

# To whom should I be kind? A randomized trial about kindness for strong and weak social ties on mental wellbeing and its specific mechanisms of change

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**Abstract:** The current study examines the role of social ties in performing kind acts to enhance university students' wellbeing. Due to facing multifaceted challenges, university students form a group that is particularly vulnerable in terms of their mental health. Interventions harnessing prosocial behaviour have the potential to increase students' wellbeing, strengthen personal competencies, and broaden social networks. The first aim of the trial ( $N = 222$ ) was to explore whether a 4-week acts-of-kindness intervention targeting either (1) *strong social ties*, (2) *weak social ties* or (3) *unspecified receivers* (treatment-as-usual) differ in their impact on students' mental wellbeing, positive relations, depressive symptoms, anxiety, and perceived stress. The second aim was to examine whether kindness for strong versus weak social ties have different underlying working mechanisms (i.e., positive emotions versus self-esteem) and who benefits most from these instructions (i.e., those with high or low levels of self-esteem and positive relations). Results demonstrated that the most significant improvements in mental wellbeing were found in the *kindness for strong social ties* condition compared to the other conditions. No mediation effects of positive emotions and self-esteem were found. Moderation analyses revealed that participants who performed kind acts for *weak social ties* reported significantly less positive effects on mental wellbeing, but only when their levels of self-esteem at baseline were medium or high. Independent of group allocation, participants' mental wellbeing increased throughout the intervention, but so did the experience of depressive symptoms, anxiety, and perceived stress. More research is needed to examine the timing of kindness interventions and investigate how they can improve mental wellbeing and psychological distress in acute phases of academic stress in university students.

**Keywords:** kindness; prosocial behaviour; positive psychology intervention; recipient; mental wellbeing; psychological distress.

## 1. Introduction

The concept of Entering university marks a critical developmental phase that transforms adolescents into adults (Arnett, 2015). University life provides students with opportunities to further their education, to build social relationships and, for some, a means to escape their parental homes (Blanco et al., 2008). This time in a young adult's life is characterized by increased autonomy, freedom, personal growth, and self-exploration opportunities (Taylor & Baxter Magolda, 2015). However, this essential developmental phase is also characterized by increased levels of psychological distress, alcohol/drug abuse, academic pressure, loneliness, social

isolation, high levels of social comparison, peer pressure, and study-life imbalances (Bergin & Pakenham, 2015; Katrevich & Aruguete, 2017; Mayer et al., 2016). Therefore, it is not surprising that university students are three times more likely than the average adult to develop lasting psychological disorders (Auerbach et al., 2016; Blanco et al., 2008) and are therefore deemed a particularly vulnerable group (van Zyl, 2021). Kessler et al. (2007) found that more than half of psychological disorders reported by adults start during their time at university. This, however, is not a one-time occurrence but an established trend that increases over time (Lipson et al., 2019). Lipson et al. reported that the diagnosis of various forms of psychopathology in university students increased from 22 to 36% during the last decade.

According to van Zyl et al. (2021), these increases in psychological disorders may be a result of a disproportional imbalance between students' study-related demands (e.g., work pressure, educational demands) and their available study resources (e.g., peer support, lecturer availability). The Study-Demands-Resources Framework (SDRF: Lesener et al., 2020) proposes that when study demands are high and study resources low, it leads to mental health impairment processes such as burnout, disengagement, stress, depression, and anxiety. This, in turn, results in a significant impairment in psychological functioning that decreases academic performance and learning potential (Ebert et al., 2018). To manage this imbalance, students need to activate their personal resources to buffer against the negative consequences it may have on their mental health (van Zyl, 2021). This idea aligns with the Two-Continua Model of mental health which suggests that psychological distress is independent of, yet related to, mental wellbeing (Westerhof & Keyes, 2010). Longitudinal studies have shown that high levels of mental wellbeing protect against the onset of psychological disorders and improve recovery in people who are diagnosed with a psychological disorder (e.g., Iasiello et al., 2019; Keyes et al., 2010; Schotanus-Dijkstra et al., 2019; Schotanus-Dijkstra et al., 2017). In addition, Lesener et al. (2020) argued that personal resources refer to the internal capacities that students activate to self-regulate, control, and successfully impact their environment (e.g., prosocial behaviours, strengths, and grit).

