

The Effects of Goal Setting Interventions in University Students: A Systematic Review

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Abstract

Background: University students are struggling with academic performance, health related behaviours and general performance. Goal setting interventions might be a quick and easy way to ameliorate these struggles. The effectivity of goal setting interventions has been demonstrated for other populations, but for university students there is some mixed evidence. This resulted in the following main research question: Do goal setting interventions have a significant effect on university students?

Methods: On the 18th November 2021 a search was conducted in the Scopus, PsychInfo and Web of Science databases. In order to be included in the review a study had to focus on the effects of a goal setting intervention for students. The intervention needed to be aimed at improving either academic performance, health related behaviours or general performance measures. The intervention could not include more than two intervention components that are unrelated to goal setting.

Results: After applying the inclusion and exclusion criteria, a total of 26 studies were left. 10 out of 26 studies included the formulation of an action plan as an intervention component. Most of the studies (n=15) were randomised controlled trials. With regards to outcomes, health-related behaviours were most effective, as 6 out of 7 studies found a significant effect. For academic achievement 6 out of 13 studies found a significant effect and 4 out of 6 studies found a significant effect on general measures of performance.

Discussion: Overall, it seems that goal setting interventions can have a significant positive effect on university students, depending which area the students want to improve in. The findings imply that goal setting interventions might actually be a relatively quick and easy way for universities to address certain student struggles, however, depending on the area of interest, other interventions might be more suitable. One limitation of this review lies in the fact that the initial review of studies as well as their subsequent data extraction was primarily done by one person. Another limitation lies in the quality of the studies, as 11 out of 15 randomised controlled trials that were included in this review had a high risk of bias in at least one of the key domains. One area that future researchers could focus on might be whether there is a specific subgroup of students that stands to reliably benefit academically from goal setting interventions. As for the implications for current practice, universities could offer goal setting interventions to improve dietary choices of university students.

Introduction

For many students their time at university is a rather challenging period in their life, that presents multiple new challenges across different domains. Students struggle, having to cope with high academic pressure (Agolla & Ongori, 2009) as well as a fear of missing out on social interactions (Quitshat & Abu Sharour, 2019). This inevitably leads some students struggling to fulfil their academic obligations and dropout rates are continually on the rise (Araque, Roldan & Salguero, 2009).

Another area that university students seem to struggle in are health related behaviours. University students seem to be quite vulnerable to excessive drug and alcohol consumption (College drinking, 2021). For students, alcohol is oftentimes a big part of social gatherings and some students might feel pressure to engage in excessive drinking (Borsari & Carey, 2001). The association between college students and alcohol consumption is also further reinforced through popular media like film and music. University students might also be generally more at risk for poor nutrition (Sogari, Velez-Argumedo, Gomez & Mora, 2018). A possible reason for this might be the fact that for many college students, living in dorms or shared flats is their first experience of living away from home for an extended period of time and thus also the first time that they have to prepare their own food.

Furthermore, university students seem to also be struggling with more general measures of performance, such as self-efficacy, motivation or goal achievement. Many students struggle with mental health during their college years (Ibrahim, Kelly, Adams & Glazebrook, 2013), which can have a negative effect on areas such as positive affect or motivation (Werner-Seidler, Banks, Dunn & Moulds, 2013; Smith, 2012). Since students are used to having a clear path set out for them through school, they may also struggle with the increased decision-making demands in a university setting.

It is apparent that university students face many unique challenges across different areas of their life. On top of that it might be especially important for university students to tackle these various challenges while in university. University years seem to be a formative time where many people establish their behaviour patterns and it has been suggested that engaging in certain behaviours while in college can be a good predictor for engaging these behaviours in professional life (Mulisa & Ebessa, 2021).

In the field of psychology, many different interventions have been developed over the years, with the purpose of addressing the unique problems of university students across

different domains. One type of intervention that could potentially help in addressing some of these issues are goal setting interventions. As such this review will focus on the effects of goal setting interventions on university students to investigate their efficacy in alleviating student problems. Goal setting interventions might be of particular interest, since it has been suggested by researchers that they might be quick, effective and inexpensive, when compared to other interventions (Morisano, Hirsh, Peterson, Pihl, & Shore, 2010). Because of this, goal setting interventions could be very attractive to universities and other institutions that try to support their student population. However, whether they really are effective in alleviating problems of university students is still somewhat contested, which is what this paper aims to investigate.

Regarding the conceptualization of goal setting, researchers seem to have slight differences about what is included in the term. The researchers Champion and Lord (1982) viewed goal setting as a dynamic process during which self-set goals and feedback from the environment are incorporated into a system where performance is monitored relative to a desired state and subsequent goals, behaviours, and strategies are adjusted. Other researchers described goal setting as an activity during which “individuals set up goals they plan on achieving along with a timeline of when to accomplish those goals” (Stone & Parks, 2018, p. 2). In general, most researchers seem to agree that goal setting refers to a person establishing objectives in order to achieve a desired outcome.

It is notable that the conceptualization from Stone and Parks (2018) included the formation of an action plan, whereas the one of Champion and Lord (1982) did not. In general it seems to not yet be settled whether goal setting interventions should necessarily include the formation of an action plan or not. In a literature review about rehabilitation person-centred goal setting interventions, Kang, Kim, Lipsey and Foster (2022) found that forming an action plan was present in 18 out of 22 interventions and heavily present in 15. They came to the conclusion that forming an action plan is one of three intervention components that are present in almost all goal setting interventions. In contrast, an earlier literature review by Pearson (2012) about goal setting interventions for diet and exercise related behaviours in overweight adults did not find the formation of an action plan to be an integral part of goal setting interventions. This disparity could be because these two reviews focused on different target groups. Since no literature review about the effects of goal setting interventions on university students exists yet, it is unclear whether the formation of an action plan presents an integral part of goal setting interventions for this target group.

The reason why goal setting interventions tend to be effective can be explained via their working mechanisms. Bodenheimer and Handley (2009) outline several different working mechanisms, such as self-efficacy, attention direction, energizing and skill acquisition.

