum, which is a center of expertise for eating disorders in Zutphen and Nijmegen. All participants were diagnosed with either BN or BED, at minimum 18 years of age, and had a BMI of 18.5 or higher. All participants were made aware of the anonymity of their data, the voluntary participation, and that they could stop without having to supply a reason at any time.

In total, 92 clients were approached, of which 66 decided to participate. In total 20 participants quitted prematurely. The drop-out percentage was 27,5% in the experimental condition (11 out of 40) and 34,6% in the control condition (9 out of 26). The reasons for drop-out were personal circumstances, time-consuming, the start of regular treatment, and unknown reasons. In addition, seven participants had missing values and were therefore excluded from the analysis.

In the end, 39 participants were processed in the analysis. The experimental condition consisted of 25 participants and the control condition consisted of 14 participants. The experimental condition and the control condition were approximately equal on the demographic variables, which are reflected in table 1. The Medical Ethics Committee gave their approval prior to the start of the research (METC number: METC153016).

The current study is part of an ongoing investigation that distinguishes between two experimental conditions; behavior regulation-IIs and emotion regulation-IIs. In the behavior regulation-IIs, participants formed IIs regarding a certain behavior which presumably caused eating binges, while in the emotion regulation-IIs participants formed IIs regarding a certain emotion which presumably caused eating binges. However, in the current study, these conditions were combined into one experimental condition because the distinction was not relevant for the research questions.

Table 1.

Participants' demographic variables

Variables		<i>M (SD)</i>	Range	Total % (<i>N</i> =39)
Gender	Male			10.3
	Female			89.7
Age		34.49 (11.752)	18-60	
Diagnosis	BED			69.2
	BN			30.8

Materials

Eating binges. The participants' amount of eating binges per week was counted based on the online food diary, consisting of a measurement in the morning, the afternoon, and the evening. A food diary is a reliable method to gain insight into one's eating pattern (Adriaanse et al., 2011). The difference score for the eating binges was calculated by subtracting the amount of eating binges of week 4 from the amount of eating binges of week 1.

Self-efficacy. To measure participants' perceived self-efficacy, the Dutch General Self-Efficacy Scale (GSE) was used (Schwarzer & Jerusalem, 1995; Teeuw et al., 1994). The GSE consists of 10 phrases that can be answered on a Likert scale ranging from 1 = *completely incorrect* to 4 = *completely correct*. An example statement is: "I can always manage to solve difficult problems if I try hard enough." It takes approximately five minutes to complete the questionnaire. The total score was computed by adding up all item scores (range 10 - 40). The average score of the general adult population is 29. A higher score refers to a higher than average degree of self-efficacy, whilst a lower score refers to a lower than average degree of self-efficacy. The internal reliability is considered good (Cronbach's alpha = .90) (Luszczynska et al., 2005).

Information brochure, informed consent, and protocols. The information brochure, the two informed consents, and the protocols were created by research supervisor Jorg Tanis (Broer, 2018). The information brochure explains the motivation, goal, and content of the treatment study. Informed consent 1 confirms receiving the information brochure and agreeing to be contacted a week later by phone about the treatment study. Informed consent 2 confirmed having received sufficient information and the decision to participate in the

treatment study. In addition, the protocols described step-by-step in what way each session should be executed by the researchers. Separate protocols were created for each condition.

Procedure

During the regular intake session at GGNet Amarum, the diagnosis BN or BED was determined by a BIG registered psychologist. If the client met the inclusion criteria, the information brochure was handed over during the intake consultation. If the client accepted to be called back, informed consent 1 was signed. A week later, the client was contacted by the researcher. During this telephone conversation, the client's questions about the study could be answered. If the client decided to participate, informed consent 2 was signed. Thereafter, treatment sessions were scheduled, and participants received a welcome mail regarding the discussed practical information.

The active phase of the treatment study lasted four weeks. All measurements took place online. At day zero, the first pre-measurement of approximately 90 minutes was taken. On day seven, the second pre-measurement was taken, which lasted approximately 45 minutes. From day one to 28, the food intake diary was filled in three times a day. At 12:00, 17:00 and 22:00 hours participants received a reminder mail. Filling in the food intake diary took approximately fifteen minutes a day. Day one to seven served as base measurement. At day 8, 15, and 22, the treatment sessions took place.