### *1.1 Prosocial behaviour and kindness interventions*

A growing body of research demonstrates that prosocial behaviour can be an essential personal resource that students can activate to help cope with the ever-increasing study-related demands and lack of resources at university (Dovidio et al., 2017; Hui et al., 2020). Prosocial behaviour helps to build new networks, strengthen social bonds, and create a sense of purpose and meaning, which benefits mental health and wellbeing (Chancellor et al., 2018). In addition, research has shown that kindness boosts one's own happiness, acts as a buffer against burnout and emotional exhaustion, and increases creativity and life satisfaction (Chancellor et al., 2018; Curry et al., 2018; Grant & Berry, 2011; Grant & Sonnentag, 2010).

Hurling et al. (2015) identified small acts-of-kindness, such as gifting ice cream to a fellow student, as an everyday activity that can spark joy and immediately elevate positive affect in university undergraduates. The benefits of experiencing positive affect can be contextualized within the Broaden-and-Build Theory of positive emotions. This theory argues that experiencing joy, interest, contentment, pride, and love broaden an individual's momentary thought-action repertoire, enable the development of more positive thoughts and activities, help to build personal resources, and create an 'upward spiral' of mental wellbeing (Fredrickson, 2001). Therefore, performing small deeds of kindness could lay the foundation for future experiences of positive cognition, affect, and personal resources in university students.

Further, the positive impact of prosocial behaviour is not only beneficial to the self but spills over onto friends, family, and the extended social network of the individual as well (Algoe et al.,

2008; Gray et al., 2014; Layous et al., 2012; Shiraki & Igarashi, 2018). For example, one experimental study, conducted in the real-world context of college sororities, demonstrated that kindness helped form new relationships, especially when the recipient acknowledged the thoughtfulness of the performer and felt gratitude (Algoe et al., 2008). Moreover, kindness interventions can also have beneficial effects on pre-existing bonds, as they can improve and strengthen relationship quality over time (O'Connell et al., 2016; Waldinger & Schulz, 2016). Thus, building interventions around enhancing prosocial behaviours could help students feel good, function well, and fit in better at university.

To date, research regarding prosocial behavioural interventions mainly focuses on *prosocial spending* or *acts-of-kindness*. The current study focuses on the latter, which is an established route to improve happiness, life satisfaction, and positive affect (Curry et al., 2018). The instructions of the acts-of-kindness intervention are simple: individuals are asked to perform kind acts for other people around them (Chancellor et al., 2018). Participants are encouraged to keep track of their acts by keeping a diary or registering such on an App. Its simplicity and inexpensiveness make this intervention easy to implement, scalable, and suitable for various populations (Van Zyl & Rothmann, 2019). Despite the growing body of research on the effectiveness of this intervention (e.g., Alden & Trew, 2013; Buchanan & Bardi, 2010; Chancellor et al., 2018; Curry et al., 2018; Nelson et al., 2021; Ouweneel et al., 2014; Trew & Alden, 2015), there are still some unresolved issues which require further exploration.

### 1.2 The role of social ties within kindness interventions

A notable limitation in current literature is that the recipients of such instructed kind acts are largely unspecified. Potential recipients can be broadly divided into *strong social ties*, consisting of the people most trusted, loved, and closest to the performer, or *weak social ties*, persons who are merely perceived as acquaintances or strangers (Gilbert & Karahalios, 2009). One of the few studies that did specify the receiver, was a 'money-spending trial' by Aknin et al. (2011). They reported that individuals who thought of a time they spent money on a family member or a close friend (i.e., *strong social ties*) experienced more positive affect than those that remembered giving money to charity (i.e., *weak social tie*). This study encourages the idea that the effect of performing kind acts is partly dependent on the nature of the relationship between performer and receiver (Curry et al., 2018; Petersen, 2012).

However, the participants in Aknin et al.'s (2011) experiment were only *retrospectively* asked to report on kindness. In contrast, studies in which participants were instructed to *perform* kind acts found contradictory results. For instance, when socially anxious students received a 4-week instruction to perform three acts-of-kindness for others on 2 days per week, participants reported a balanced distribution of kind acts for strong and weak social ties, and the type of relationship with the recipient did not predict improved positive affect (Alden & Trew, 2013). A similar conclusion was drawn in a recent experimental study. Adult participants from 29 countries were directly instructed to perform at least one kind act each day for strong social ties, weak social ties, or the self, for 7 consecutive days (Rowland & Curry, 2019). These kindness conditions were compared to both an active control group, in which regular kind acts were observed, and a self-selected waitlist control group. The results showed improved happiness among the three kindness conditions compared to both control groups, but there were no differences between kindness directed at the self, strong or weak social ties. These results indicated that the effects of kindness did not vary as a function of the target (Alden & Trew, 2013; Rowland & Curry, 2019). However, these prior studies only measured aspects of emotional wellbeing, limiting conclusions about overall mental wellbeing (i.e., including social and psychological wellbeing; Keyes, 2002;