Goal setting interventions have a direct link with self-efficacy. Self-efficacy refers here to an individual's belief in his/her capacity to execute a certain behaviour and achieve a specific outcome (Carey & Forsyth, 2009). By reaching specific goals a person increases their confidence in that area, which may lead them to strive for more ambitious goals. This may result in an upward cycle whereby a person step by step increases their self-efficacy by accomplishing more and more challenging goals (Bodenheimer & Handley, 2009).

However, self-efficacy is not the only working mechanism of goal setting interventions that was outlined by Bodenheimer and Handley (2009). Goal setting also directs a person's attention towards activities that are relevant to the specific goal, which may help people focus and recognise opportunities and pitfalls with regards to their goal. Furthermore, having a clear goal to work towards can also energize people to perform better and with greater persistence. This may also lead people towards the acquisition of new skills that are relevant for achieving the goal.

Goal setting interventions can have a myriad of different benefits for a variety of people. Goal setting can not only increase meaning in a person's life (Stone & Parks, 2018), but has been shown to also reduce depression (Swoboda, Miller & Wills, 2017). Furthermore, goal setting has been shown to reduce financial anxiety and improve wellbeing (Archuleta, Mielitz, Jayne & Le, 2020). Goal setting does not only have a myriad of different benefits, but these benefits may also apply to a wide variety of people, from elite boxers to primary care patients (Teal, Haidet, Balasubramanyam, Rodriguez & Naik, 2012; O'Brien, Mellalieu & Hanton, 2009; Swoboda, Miller & Wills, 2017).

With regards to university students in particular, many goal setting interventions have been conducted and have led to varying outcomes. While some studies have shown goal setting interventions to improve academic performance (Morisano, Hirsh, Peterson, Pihl, & Shore, 2010) other studies could find no evidence for such a link (Chase, Houtmanfar, Hayes, Ward, Vilardaga & Follette, 2013). There are some researchers who suggest that goal setting interventions could reduce alcohol consumption in college students (Crotwell, 2017), whereas other researchers found them to be ineffective in such regards (Curtin, Stephens & Bonenberger, 2001). It is because of these varied and sometimes contradictory conclusions

regarding goal setting interventions and university students, that a comprehensive review is needed to provide a better overview over the current state of the art.

There have been several literature reviews about goal setting (Kang, Kim, Lipsey & Foster, 2022; Pearson, 2012), but since none of those interventions have focused on college students, it remains somewhat unclear whether they are effective for this target group. This paper aims to address that issue by providing a systematic review of the effects of goal setting interventions on students across academic achievement, health related behaviours and general performance measures. Furthermore, this review aims to investigate whether goal setting interventions for university students tend to include the formation of action plans as an intervention component. This results in the formation of the main research question, as well as several sub-questions:

Do goal setting interventions have a significant effect on university students?

1. Do goal setting interventions for university students include the formulation of an action plan as an intervention component?
2. What are the study designs used to study goal setting interventions?
3. Do goal setting interventions have a significant effect on the academic achievement of university students?
4. Do goal setting interventions have a significant effect on health-related behaviours of university students?
5. Do goal setting interventions have a significant effect on general measures of performance in university students?

Methods

A search matrix (Appendix A) was created around the basic concepts of university students, goal setting and intervention. Out of this initial search matrix the following search string was developed: (“university student*” OR “college student*” OR “undergrad* student*” OR “graduate student*” OR “postgrad* student*” OR “college freshman” OR “university freshman”) AND (“goal setting” OR “goal determining” OR “goal planning” OR “goal defining”) AND (intervention OR therapy OR treatment).

An overview of the search and selection process can be seen in figure 1. The search was conducted on the 18th November 2021 in the Scopus, PsychInfo and Web of Science

databases, which lead to a total of 300 results. These databases were chosen in order to have both a specifically psychological database in PsychInfo, as well as more broad interdisciplinary databases in Scopus and Web of Science. The results of the search were imported into the reference manager Covidence, in which they were automatically screened for duplicates. After the duplicates were removed, a total of 218 potential studies were left.

To filter out the irrelevant studies, several inclusion criteria were set up. Firstly, it was decided to only include studies that focused on the effects of an intervention. This was done, because this review explicitly focuses on the effects of goal setting and correlational studies or other papers would thus not be suitable. Furthermore, it was made so that the intervention had to directly include acts of goal setting to be eligible to be included. This was done because it was decided that only including a lecture on the benefits of goal setting was not sufficient in assessing the effects of goal setting. Since this review focuses on university students, all the studies that were included had to have university students as their participants. Furthermore, it was decided that only studies would be included that focused on the impact of goal setting on academic achievement, health related behaviours or general performance measures. This was done to exclude studies that focused on topics with little existing research, as only having one or two studies about a given topic would not suffice for a literature review. Of course, another important factor was that the researcher could access and understand the studies, so in order to be included, the studies had to be written in English and had to be accessible to the researcher. As a master student of the University of Twente, the researcher had access to all studies that were accessible through the universities library.

Besides these inclusion criteria, two exclusion criteria were also set up. First of all it was decided that the intervention may not include more than two other concepts besides goal setting. Ideally, goal setting would have been the sole focus of the intervention, however, many studies focused on interventions with multiple concepts. This criteria was set, to keep the number of available studies reasonably high, while still excluding studies that only marginally focused on goal setting. The second exclusion criterion was that the study may not be a type of review. This criterion was included, since this study is a literature review itself and thus including an older review among the other studies would have skewed the results.

The 218 studies were individually examined according to these inclusion and exclusion criteria. The articles were examined in their title and abstract first and if they were found to be potentially worth including, their full text was analysed. If the researcher was still unsure about a studies eligibility after the full text review, he consulted his supervisor and

they jointly made a decision. This assessment of eligibility was treated as one step and the main reasons for exclusion consisted of studies having the wrong intervention (n=63), a lack of access to the study (n=61), the wrong study design (n=39), the wrong participants (n=25), being written in the wrong language (n=3) and focusing on the wrong topic (n=1). In the end this assessment resulted in a total of 26 studies to be included in this review.