All participants were randomly assigned to either the experimental condition or the control condition. Both conditions received three individual sessions. Each session lasted for approximately 45 minutes and took place at a consulting room at GGNet Amarum in Nijmegen or Zutphen. However, due to SARS-CoV-2, three participants followed the treatment sessions online using Skype. During the first session, researcher and participant took some time to get acquainted. Once the participant was comfortable, the eating binges and food diary were discussed. In the experimental condition, the IIs technique was introduced and both general goals and IIs were formed, whilst in the control condition only the general goals were formed. Thereafter, during the second and third sessions, the food diary and possible progress or difficulties were discussed. Then, the formulated goal or II was evaluated on the basis of the food diary and possibly altered or adjusted.

On day 29, the post-measurement was taken, which lasted approximately 45 minutes. Finally, three follow-up measurements were taken, each taking approximately 30 minutes, respectively one, three, and six months after the post-measurement. After the follow-up measurements were completed, participants were debriefed. Disturbance variables due to

differences between researchers were controlled for as much as possible by strictly following the created protocols. Possible deviations from the protocols had to be reported to the research supervisor and noted in the research file. In the current research, no deviations were reported.

Data analysis

The experiment had a between-subjects design with Condition as between-subject factor (qualitative, experimental/control), Self-efficacy as covariate (quantitative) and Eating Binges as dependent variable (quantitative, number of binges in week 4 minus week 1). The research question was answered by performing an ANOVA and ANCOVA with the use of SPSS 25.

Results

Relevant assumptions regarding normality, homogeneity, outliers, and influential points for both analyses were checked on violations and the results showed that none were violated.

A one-way analysis of variance (ANOVA) with Condition as between-subject variable and Eating Binges as dependent variable revealed a marginal statistically significant and medium main effect of Condition, $F(1, 37) = 3.95, p = .054, \eta^2 = .10$, indicating a possible effect of the IIs-treatment on the number of eating binges (Ellis, 2013; Pritschet et al., 2016; Johnson, 2019). The results are shown in Table 2.

A 2 x 1 (Condition [experimental, control] x Self-efficacy [quantitative]) one-way analysis of covariance (ANCOVA) showed no statistically significant Condition x Self-efficacy interaction effect, $F(1, 35) = 2.44, p = .127$ (see Table 2).

Table 2.
Means and standard deviations of Eating Binges and Self-efficacy*

Variables		<i>M</i>	<i>SD</i>
Eating binges	Control group	-.43	2.68
	Experimental group	-2.32	2.94
Self-efficacy	Control group	28.07	5.06
	Experimental group	28.12	4.79

**(number of binges in week 4 minus week 1)*

Discussion

The present study investigated whether the IIs treatment has an effect on eating binges and whether self-efficacy plays a moderating role in the process. It was hypothesized that the experimental group would experience fewer eating binges compared to the control condition after completing the treatment. Evidence for this hypothesis, indicating a possible trend, may have been found. The second hypothesis was that the effects of IIs in patients with a higher self-efficacy would be stronger than the effects of IIs in patients with a lower self-efficacy. This hypothesis was not confirmed.

The results showed a marginally significant effect of the IIs treatment on the eating binges with a medium effect size, which indicates a trend (Pritschet et al., 2016; Johnson, 2019). Although there is some discussion on how to interpret and value a marginally significant effect, a near-threshold p -value is increasingly labeled as marginally significant by researchers, because they could be worth investigating further. However, these effects should be interpreted with caution (Johnson, 2019).

The experimental group seems to have a slightly larger decrease in eating binges than the control group. If the marginal significance appears to be a result of coincidence, it would indicate a lack of treatment effect. However, if the marginal significance does not appear to be a result of coincidence, the marginally significant result could be caused by the small power. An a priori power analysis indicated that the total sample requires 128 participants to achieve a power of .80 with a medium effect size ($d = .25$) (Faul et al., 2007). Notwithstanding, our sample consisted of 39 participants. A posteriori power analysis revealed a too small power to produce decisive results ($Mpower = 0.09$) (Faul et al., 2007). Therefore, a significant result may be found once the desired sample size is reached (Button et al., 2013).

One of the factors that caused the small power, is the number of drop-outs in the current study. Although the drop-out percentage was rather high, they were approximately equal in the experimental and control group (Gravetter & Forzano, 2017). This is fortunate since it makes it unlikely that the drop-outs have influenced the results in a certain direction. Even though drop-outs cannot be prevented, to minimize the drop-outs in the future, researchers should motivate the participants during the whole course of the study and be alert to collect missing data.