Ryff, 1989) and psychological distress. In addition, prior studies only aimed to determine the intervention's effectiveness, with limited focus on the psychological or behavioural mechanisms underpinning the change. Specifically, none of these prior studies comparing kindness for strong or weak social ties examined the mechanisms through which the intervention might operate.

### *1.3 Potential mediators and moderators of acts-of-kindness*

Evidence from previous acts-of-kindness exercises in which social ties were not specified, shows that positive affect acted as a mediator of the intervention effects on relationship satisfaction (Alden & Trew, 2013) and mental wellbeing (Nelson et al., 2016). Increased need satisfaction—thus the level of autonomy, competence and connectedness—was also found to be a mediator of performing kind acts for others on emotional wellbeing (Nelson et al., 2015).

These working mechanisms may vary dependent on the different types of recipients, as the relationship between performer and receiver might strongly influence the nature of the interaction (Van Zyl et al., 2019). For instance, while strong social ties are characterized by high emotional intensity and positive communication (Goette et al., 2012; Klimecki et al., 2013), weak social ties can be linked to feelings of insecurity and anxiousness, as making contact with strangers may be perceived as more challenging (Duronto et al., 2005; Russell & Shaw, 2009). A study by Datu et al. (2021) demonstrated that a brief kindness intervention led to increased self-esteem in adolescents. This effect might be even more evident when kindness is directed at strangers (Fu et al., 2017). Thus, successfully performing kind acts for strong social ties might lead to experiencing more positive emotions. However, kindness for weak social ties might lead to positive self-esteem changes by inducing and handling uncomfortable situations (Lyubomirsky et al., 2005). In turn, positive emotions and increased self-esteem might improve mental wellbeing (Fredrickson, 2001).

By contrast, self-esteem could also be a moderator of the effects of performing kind acts, because previous literature has revealed that individuals with high self-esteem are more engaged in prosocial behaviour (Zuffianò et al., 2014). Marshall et al. (2014) demonstrated that an increase in self-esteem predicts higher levels of later social support. In particular, research has shown that a longitudinal relation between self-esteem and prosocial behaviour exists, but only when kindness is directed towards strangers (Fu et al., 2017). If individuals low in self-esteem show less kindness to strangers on their own initiative, it can be assumed that they are brought more out of their comfort zone when they are asked to do so as part of an intervention. Therefore, research to date suggests that being kind to strangers might be most beneficial for people with low self-esteem because they might conquer themselves when accepting the challenge of helping people they are not familiar with.

Additionally, the performer's level of positive relationships may also play an essential role in how successful prosocial interventions are (Lyubomirsky & Layous, 2013; Senf & Liao, 2013). For example, positive emotions such as joy and love might be more easily evoked in interactions with individuals engaged in fulfilling relationships than with individuals with weaker social networks (Kashdan et al., 2013). Likewise, the positive effects of kindness are often spread among the person's social network; thus, a large and active network might boost these positive changes over a more extended period when multiple interactions have occurred. Hence, being kind to friends and family might be most beneficial for individuals who are strongly engaged in positive relationships (Lyubomirsky & Layous, 2013).

### *1.4 Current study*

The current study extends existing research by focusing on the role of social ties in performing

prosocial behaviour, using various mental health outcomes, and conducting mediation and moderation analyses. The primary aim was to explore whether 4-week *acts-of-kindness* interventions targeting either (1) *strong social ties* (family and friends), (2) *weak social ties* (strangers) or (3) *unspecified receivers* (treatment-as-usual) differ in their impact on students' mental wellbeing, positive relations, depressive symptoms, anxiety, and perceived stress. The secondary aim of the current study focused on the mechanism by which acts-of-kindness intervention for strong versus weak social ties works and to determine which type of instructions works best for whom. We expect to find different working mechanisms of kindness dependent on the specific recipient. For example, being kind to family and friends might improve mental wellbeing primarily by experiencing more positive emotions during the interaction. In contrast, the positive impact of kindness to strangers might be mediated through positive self-esteem changes. It is also expected that the effectiveness of kindness is influenced by the levels of self-esteem and positive relations of the performer in a way that people with low levels of self-esteem benefit most from the *weak social ties* condition and people with high levels of positive relations benefit most from the *strong social ties* condition.