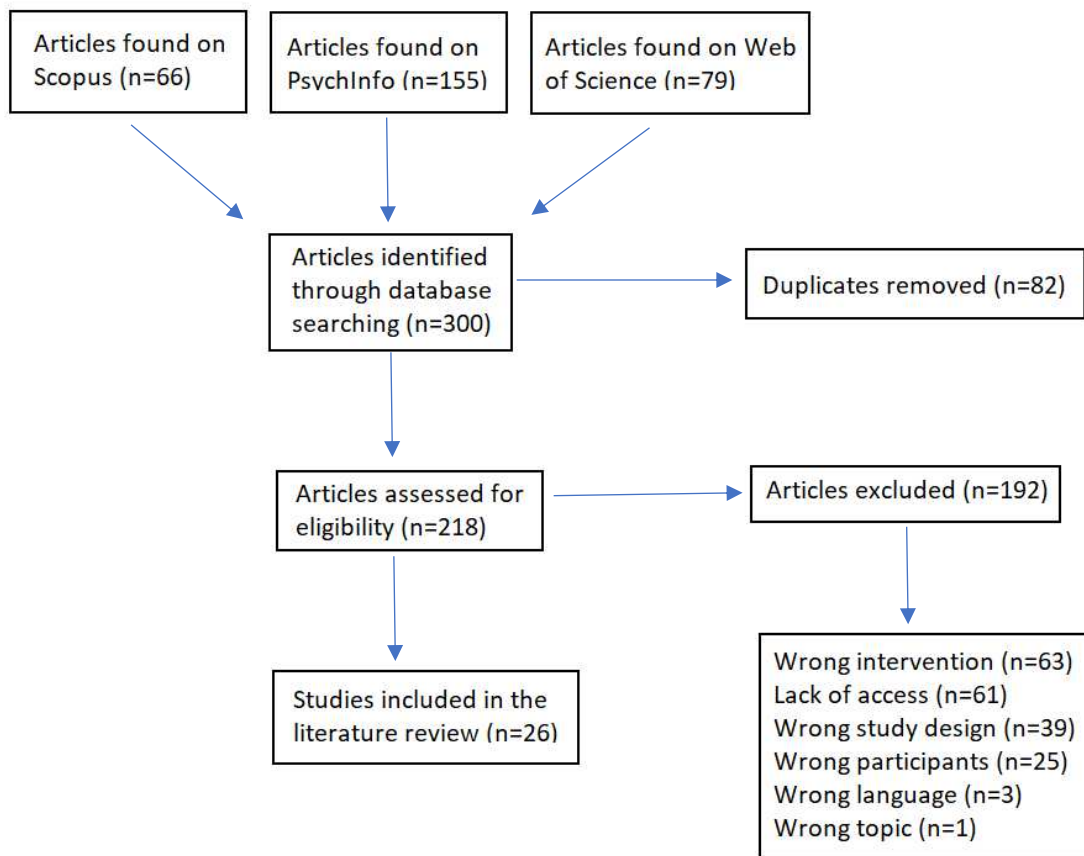
At this point the relevant information was extracted from the 26 studies. First, all the studies were numbered by alphabetical order of their authors. Next, all the studies were examined for their intervention parameters. This included the specific target group, goal setting process, intervention group format, duration, inclusion of an action plan and the goal of the intervention. The goal setting process referred to the method by which the participants would arrive at their goals, which could either be guided by the researchers, unguided or assigned, which meant that the participants had no part in choosing their goal. Intervention group format was a binary variable and refers to whether there was any significant interaction between the participants as part of the intervention. The goal of the intervention refers to the explicit goal or the hypothesis of the researchers, not the goal that the participants had to set for themselves.

Next, the studies were examined for their study properties. These included the study design, participant number, control condition and the other concepts besides goal setting. Control condition referred to whether the study had a control group and if so, which type of control group it was. The control groups could be either active, which meant that they engaged in an activity similar to the intervention, or passive, which meant that they did not engage in any extra activity. The concepts besides goal setting referred to any intervention components that were not related to goal setting.

Lastly the studies were examined for their outcome measures, main findings and p-values. All the information was extracted by the researcher. In cases when the researcher was unsure about the information, he consulted with his supervisor and they jointly made a decision.

Figure 1

PRISMA flowchart



Results

In total 26 studies were included in this review, 21 were published in peer reviewed journals and the other five were doctoral theses. The date of publication for the studies ranged from 1990 to 2021. The majority of the studies, however, were published fairly recently with the median date of publication being 2016. The majority of the studies were made in either a European or North American context and some were from east Asian countries. Out of the 26 studies, 9 included a concept other than goal setting. For the intervention group format, 22 studies used an individual format and 4 used a group format.

Table 1

Intervention Parameters

Study Nr.	Author	Goal setting process	Intervention group format	Duration	Inclusion of an action plan	Concepts besides goal setting	Goal
1	Acee (2009)	Unguided	Individual format	<1 day with several follow ups over a 2-week period	Action plan	Value reappraisal	Increase in measures of self-efficacy over time and higher exam scores
3	Bowman et al. (2020) (1)	Guided	Individual format	~30min	Action plan	/	Positive effect on grades
4	Bowman et al. (2020) (2)	/	Individual format	<1 day	No action plan	/	Positive effect on grades and increased likelihood to return to academic good standing
5	Chase et al. (2013)	Unguided	Individual format	~30-45min	Action plan	Values exploration	/
6	Cooley et al. (2020)	Unguided	Individual format	~12min-17min	No action plan	Theory of planned behaviour	More positive attitudes, subjective norms, perceived behavioural control and learning

							intentions regarding outdoor learning and groupwork
9	Dobronyi et al. (2019)	Unguided	Individual format	~2 hours	Action plan	Growth mindset treatment	Positive effect on grades and retention rates
10	Garavallia et al. (2002)	Unguided	Individual format	~1 hr 20 min	No action plan	/	/
16	Morisano et al. (2010)	Unguided	Individual format	2.5 hours with a follow up after 4 months	Action plan	/	Improvements in GPA and student retention rates
17	Munezane (2015)	Guided	Group format	Two 12 minute sessions and three 10 minute sessions over the course of a semester	No action plan	/	/
20	Rivera et al. (2019)	Guided	Individual format	1 hour per session, 2-3 sessions per week over the course of less than one semester	No action plan	Task analysis	Improved study skills
22	Schippers et al. (2015)	Unguided	Individual format	~2 hrs 10 min	Action plan	/	Enhancing the performance of lower performing students
25	Van Lent et al. (2020)	Unguided & Guided	Individual format	<1 day & multiple follow ups	No action plan	/	Improve study performance