Another possible explanation for the marginally significant effect could be that the number of treatment sessions was too little. For instance, the majority of the studies in the meta-analysis conducted by Gollwitzer & Sheeran (2006) wielded weekly II-treatment

sessions for four months targeting multiple goals rather than one. Compared to one month of weekly treatment sessions in the current study, our treatment was limited in time. Participants might need more training to implement the IIs technique for it to be optimally effective. In future research, the IIs effect could be enhanced by prolonging the treatment by adding weekly sessions for three more months. Though, the intensity of participation should be taken into account.

In addition, variety in the way the IIs treatment was given may have contributed to the marginal significance. Many measures have been taken to prevent diversity between the 16 different research students supplying the IIs treatment, such as the use of clear and specific protocols, training on how to carry them out, and writing session reports. Still, it is possible that the way the treatment was given, was inconsistent over the participants and therefore could have influenced the results. A reason to believe this, are the standard deviations of 2.94 and 2.68 in the experimental and control group respectively, which indicates coefficients of variations (CV) of 1.27 and 6.23. A CV larger than 1 indicates widely spread results within the groups. Therefore, it can be stated that especially in the control group, the results are widely spread (Brown, 1998). Ideally, all participants would be treated by the same person. However, the ongoing investigation of this current study is based on will last for 5 years, therefore it will not be realistic for one person to carry out all treatments. A possible solution might be to change the setting of the research into a digital treatment program with the use of E-Health (Kwan et al., 2020). The treatment would consist of three videos instead of personal sessions to guarantee consistent quality. Though, offering standard videos instead of personal sessions may also bring disadvantages, such as the lack of a valuable client-therapist relationship (Callaghan et al., 1996).

Regarding the second hypothesis, results showed that self-efficacy is no moderating variable in the treatment of eating binges with IIs. The level of self-efficacy did not have an influence on the effect of the IIs treatment. However, this may be partly due to the way the construct of self-efficacy has been interpreted. It is possible that the used theory was incorrect. In the current study, self-efficacy was viewed as a domain-specific, stable concept which does not change over time. However, if self-efficacy should be interpreted otherwise, the results of this study might not reflect reality. Bandura (1982) proposed that levels of self-efficacy vary across domains. In that case, the general questionnaire used in the current research may have contributed to the non-significant effect due to not mapping the level of self-efficacy regarding treatment relevant domains, such as self-efficacy to control binge eating while in various mood states and self-efficacy for the acceptance of current body

shape. Therefore, future research should use a domain-specific questionnaire, such as the questionnaire on self-efficacy specified for eating disorders (Marinilli Pinto et al., 2006).

Furthermore, self-efficacy may be considered as a concept that changes over time (Taylor et al., 2020; Foroumandi et al., 2020; Rahman et al., 2019). For instance, Schneider et al. (1987) investigated self-efficacy in bulimic patients across various domains and found an increase in self-efficacy to control binge eating while in various mood states and to control eating patterns using stimulus-control techniques (Schneider et al., 1987). If self-efficacy is domain-specific and dynamic, the one-time measurement of self-efficacy in the current study may have contributed to the non-significant effect, since a possible change in the level of self-efficacy has been left unnoticed. To eliminate this doubt in the future, there should be both a pre and post measurement. In addition, the effect of IIs treatment could be further investigated in the clinical population by dividing participants into a control group that only receives the standard treatment for BN or BED, and an experimental group that receives the standard treatment in combination with the IIs treatment. This way, the possible effect of the IIs treatment will become more visible.

To summarize, the current study investigated whether the IIs treatment has an effect on eating binges in people/patients with BED or BN, and if self-efficacy plays a moderating role in the process. It was found that the IIs treatment did marginally significantly decrease eating binges, which indicates a trend. However, there was no evidence found that self-efficacy plays a moderating role in the effect of the IIs treatment on eating binges. In the future, more participants should be recruited, and the amount of IIs treatment sessions should be increased. This would improve the validity of the study and increase the chance of determining whether the IIs treatment can decrease eating binges in eating disordered patients.

Reference list

- Achtziger, A., Gollwitzer, P. M., & Sheeran, P. (2008). Implementation intentions and shielding goal striving from unwanted thoughts and feelings. *Personality and Social Psychology Bulletin*, 34(3), 381–393. <https://doi.org/10.1177/0146167207311201>
- 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(1), 183–193. <https://doi.org/10.1016/j.appet.2010.10.012>