## 2. Methods

This three-armed randomized trial was approved by the Ethics Committee of the University of Twente (BCE17724) and registered in the Dutch Trial Register (NTR6820). The best practice guidelines for positive psychological intervention research designs (Van Zyl et al., 2019) and the CONSORT reporting guidelines were followed (Moher et al., 2010).

### 2.1 Participants

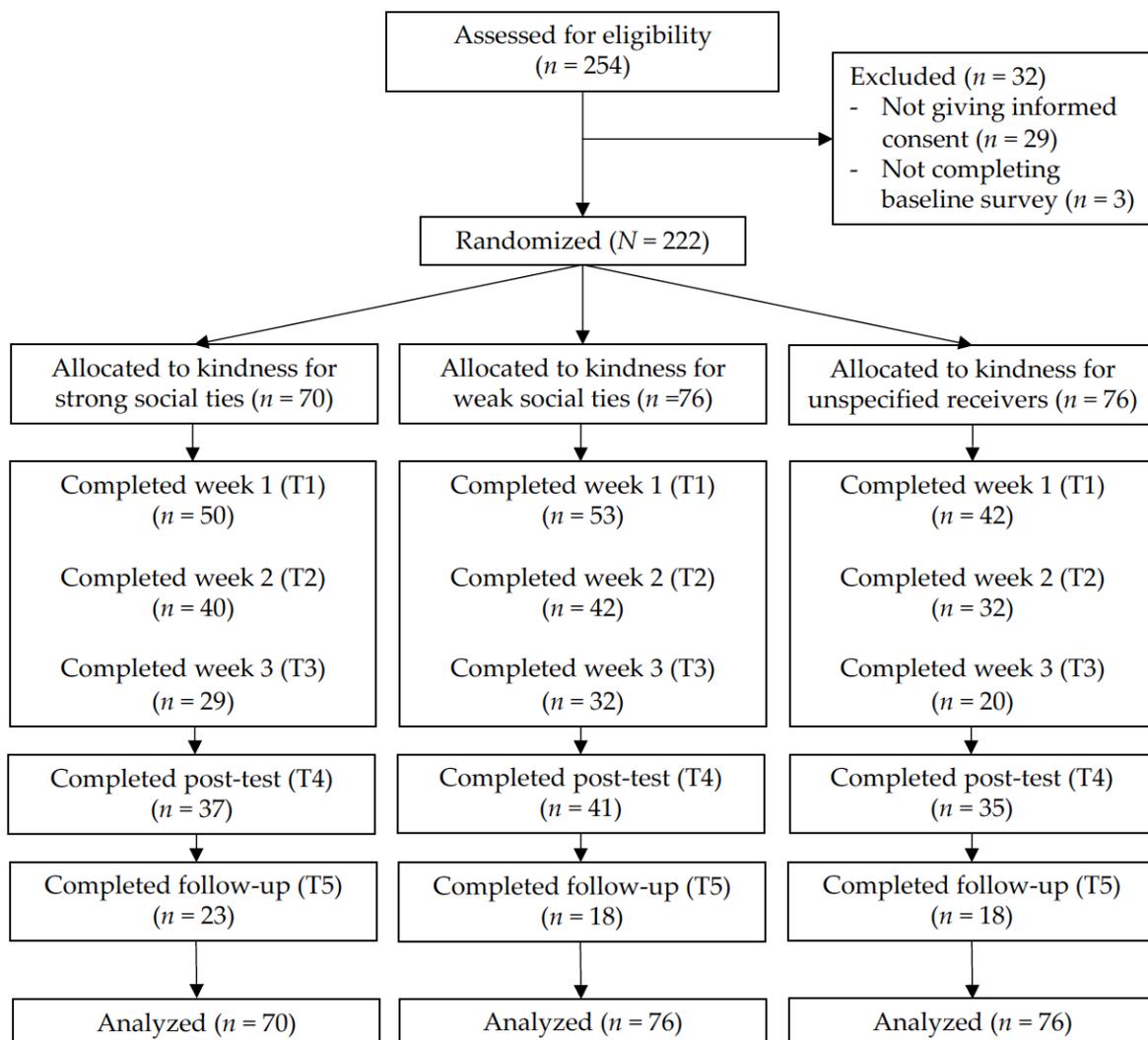
Participants were undergraduate psychology students from a University in the Netherlands ( $N = 222$ ; 74.3% female) with a mean age of 21.3 years ( $SD = 2.5$ ). The majority of the participants were of Dutch or German nationality (94.6%). Differences in sociodemographic characteristics were not significant between the three conditions (see Table 1,  $ps > .190$ ) and there were also no significant group differences in any of the baseline outcomes ( $ps > .298$ ).