26	Waldron (2021)	Unguided	Individual format	~30 min	Action plan	Mental contrasting with implementation intentions exercises	Improved time management self-efficacy and time management skills of students taking online courses
2	Bhurosy et al. (2020)	Unguided	Individual format	Daily sessions over a 3 day period	No action plan	/	/
7	Crotwell (2017)	Unguided	Individual format	~2 hours with a follow up after 1 month	Action plan	/	Different time allocation and increased frequency and enjoyment of alcohol unrelated activities
8	Curtin et al. (2001)	Assigned	Individual format	<1 day with two follow ups over a 2 month period	No action plan	/	Reduction in heavy drinking
12	Ghelfi-Dunbar (2019)	Guided	Group format	~2 hrs	Action plan	Information on health, diet and fitness	A decrease in bodyfat and an increase in physical activity as well as activity monitoring
13	Lozano et al. (2010)	Guided & assigned	Individual format	<1 day & multiple follow ups during 4 week period	No action plan	/	Lower quantity and frequency of alcohol use

18	O'Donnell et al. (2014)	Unguided	Individual format	Weekly sessions of ~15 minutes over a 10 week period	No action plan	/	Increased fruit and vegetable consumption and increased physical activity
23	Schnoll et al. (2001)	Unguided	Individual format	2 sessions per week over a 4 week period	No action plan	/	Promote and enhance dietary self-efficacy and foster a change in dietary fiber consumption
11	Gavrilova et al. (2019)	/	Individual format	~52min with 1 week follow up	No action plan	/	Improve motivation and goal achievement of a chosen lifestyle behaviour
14	Mai et al. (2020)	Unguided	Group format	4 hrs	No action plan	Relapse prevention	Increased transfer of training
15	McCutcheon et al. (2020)	Guided	Individual format	<1 day & multiple follow ups over 1 year period	No action plan	/	/
19	Ridley et al. (1992)	Unguided	Individual format	<1 day	No action plan	Metacognitive awareness	Increased performance on a novel decision-making task
21	Rolo (2004)	Guided	Group format	1 hour per session, 12 sessions over a six week period	Action plan	/	Assist student athletes to reach their athletic and academic potential
24	Stock et al. (1990)	Assigned	Individual format	<1 day	No action plan	/	Enhance initial perceived self-efficacy and task persistence

Note: Missing data is marked as (/)

The first sub-question was: Do goal setting interventions for university students include the formulation of an action plan as an intervention component? As can be seen in table 1, a total of 10 studies out of 26 included the formulation of an action plan as an intervention component. This means that most goal setting interventions for university students do not include the formulation of an action plan as an intervention component.

Table 2

Study properties

Study Nr.	Author	Design	Participant number	Control condition
1	Acee (2009)	Randomized controlled trial	88	Active control group
3	Bowman et al. (2020) (1)	Regression discontinuity design	3164	No control group
4	Bowman et al. (2020) (2)	Randomized controlled trial	113	Passive control group
5	Chase et al. (2013)	Randomized controlled trial	132	Passive control group
6	Cooley et al. (2020)	Randomized controlled trial	173	Passive control group
9	Dobronyi et al. (2019)	Randomized controlled trial	1492	Active control group
10	Garavallia et al. (2002)	Randomized controlled trial	69	Active control group
16	Morisano et al. (2010)	Randomized controlled trial	85	Active control group
17	Munezane (2015)	Quasi-experimental design	662	Active control condition
20	Rivera et al. (2019)	Experimental Design	3	No control group

22	Schippers et al. (2015)	Quasi-experimental design	703	Passive control group
25	Van Lent et al. (2020)	Randomized field experiment	1092	Active control group
26	Waldron (2021)	Quasi-experimental design	255	Passive control group
2	Bhurosy et al. (2020)	Pre-posttest experimental design	165	Active control group
7	Crotwell (2017)	Randomized controlled trial	168	Active control group
8	Curtin et al. (2001)	Mixed-model factorial design	76	Active control group
12	Ghelfi-Dunbar (2019)	Pre-posttest experimental design	291	No control group
13	Lozano et al. (2010)	Randomized controlled trial	126	Active control group
18	O'Donnell et al. (2014)	Experimental design	724	Passive control group
23	Schnoll et al. (2001)	Randomized controlled trial	113	Passive control group
11	Gavrilova et al. (2019)	Randomized controlled trial	93	Active control group
14	Mai et al. (2020)	Randomized controlled trial	207	Passive control group
15	McCutcheon et al. (2020)	Pre-posttest quasi-experimental design	8	No control group
19	Ridley et al. (1992)	Randomized controlled trial	89	Active control group
21	Rolo (2004)	Randomized controlled trial	44	Active control group
24	Stock et al. (1990)	Randomized controlled trial	80	Active control group

Note: Missing data is marked as (/)

The second sub-question was: What are the study designs used to study goal setting interventions? As can be seen in table 2, most studies used the design of a randomized controlled trial (n=15), with the second most common design being some other form of experimental design (n=11). Out of the 15 randomized controlled trials, 10 had an active control group and 5 had a passive control group.

Furthermore, the 15 randomized controlled trials were assessed for their risk of bias. For a complete summary of the risk of bias, see figure 2. Of the included studies, 13 mentioned random sequence generation, but did not describe the process sufficiently, so the risk of selection bias was judged as unclear. In 2 studies the risk of selection bias was judged as high because their sequence generation process was found to be not sufficiently random. None of the studies described an allocation concealment effort, so all of the 15 studies were considered to have an unclear risk of selection bias. Six of the studies were judged to have a low risk of performance bias, due to the use of objective outcome measures or deliberate blinding of participants. Seven of the studies were considered to have an unclear risk of performance bias, since they had active control groups but did not report any blinding process. The remaining two studies had passive control groups and did not report any blinding process and were thus judged to have a high risk of performance bias.