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-t](https://doi.org/10.1016/0749-5978(91)90020-t)
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37(2), 122–147. <https://doi.org/10.1037/0003-066x.37.2.122>
- Bardone-Cone, A. M., Abramson, L. Y., Vohs, K. D., Heatherton, T. F., & Joiner, T. E. (2006). Predicting bulimic symptoms: An interactive model of self-efficacy, perfectionism, and perceived weight status. *Behaviour Research and Therapy*, 44(1), 27–42. <https://doi.org/10.1016/j.brat.2004.09.009>
- Bohn, H. G. (1855). *A handbook of proverbs*. H.G. Bohn.
- Broer, E. (2018). *Het effect van implementatie intenties op eetbuien en de rol van neuroticisme* [The effect of implementation intentions on eating binges and the role of neuroticism] [Unpublished master's thesis]. Radboud University, Nijmegen.
- Brown, C. E. (1998). Coefficient of variation. In *Applied multivariate statistics in geohydrology and related sciences* (pp. 155-157). Springer Publishing.
- Button, K. S., Ioannidis, J. P. A., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S. J., & Munafò, M. R. (2013). Power failure: Why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience*, 14(5), 365–376. <https://doi.org/10.1038/nrn3475>
- Callaghan, G. M., Naugle, A. E., & Follette, W. C. (1996). Useful constructions of the client–therapist relationship. *Psychotherapy: Theory, Research, Practice, Training*, 33(3), 381–390. <https://doi.org/10.1037/0033-3204.33.3.381>
- Dalton, A. N., & Spiller, S. A. (2012). Too much of a good thing: The benefits of implementation intentions depend on the number of goals. *Journal of Consumer Research*, 39(3), 600–614. <https://doi.org/10.1086/664500>
- Ellis, J. L. (2013). *Statistiek voor de psychologie* [Statistics for psychology]. Boom Lemma.
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/bf03193146>
- Foroumandi, E., Kheirouri, S., & Alizadeh, M. (2020). The potency of education programs for management of blood pressure through increasing self-efficacy of hypertensive patients: A systematic review and meta-analysis. *Patient Education and Counseling*, 103(3), 451–461. <https://doi.org/10.1016/j.pec.2019.09.018>
- Gollwitzer, P. M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist*, 54(7), 493–503. <https://doi.org/10.1037/0003-066x.54.7.493>

- Gollwitzer, P. M., & Sheeran, P. (2006). Implementation intentions and goal achievement: A meta-analysis of effects and processes. *Advances in Experimental Social Psychology*, 69–119. [https://doi.org/10.1016/s0065-2601\(06\)38002-1](https://doi.org/10.1016/s0065-2601(06)38002-1)
- Gravetter, F. J., & Forzano, L. A. B. (2017). *Research methods for the behavioral sciences* (6th ed.). Cengage Learning.
- Guillaumie, L., Godin, G., Manderscheid, J. C., Spitz, E., & Muller, L. (2012). The impact of self-efficacy and implementation intentions-based interventions on fruit and vegetable intake among adults. *Psychology & Health*, 27(1), 30–50. <https://doi.org/10.1080/08870446.2010.541910>
- Hawkins, R. M. F. (1995). Self-efficacy: A cause of debate. *Journal of Behavior Therapy and Experimental Psychiatry*, 26(3), 235–240. [https://doi.org/10.1016/0005-7916\(95\)00023-s](https://doi.org/10.1016/0005-7916(95)00023-s)
- Johnson, V. E. (2019). Evidence from marginally significant t statistics. *The American Statistician*, 73(sup1), 129–134. <https://doi.org/10.1080/00031305.2018.1518788>
- Kwan, R. Y. C., Salihu, D., Lee, P. H., Tse, M., Cheung, D. S. K., Roopsawang, I., & Choi, K. S. (2020). The effect of e-health interventions promoting physical activity in older people: A systematic review and meta-analysis. *European Review of Aging and Physical Activity*, 17(1), 1–17. <https://doi.org/10.1186/s11556-020-00239-5>
- Luszczynska, A., Scholz, U., & Schwarzer, R. (2005). The general self-efficacy scale: Multicultural validation studies. *The Journal of Psychology*, 139(5), 439–457. <https://doi.org/10.3200/jrlp.139.5.439-457>
- Maddux, J. E. (2016). Self-efficacy. In *Interpersonal and intrapersonal expectancies* (pp. 41–46). Routledge.
- Marinilli Pinto, A., Guarda, A. S., Heinberg, L. J., & DiClemente, C. C. (2006). Development of the eating disorder recovery self-efficacy questionnaire. *International Journal of Eating Disorders*, 39(5), 376–384. <https://doi.org/10.1002/eat.20256>
- Mitchell, J. E., Devlin, M. J., De Zwaan, M., Peterson, C.B., & Crow, S.J. (2007). *Binge-eating disorder: Clinical foundations and treatment*. The Guilford Press.
- 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(7), 902–912. <https://doi.org/10.1177/0146167204272311>