**Table 1. Baseline characteristics of participants that performed acts-of-kindness for strong social ties, for weak social ties or non-specified (treatment-as-usual)**

	Kindness for strong social ties ( $n=76$ )	Kindness for weak social ties ( $n=76$ )	Kindness for unspecified receivers ( $n=70$ )
Age, $M$ ( $SD$ )	21.25 (1.89)	21.16 (1.99)	21.39 (3.39)
Gender, $n$ (%)			
Female	56 (73.7)	54 (71.1)	55 (78.6)
Male	20 (26.3)	22 (28.9)	15 (21.4)
Nationality, $n$ (%)			
Dutch or German	71 (93.4)	72 (94.7)	67 (95.7)
Other	5 (6.6)	4 (5.3)	3 (4.3)
Marital status, $n$ (%)			
Married	1 (1.3)	1 (1.3)	1 (1.4)
Never been	75 (98.7)	75 (98.7)	69 (98.6)
Living situation, $n$			
Alone	5 (6.6)	8 (10.5)	12 (17.1)
With partner	10 (13.2)	7 (9.2)	7 (10.0)
With parents	16 (21.1)	10 (13.2)	6 (8.6)
With others	45 (59.2)	51 (67.1)	45 (64.3)

## 2.2 Procedure

All second-year psychology students ( $N = 254$ ) received an email with information and an online informed consent form after attending an introductory lecture about the study. The 222 participants, who gave informed consent and completed the baseline survey, were randomly allocated (ratio 1:1:1) to one of the three conditions using random numbers from randomizer.org. The randomization procedure was stratified by gender to ensure equal distribution of males over the three conditions. Participants completed all online assessment measures at baseline, posttest, and 4 weeks after baseline (follow-up). During the 4-week intervention period, the mediator measures were weekly assessed (c.f. Figure 1 for a flow-chart of the study and participants). All instructions and surveys were conducted in English in line with the language used in the study course program at the university.



**Figure 1.** Flow-chart of participants.

### 2.3 Intervention conditions

The three conditions received similar instructions once a week during the 4-week intervention period. In each condition, the participants were instructed to pick 1 day per week as their *kindness day*, on which they had to perform five kind acts for other people. We instructed participants to perform five kind acts on 1 day per week based on prior research indicating that performing five acts-of-kindness in 1 day led to more significant wellbeing improvements than performing five acts-of-kindness throughout the week (Lyubomirsky et al., 2005). Several other studies have also examined the effects of performing five kind acts on 1 day (Chancellor et al., 2018; Nelson et al., 2021; Nelson et al., 2015). Although examples of possible kind acts were listed as a guideline, conditions on performing the task were open. Kind acts could be directed at the same person or at different persons, who could or could not be aware of the acts. The only difference between the three conditions were the instructions concerning the recipients of the acts. Participants in the *kindness for strong social ties* condition were explicitly asked to perform kind acts for close family and friends. In contrast, participants in the *kindness for weak social ties* condition were asked to perform kind acts for strangers. The treatment-as-usual condition received general instructions without any emphasis on the recipient. The examples of possible kind acts aligned with these instructions, in that they focused on either family and friends (*strong social ties*) or strangers (*weak social ties*), or a mix of those.

The following day, participants reported their kind acts they had performed in an online diary. Examples of the performed acts as reported in these online diaries were: *'Doing the dishes for my flatmates'*, *'I bought coffee for my friend'*, or *'I gave a friend a ride home'* (for strong social ties) and *'I let a stranger queue in front of me at the cashier in the supermarket'* or *'I held the door open for multiple people at the bakery'* (for weak social ties). In the *treatment-as-usual* condition, in which the instruction of the intervention did not specify the receiver, the reported acts were distributed across both strong and weak social ties, for instance *'Helping another student with her bike'*, *'I bought my husband's favorite dessert'* or *'I shared my cookies with someone I didn't know in the lecture'*.