Since blinding is generally difficult to do in behavioural interventions, all 8 studies that had direct involvement of the researchers in the intervention and did not describe a blinding process were judged to have a high risk of detection bias. Five of the studies were judged to have a low risk of detection bias, since all of their measures were taken online, so no personnel was involved and 2 studies were considered to have an unclear risk of bias. In total, 9 studies were judged to have a low risk of attrition bias, mainly because they did not report much participant bleed off. Four of the studies were judged to have a high risk of attrition bias, because they had meaningful levels of participant bleed off that was not equally distributed across the intervention groups and 2 studies were considered to have an unclear risk of bias. Finally, none of the studies provided a research protocol, so all 15 studies were considered to have an unclear risk of reporting bias.

Figure 2

Risk of bias summary of the included RCTs

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)
Nr. 1 Acee (2009)	?	?	?	+	+	?
Nr. 4 Bowman et al. (2020)	?	?	+	-	-	?
Nr. 5 Chase et al. (2013)	?	?	+	+	-	?
Nr. 6 Cooley et al. (2020)	-	?	-	-	+	?
Nr. 7 Crotwell (2017)	?	?	?	+	-	?
Nr. 9 Dobronyi (2019)	?	?	+	+	?	?
Nr. 10 Garavalia et al. (2002)	?	?	+	-	+	?
Nr. 11 Gavrilova et al. (2019)	?	?	?	-	+	?
Nr. 13 Lozano et al. (2010)	?	?	?	?	-	?
Nr. 14 Mai et al. (2020)	?	?	-	-	?	?
Nr. 16 Morisano et al. (2010)	?	?	?	?	+	?
Nr. 19 Ridley et al. (1992)	?	?	+	-	+	?
Nr. 21 Rolo (2014)	?	?	?	-	+	?
Nr. 23 Schnoll et al. (2001)	-	?	+	-	+	?
Nr. 24 Stock et al. (1990)	?	?	?	+	+	?

The third, fourth and fifth sub-question were each concerned with the efficacy of the goal setting interventions. As such the following tables 3, 4 and 5 each answer one of these three sub-questions, that were posed in the introduction. To do so, the tables display all the outcome measures of the respective studies. Each outcome measure was assigned either a (+), which meant that a significant effect was found, or a (0), which meant that no significant effect was found. Additionally, the p-values of each outcome measure were also displayed. An intervention was deemed effective, as long as at least 50% of the outcome measures showed the desired effect.

Table 3

Study parameters for studies about academic performance

Study Nr.	Author	Outcome measures	Main Findings	P-value
1	Acee (2009)	<i>Perceived Academic Competence Scale (PACS)</i>	0	/
		<i>Self-efficacy for exam performance (SEEP) (single item scale)</i>	0	/
		<i>Self-efficacy for reaching learning objectives (SERLO) (single item scale)</i>	0	/
		<i>Task value scale (TVS)</i>	0	/
		<i>Perceptions of instrumentality scale (PI) (ENDUV)</i>	0	/

		<i>Perceptions of instrumentality scale (PI) (EXOUV)</i>	0	/
		<i>Interest/Enjoyment Scale (IES)</i>	0	/
		<i>Intentions to continue learning statistics (ICLS)</i>	0	/
		<i>Choice-Behaviours to learn statistics (CBLS)</i>	0	/
		<i>Exam performance (EP) (standardized exam scores)</i>	0	/
3	Bowman et al. (2020) (1)	<i>GPA</i>	0	/
4	Bowman et al. (2020) (2)	<i>GPA in spring 2017 semester</i>	0	/
		<i>Returning to academic good standing after spring 2017 semester</i>	0	/
5	Chase et al. (2013)	<i>Cumulative GPA</i>	0	.33
6	Cooley et al. (2020)	<i>Theory of planned behaviour questionnaire - Intention</i>	+	.002
		<i>Theory of planned behaviour questionnaire – Affective attitude</i>	+	.009
		<i>Theory of planned behaviour questionnaire – Instrumental attitude</i>	+	.002
		<i>Theory of planned behaviour questionnaire – Descriptive norms</i>	+	.020
		<i>Theory of planned behaviour questionnaire – Injunctive norms</i>	+	.042
		<i>Theory of planned behaviour questionnaire – Self-efficacy</i>	+	.007
		<i>Theory of planned behaviour questionnaire - Controllability</i>	0	.760

		<i>Groupwork skills questionnaire (task groupwork skills)</i>	0	.50
		<i>Groupwork skills questionnaire (interpersonal groupwork skills)</i>	0	.85
9	Dobronyi et al. (2019)	<i>Course grades</i>	0	/
		<i>Registration status</i>	0	/
10	Garavalia et al. (2002)	<i>SESRL (General organizing/planning strategies)</i>	0	/
		<i>SESRL (Task preparation strategies)</i>	+	.0270
		<i>SESRL (Environmental restructuring)</i>	0	/
		<i>SESRL (Recall ability)</i>	0	/
		<i>SESRL (typical study strategies)</i>	0	/
		<i>Goal-analysis test (10 item survey)</i>	+	<.0001
		<i>Course grades (average score across 4 exams)</i>	+	.0194
16	Morisano et al. (2010)	<i>GPA</i>	+	.03
		<i>Retention rates (course load of 9 credits or more)</i>	+	<.005
		<i>Negative affect (15 item concluding questionnaire)</i>	+	<.05
		<i>Enthusiasm (15 item concluding questionnaire)</i>	0	.47
17	Munezane (2015)	<i>Willingness to communicate in English questionnaire (modified WTC scales)</i>	+	/
20	Rivera et al. (2019)	<i>Percentage of correct steps on an 11 item task analysis checklist for study skills</i>	+	/
		<i>Percentage of tasks completed per study session</i>	+	/
22	Schippers et al. (2015)	<i>ECTS (credits)</i>	+	/
		<i>Retention rates</i>	+	/
25	Van Lent et al. (2020)	<i>GPA</i>	+	<.05