- Pritschet, L., Powell, D., & Horne, Z. (2016). Marginally significant effects as evidence for hypotheses. *Psychological Science*, *27*(7), 1036–1042.
<https://doi.org/10.1177/0956797616645672>
- Rahman, N., Horesh, D., Kouri, N. A., Kapel Lev-Ari, R., Titcombe-Parekh, R., Bryant, R. A., Marmar, C. R., & Brown, A. D. (2019). Increasing self-efficacy reduces visual intrusions to a trauma-film paradigm. *Anxiety, Stress, & Coping*, *32*(2), 202–215.
<https://doi.org/10.1080/10615806.2019.1566532>
- Rodrigues, P. R. M., Luiz, R. R., Monteiro, L. S., Ferreira, M. G., Gonçalves-Silva, R. M. V., & Pereira, R. A. (2017). Adolescents' unhealthy eating habits are associated with meal skipping. *Nutrition*, *42*, 114-120.e1. <https://doi.org/10.1016/j.nut.2017.03.011>
- Schneider, J. A., O'leary, A., & Stewart Agras, W. (1987). The role of perceived self-efficacy in recovery from bulimia: a preliminary examination. *Behaviour Research and Therapy*, *25*(5), 429–432. [https://doi.org/10.1016/0005-7967\(87\)90020-9](https://doi.org/10.1016/0005-7967(87)90020-9)
- Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston (Eds.). *Measures in health psychology: A user's portfolio* (pp. 35-37). NFER-NELSON.
- Slade, E., Keeney, E., Mavranzouli, I., Dias, S., Fou, L., Stockton, S., Saxon, L., Waller, G., Turner, H., Serpell, L., Fairburn, C. G., & Kendall, T. (2018). Treatments for bulimia nervosa: A network meta-analysis. *Psychological Medicine*, *48*(16), 2629–2636.
<https://doi.org/10.1017/s0033291718001071>
- Smink, F. R. E., van Hoeken, D., & Hoek, H. W. (2012). Epidemiology of eating disorders: Incidence, prevalence and mortality rates. *Current Psychiatry Reports*, *14*(4), 406–414. <https://doi.org/10.1007/s11920-012-0282-y>
- Steele, A. L., Bergin, J., & Wade, T. D. (2010). Self-efficacy as a robust predictor of outcome in guided self-help treatment for broadly defined bulimia nervosa. *International Journal of Eating Disorders*, *44*(5), 389–396. <https://doi.org/10.1002/eat.20830>
- Tanis, J., Vroling, M. S., Van Heijningen, L. A., Martijn, C., Maas, J., & Keijsers, G. P. J. (2019). *Effects of implementation intentions on subclinical binge eating: A treatment study* [Manuscript submitted for publication]. Maastricht University.
- Tanis, J., Vroling, M. S., Martijn, C., Maas, J., & Keijsers, G. P. J. (2020a). *Effect of implementation intentions and regulatory fit on subclinical binge eating* [Unpublished manuscript]. Maastricht University.
- Tanis, J., Maas, J., Vroling, M. S., Martijn, C., & Keijsers, G. P. J. (2020b). *Effect of implementation intentions with mental imagery on subclinical binge eating*

[Unpublished manuscript]. Maastricht University.

- Taylor, S. B., Kennedy, L. A., Lee, C. E., & Waller, E. K. (2020). Common humanity in the classroom: Increasing self-compassion and coping self-efficacy through a mindfulness-based intervention. *Journal of American College Health*, 1–8. <https://doi.org/10.1080/07448481.2020.1728278>
- Teeuw, B., Schwarzer, R., & Jerusalem, M. (1994). Dutch adaptation of the General Self-Efficacy scale. http://userpage.fu-berlin.de/~gesund/publicat/ehps_cd/health/dutch.htm
- Wade, T. D. (2019). Recent research on bulimia nervosa. *Psychiatric Clinics of North America*, 42(1), 21–32. <https://doi.org/10.1016/j.psc.2018.10.002>
- Webb, T. L., & Sheeran, P. (2008). Mechanisms of implementation intention effects: The role of goal intentions, self-efficacy, and accessibility of plan components. *British Journal of Social Psychology*, 47(3), 373–395. <https://doi.org/10.1348/014466607x267010>
- Wieber, F., Odenthal, G., & Gollwitzer, P. (2010). Self-efficacy feelings moderate implementation intention effects. *Self and Identity*, 9(2), 177–194. <https://doi.org/10.1080/15298860902860333>