### 2.4 Outcome measures

#### 2.4.1 Mental wellbeing

Mental wellbeing was measured as a primary outcome using the Mental Health Continuum Short Form (MHC-SF; Keyes et al., 2008). The 14-item scale measures emotional wellbeing (3 items; e.g., "In the past 4 weeks, how often did you feel happy?"), social wellbeing (5 items; e.g., "In the past 4 weeks, how often did you feel that you belonged to a community like a social group, your neighborhood, your city?") and psychological wellbeing (6 items; e.g., "In the past 4 weeks, how often did you feel that your life had a sense of direction or meaning to it?"). Participants responded on a 6-point scale from 0 (*never*) to 5 (*almost always*). Higher scores on the computed mean score indicate a higher level of mental wellbeing. Cronbach's alpha was .87 at baseline and .92 at posttest, which is consistent with previous reports of the MHC-SF (Keyes et al., 2008; Lamers et al., 2011; Schotanus-Dijkstra et al., 2016).

#### 2.4.2 Positive relations

The 9-item version of Ryff's Subscale of Positive Relations (Ryff, 1989) was used, which addresses the quantity and quality of established relationships, e.g., "I know that I can trust my friends and they know that they can trust me". Estimations on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*) result in total scores ranging from 9 to 63. A higher summed score hints at high engagement with others in positive relations, whereas lower levels indicate the lack of it. The instrument has

shown good internal consistency in previous studies (van Dierendonck, 2004) and showed a Cronbach's alpha of .83 at baseline and .89 at posttest.

#### 2.4.3 Depressive symptoms

The 20-item Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977) asks participants to rate the frequency of depressive emotions and behaviours over the course of the last week, e.g., "I felt that everything I did was an effort". Answers range from 0 (*rarely or none of the time*) to 3 (*most or all of the time*) with a total score from 0 to 60, of which a higher score indicates more depressive symptoms. The CES-D reports overall good psychometric properties (Smarr & Keefer, 2011), which was confirmed in the current study with Cronbach's alpha's of .91 at baseline and .92 at posttest.

#### 2.4.4 Anxiety

The 7-item Generalized Anxiety Disorder scale (GAD-7) (Spitzer et al., 2006) was implemented in order to estimate participants level of anxiety (e.g., "Not being able to stop or control worrying"). Total higher scores (0–21) indicate prominent feelings of anxiety during the last two weeks on a scale from 0 (*not at all*) to 3 (*almost every day*). Cronbach's alpha was .89 at baseline and .85 at posttest, which was similar to prior validation studies (Löwe et al., 2008).

#### 2.4.5 Perceived stress

The level of perceived stress was estimated with the 10-item Perceived Stress Scale (PSS) of Cohen et al. (1983), e.g., "In the last month, how often have you been upset because something that happened unexpectedly?", with answers from 0 (*never*) to 4 (*all the time*). Higher total scores (0–40) indicate a higher level of perceived stress. Earlier studies demonstrated good psychometric characteristics of the scale (Cohen et al., 1997), affirmed in the current study ( $\alpha = .87$  at baseline and at posttest).

#### 2.4.6 Positive emotions

Positive emotions was assessed with 8 items from the modified Differential Emotions Scale (mDES; Schaefer et al., 2010). On a scale from 1 (*not at all*) to 7 (*very intense*), participants rated to what extent they experienced different kinds of emotions in the past 24 hours (e.g., "interested, concentrated, alert"; and "loving, affectionate, friendly"). Higher total mean scores display the experience of deep positive emotions. The mDES has previously shown good psychometric properties (Galanakis et al., 2016) and Cronbach's alpha in the current study was .78 at baseline and .83 at posttest.

#### 2.4.7 Self-esteem

Self-esteem was measured with the 10-item Rosenberg Self-esteem Scale (RSE; Rosenberg, 1965), which consists of positively and negatively worded statements concerning an individual's personal feelings of self-worth (e.g., "On the whole, I am satisfied with myself"). Answers range from 1 (*strongly disagree*) to 4 (*strongly agree*), with higher sum scores (10–40) indicating high feelings of self-worth. The Cronbach's alpha of .90 at baseline and .91 at posttest is in line with previous findings on the good psychometric properties of the scale (Franck et al., 2008).