26	Waldron (2021)	<i>Percentage of course assessments submitted on time</i>	0	.627
		<i>Modified scale based on the online learning self-efficacy scale</i>	0	.193
		<i>Course completion</i>	0	>.999
		<i>Course grades</i>	0	.643

The third sub-question was: Do goal setting interventions have a significant effect on the academic achievement of university students? As can be seen in table 3, a total of 13 studies focused on the academic achievement of its participants. Out of these 13 studies, 6 studies reported a significant effect in at least fifty percent of their outcome measures and all of these effects went into the expected direction. In those six studies, the academic performance of the participants increased after the goal setting intervention. In the other seven studies that was not the case, however some of them could still show some interesting findings for this review. Studies nr 3 and 4 by Bowman et al. (2020) did not find a significant effect for their overall sample, but when focusing exclusively on students beyond the first year, they did find a significant positive effect for their outcome measures. Study nr. 5 by Chase et al. (2013) did not find a significant effect of goal setting alone on GPA, but when goal setting was combined with value exploration training, they did find a significant positive effect on GPA.

Each of the thirteen studies used between one and ten outcome measures, with the mean being 3.5 and the median being 2. In total there were 46 outcome measures across all thirteen studies, of which 28 (60.9%) did not find a significant effect and 18 (39.1%) did find a significant effect.

Table 4

Study parameters for studies about health-related behaviour

Study Nr.	Author	Outcome measures	Main Findings	P-value
2	Bhurosy et al. (2020)	<i>Estimated vegetable consumption based on photographs and descriptions (Tuesday)*</i>	+	<.001
		<i>Estimated vegetable consumption based on photographs and descriptions (Wednesday)*</i>	+	.006
7	Crotwell (2017)	<i>Alcohol free reinforcement</i>	0	/
		<i>Alcohol consumed (typical week)</i>	+	.024
		<i>Alcohol consumed (heaviest week)</i>	+	.030
		<i>Nr. of hours spent drinking (typical week)</i>	+	.020
		<i>Nr. of hours spent drinking (heaviest week)</i>	0	.12
8	Curtin et al. (2001)	<i>The time-line follow-back method (number of heavy drinking occasions)</i>	0	/
		<i>The time-line follow-back method (average number of drinks per drinking occasion)</i>	0	/
12	Ghelfi-Dunbar (2019)	<i>Activity monitoring</i>	+	.001
		<i>Food monitoring</i>	+	.001
		<i>Physical activity log</i>	+	.001
		<i>Fruit/vegetable consumption log</i>	0	.51
		<i>BodPod</i>	0	.92
13	Lozano et al. (2010)	<i>Daily drinking questionnaire (drinks per drinking day)</i>	+	<.005
		<i>Daily drinking questionnaire (drinking days per week)</i>	+	<.05
18	O'Donnell et al. (2014)	<i>Self reported consumption of fruits and vegetables in average number of cups per day over past week</i>	+	<.001
		<i>Self reported amount of physical activity in minutes per week</i>	0	/

23	Schnoll et al. (2001)	<i>Dietary fiber self-efficacy questionnaire</i>	+	<.05
		<i>Self-reported fiber consumption</i>	+	<.001

Note: * Outcome measures with the same asterisk are the same outcome measure, measured on separate points in time

The fourth sub-question was: Do goal setting interventions have a significant effect on health-related behaviours of university students? As can be seen in table 4, a total of seven studies focused on health-related behaviour of university students. Out of these seven studies, six studies reported a significant effect in at least fifty percent of their outcome measures and all of these effects went into the expected direction. In those six studies, the health-related behaviours of the participants improved after the goal setting intervention. In the other study, that was not the case.

Each of the seven studies used between 1 and 5 outcome measures, with the mean being 2.8 and the median being 2. Across all seven studies there were 20 outcome measures in total, of which 7 (35%) did not find a significant effect and 13 (65%) did find a significant effect. When it comes to the types of outcome measures, all of the studies focused to some extent on either dietary behaviour, physical activity or alcohol consumption. Out of the 5 times that fruit, vegetable or fiber consumption was used as an outcome measure, 4 times (80%) it found a significant effect. Out of the 2 times that physical activity was used as an outcome measure, 1 time (50%) it found a significant effect. Out of the 8 times that alcohol consumption was used as an outcome measure, 5 times (62.8%) it found a significant effect.

Table 5

Study parameters for studies about general performance

Study Nr.	Author	Outcome measures	Main Findings	P-value
11	Gavrilova et al. (2019)	<i>Importance motivation scales (pcr)_a</i>	+	.001
		<i>Importance motivation scales (ncr)_a</i>	+	.036
		<i>University of Rhode Island change assessment scale (RCI) (pcr)_b</i>	0	/
		<i>University of Rhode Island change assessment scale (RCI) (ncr)_b</i>	0	/
		<i>University of Rhode Island change assessment scale (Action) (pcr)_c</i>	+	.04
		<i>University of Rhode Island change assessment scale (Action) (ncr)_c</i>	0	.054
		<i>Goal achievement scales (Effort scale) (pcr)_d</i>	+	.005
		<i>Goal achievement scales (Effort scale) (ncr)_d</i>	+	.01
		<i>Goal achievement scales (Success scale) (pcr)_e</i>	0	.093
		<i>Goal achievement scales (Success scale) (ncr)_e</i>	+	.002
		<i>PANAS (positive affect) (pcr)_f</i>	+	.002
		<i>PANAS (positive affect) (ncr)_f</i>	+	.011
		<i>PANAS (negative affect) (pcr)_g</i>	0	/
		<i>PANAS (negative affect) (ncr)_g</i>	0	/
		<i>Likelihood of seeking professional assistance scale (pcr)_h</i>	0	/
		<i>Likelihood of seeking professional assistance scale (ncr)_h</i>	0	/
		<i>Helpfulness with session scale (pcr)_i</i>	+	.003
		<i>Helpfulness with session scale (ncr)_i</i>	+	<.001
		<i>Client satisfaction questionnaire-8 (pcr)_j</i>	+	<.001

		<i>Client satisfaction questionnaire-8 (ncr)_j</i>	+	<.001
14	Mai et al. (2020)	<i>Observer reported behaviour measures (from Wexley & Baldwin)</i>	0	.81
		<i>Self-reported behaviour measures (from Wexley and Baldwin)</i>	0	.65
		<i>Wexley & Baldwin's 16 short answer questions (modified)</i>	0	.65
15	McCutcheon et al. (2020)	<i>8 item post intervention survey</i>	+	.0187
19	Ridley et al. (1992)	<i>DOC-medical decision software</i>	+	<.05
21	Rolo (2004)	<i>Adult state hope scale</i>	+	.01
		<i>Adult trait hope scale</i>	0	/
		<i>Academic domain hope scale</i>	0	/
		<i>Athletic domain hope scale</i>	0	/
		<i>Self-reported academic performance</i>	0	/
		<i>GPA</i>	0	/
		<i>Athletic performance report (by Curry & Maniar)</i>	0	/
24	Stock et al. (1990)	<i>Self-efficacy questionnaire (unspecified)</i>	+	<.05

Note: Outcome measures sharing the same subscript are the same outcome measure, measuring two separate experimental groups

The fifth sub-question was: Do goal setting interventions have a significant effect on general measures of performance in university students? As can be seen in table 5, a total of six studies focused on general measures of performance in university students. Out of these six studies, four reported a significant effect in at least fifty percent of their outcome measures and all of these effects went into the expected direction. In those four studies, the measures of general performance of the participants increased after the goal setting intervention. In the other two studies, that was not the case.

Each of the six studies used between 1 and 20 outcome measures, with the mean being 5.5 and the median being 2. Across all six studies there were 33 outcome measures in total, of which 16 (48.5%) found a significant effect and 17 (51.5%) did not find a significant effect.

So, to summarize across the different intervention goals, a total of 16 (61.5%) out of 26 studies found a significant effect in at least 50% of their outcome measures, whereas 10 (38.5%) studies did not. Among the effective interventions, 25% included an action plan, whereas 60% of the ineffective interventions included an action plan. Out of the studies that found their intervention to be effective, 50% were randomised controlled trials, whereas 70% of studies that found their intervention to be ineffective were randomised controlled trials. Out of successful studies, 56% had active control groups, 25% had passive control groups and 19% had no control group at all. In the case of unsuccessful studies 50% had an active control group, 40% had a passive control group and 10% had no control group at all. Successful studies had a median participant number of 145.5 and unsuccessful studies had a median participant number of 122.5. Among effective interventions 25% included concepts other than goal setting and among ineffective interventions 50% included concepts other than goal setting.

Discussion

The main research question of this review was: Do goal setting interventions have a significant effect on university students? When considering the results, it can be said that goal setting interventions may have a significant effect on university students, depending on which area the students seek to improve in. Overall, goal setting interventions seem to be most effective for health behaviours. For general performance measures the interventions appeared to be considerably less effective, and academic achievement showed the least improvement.

The relative lack of action plans in goal setting interventions contradicts some findings from previous researchers. The literature review about rehabilitation person-centred goal setting interventions by Kang, Kim, Lipsey and Foster (2022) analysed 22 studies and found 18 studies to include the formation of action plans as a part of the intervention. In contrast, the research of Pearson (2012), who focused on goal setting interventions about health behaviours in overweight adults, found action plans to be a part of 1 out of 18 studies. In comparison the current review on goal setting interventions for university students does not perfectly align with either of those studies, as it found 10 out of 26 studies to include the formation of an

action plan as part of their intervention. Furthermore, it did not appear that action plans were particularly helpful in achieving significant outcomes in the context of the current review, since only 25% of effective interventions included an action plan, whereas 60% of ineffective interventions included an action plan.

This discrepancy could be explained by the target groups that were addressed by the respective literature reviews. It is possible that rehabilitation of adults with health conditions, like in the case of Kang et al. (2022), involves more concrete, tangible steps that are easy to line out in an action plan. In contrast, the improvement of health behaviours in overweight adults, like in the case of Pearson (2012), would likely include the adjustment of eating habits, which is a much more frequent activity that would probably be more difficult to address with an action plan. Since university students have a greater variety of problems that might be addressed through goal setting interventions, it would make sense that they do not align perfectly with either of the other two target groups when it comes to the usage of action plans.

These findings also have an impact on the way goal setting may be conceptualized. The researchers Stone and Parks (2018) included the setting up of a timeline as part of their conceptualization about goal setting. This would imply that the majority of goal setting interventions include the formation of an action plan, which is something that was not shown by this literature review. Instead, this research would be more in line with a conceptualization such as the one by Champion and Lord (1982).

When comparing the three different domains of goal setting that were present in the sub-questions of this review, it appears that health related behaviours show the greatest possibilities for improvement through goal setting interventions. In particular it seems like interventions aiming to improve dietary behaviours are most likely to succeed, whereas interventions that aim to improve physical exercise or alcohol consumption are less likely to succeed. In comparison, measures of general performance are even less likely to be improved through goal setting interventions and the domain that is least likely to be improved is academic performance.

One possible explanation for why dietary behaviour shows the greatest improvement might be because people in regular life often do not keep track of how much they eat. With other types of behaviours, like studying or exercising, people know when they do it and it is very easy to keep track of how many times a week one visited the gym or the library. Eating is somewhat more complicated because people have to eat every day and unless they make a conscious effort it can be hard to keep track of what one eats, or how much of it. Since

participants in a goal setting intervention have to keep track of their food intake, in order to assess whether they have met their goal, it is possible that keeping track of the food intake might already have a positive effect on dietary behaviour (Ingels, Misra, Stewart, Lucke-Wold & Shawley-Brzoska, 2017).

When it comes to academic achievement, the results of the current review were somewhat contradictory to the speculations of earlier researchers. A literature review by Abraham, Richardson and Bond (2012), which focused on psychological correlates of university students' academic performance, suggested that goal setting interventions might be a great avenue for academic improvement. One possible explanation for this discrepancy could be the fact that many of the interventions included concepts other than goal setting. In total, 6 out of 13 interventions focusing on academic performance included concepts other than goal setting and ineffective studies were more likely to include these concepts than effective studies. This might have affected the relative dose of goal setting that participants were exposed to and because of that made the interventions less effective.

Another possible explanation for the relative ineffectiveness of some goal setting interventions might be the working mechanism. It could be that the duration of the interventions was too short to meaningfully affect the working mechanism of self-efficacy. Bodenheimer and Handley (2009) described the process of gaining self-efficacy as a step by step increase of reaching lower tier goals and setting more challenging goals. They also mention the acquisition of new skills as a relevant working mechanism for goal setting, which might take a considerable amount of time, depending on the skill. Since most goal setting interventions lasted for less than a day, it is possible that there was not enough time for the interventions to unfold their full potential.

Self-efficacy is of particular interest here, since it was not only a working mechanism, but also an outcome measure. Across all three domains that were investigated by this review, self-efficacy was used as an outcome measure six times in total. Out of those six outcome measures, only three found a significant effect of goal setting on self-efficacy. This somewhat supports the idea that the goal setting interventions were too short to reliably affect self-efficacy, since it would otherwise be expected that self-efficacy would be affected by the intervention as it is one of the main working mechanisms.

When comparing goal setting interventions with other behavioural interventions that aim to improve the life and performance of university students, some interesting comparisons can be made. Task value interventions target the perceived value of a topic by pointing out

how it could be used to achieve a short term or long term goal of the participant. A literature review by Harackiewicz and Priniski (2017) showed that these interventions seem to not only be useful in improving the academic performance of university students but may also increase their interest in the respective field. Furthermore, these interventions do not appear to require significantly more effort than an average goal setting intervention. These factors lead to the conclusion that other interventions could achieve a similar outcome to goal setting interventions and might even be preferable, depending on the situation. When considering larger interventions that include multiple concepts it might be preferable to use task value interventions for the goal of improving academic achievement.

Limitations

When analysing the results of this paper, it is important to keep in mind that there were several limitations. One possible limitation could be the fact that this review only included studies that were directly found through three separate databases, whereas reference lists of included studies could have additionally been checked for possibly interesting sources. The current review was also limited to studies that were available through the University of Twente's online library. This led to the exclusion of 61 studies in total, some of which possibly could have otherwise been included. Additionally, the review of studies and their subsequent data extraction was primarily done by one person. While the researcher did occasionally check in with his supervisor, this was not the case for most of the studies and it would have been preferable to have two or more researchers decide over the studies inclusion or exclusion. Lastly, a point of possible bias lies in the quality of the included studies. The studies vary widely in their design, participant number and use of control groups.

Implications for future research

Regarding implications for future research, there are several areas that could be interesting to explore in the future. The perhaps most interesting, but also most extensively researched area would be academic achievement. In this area, future researchers could focus on whether there is a specific subgroup of students that stands to benefit reliably from goal setting interventions. Bowman et al. (2020) found a significant effect, but only for students past the first year, whereas Schippers, Scheepers and Peterson (2015) suggested that goal setting interventions could be uniquely useful for male students and ethnic minorities. Future

researchers could build upon these findings and determine which subgroups of students stand to gain most and least from goal setting. In doing so it would be advisable to focus on objective outcome measures, such as grades or retention rates, since that is what the previously mentioned researchers, Bowman et al. and Schippers et al., have used.

Furthermore, it could be interesting to determine which aspects a goal setting intervention needs to include in order to be most effective for university students. Chase et al. (2013) found a significant effect for students who engaged in goal setting and value reappraisal, but not for students who engaged in goal setting alone. Future researchers could build upon findings like these and determine what aspects make a goal setting intervention most effective. In doing so, it would be advisable to not include the formation of an action plan as an intervention component, since the current review found interventions that include an action plan to be less likely to be effective than ones that do not.

It could also be interesting to examine whether food tracking by itself would yield similar results regarding dietary behaviour as the goal setting intervention. To test this, future researchers could set up a randomised controlled trial with one experimental group engaging in a goal setting and another experimental group only engaging in food tracking and a control group, that is engaging in a comparable control task.

Another area that could be interesting to explore would be alcohol consumption. As of now there have been two studies that found goal setting to lead to a reduction of alcohol use among college students and one study that did not find such an effect. Future researchers could clear this somewhat mixed evidence up by looking further into the effects of goal setting interventions on alcohol use. In doing so, future researchers could also examine the participants self-efficacy in regard to alcohol consumption, to see whether increased self-efficacy plays a role in reducing alcohol consumption, as previous researchers pointed to it as a working mechanism.

Implications for practice

The results of this review leave some interesting implications for current practice. Goal setting interventions might not always be a reliable way for universities to improve the academic performance of their students. In this area it might be advisable to closely examine the context of the intervention when deciding which intervention to use. For self-contained interventions, goal setting could show some positive results, but for larger multi-concept

interventions, it might be better to focus on other interventions with good potential, such as task value interventions. Universities could, however, offer goal setting interventions to improve dietary choices of university students, since that is an area that has shown to improve significantly with goal setting interventions. University students are known to struggle with dietary behaviours. Furthermore, it was suggested by previous researchers (Morisano, Hirsh, Peterson, Pihl, & Shore, 2010) that goal setting interventions might be relatively quick and easy to implement for universities, which is supported by the current review, as most interventions took less than a day and many took less than an hour to complete.

Overall, this review shows that goal setting is an interesting field, however it is not an ideal solution for every situation and should only be applied in an appropriate context.

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Appendix

Appendix A – Search Matrix

Constructs	Related Terms	Broader Terms	Narrower Terms
University students	College students	students	Undergraduate students, graduate students, postgraduate students, college freshman, university freshman
Goal setting	Goal determining, goal planning, goal defining	planning	Guided goal setting, supervised goal setting, independent goal setting
Intervention	Therapy, treatment		Positive psychological intervention/ PPI