## 2.5 Statistical analyses

Data analyses were conducted with SPSS version 25.0, using 2-tailed tests with a significance level  $< .05$ . Due to high drop-out rates throughout the intervention, missing data were imputed using multiple imputations with 10 iterations and fully conditional specification (van Buuren, 2007). Drop-out at 4-week follow-up was so high (73.4%) that the presented analyses were conducted up to posttest only. The drop-out rates at posttest were equally distributed among the three conditions, *kindness for strong social ties* = 52.6%, *kindness for weak social ties* = 47.4%, *kindness for unspecified receivers* = 47.1;  $\chi^2(2) = 0.58, p = .749$ . In addition, demographic characteristics and outcome measures at baseline did not significantly differ between drop-outs and completers ( $ps > .217$ ).

Adherence was a priori defined as performing at least 3 kind acts for at least two weeks. This is in accordance with most studies about acts-of-kindness, in which participants are usually instructed to perform 3 or 5 kind acts per day (e.g., Alden & Trew, 2013; Chancellor et al., 2018; Nelson et al., 2021; Nelson et al., 2015; Nelson et al., 2016; Trew & Alden, 2015). Not all participants completed the online diaries (see Figure 1), but at least 44.1% of the participants adhered to the program. Adherence per week and total adherence did not significantly differ between conditions,  $\chi^2s < 0.70, ps > .706$ . Further, three indicators of effort were measured each week on scales from 1 (*no effort at all*) to 9 (*a great deal of effort*). The level of effort the students had put in last week's kind acts (average means between 3.4 and 4.5) and how hard they had tried to perform these acts (average means between 3.2 and 4.2) did not differ between conditions ( $ps > .176$ ). However, invested time to perform the kind acts was significantly lower for *weak social ties* compared to the other conditions at week 2, *kindness for strong social ties*  $M = 4.23, SD = 2.21$ ; *kindness for weak social ties*  $M = 3.17, SD = 1.70$ ; *kindness for unspecified receivers*  $M = 4.34, SD = 2.18$ ;  $F(2; 111) = 4.11, p = .021$ , and at week 3, *kindness for strong social ties*  $M = 3.93, SD = 2.09$ ; *kindness for weak social ties*  $M = 2.84, SD = 1.82$ ; *kindness for unspecified receivers*  $M = 4.00, SD = 2.02$ ;  $F(2; 80) = 3.17, p = .047$ , but not at week 1 and 4 ( $ps > .135$ ).

Paired t-tests were used to examine the change in all outcomes over time within each group. In addition, between-group efficacy was investigated with analyses of covariance (ANCOVA) controlling for baseline levels of each outcome measure and Bonferroni *post-hoc* tests. The relevant within and between-group effect sizes were reported in Cohen's  $d$  (Cohen, 1988), in which a correction was applied to take baseline differences between groups into account (Morris, 2008).

Additionally, simple mediation, multiple mediation, and moderator analyses were performed with Hayes's (2012) PROCESS Macro v3.1. First, it was tested whether the beneficial effect of prosocial behaviour (*kindness for strong social ties* = 1; *kindness for weak social ties* = 0) on mental wellbeing at posttest (T4) was mediated by positive emotions and self-esteem  $[(T1+T2+T3)/3]$ . Mental wellbeing at baseline (T0) was added as covariate in the model. In the results, the regression coefficients of the  $a$ -paths describe the effect of the intervention on the mediator. The  $b$ -paths show the effect of the mediator on mental wellbeing and the  $c$ -path reports the total effect of the intervention on mental wellbeing. The  $c'$ -path is the direct effect of the intervention on mental wellbeing, when controlled for the mediators. Calculation of the indirect effects ( $ab$ ) were bias-corrected (BC) with 95% confidence intervals (CI) based on 10,000 bootstrapped resamples. An indirect (or mediation) effect is found when the BC 95% CI's range does not contain zero.

Second, it was tested who benefited most from performing prosocial behaviour depending on the instructions given. The grand centred means of the potential moderators, self-esteem, and positive relations, at baseline and the condition strong versus weak social ties x moderator

interaction term were entered as predictors of the model. Mental wellbeing at baseline was also entered in the model. Interaction plots displayed the predictive effect of the condition at different levels of the moderator (1 SD below average, average, and 1 SD above average).

### 3. Results

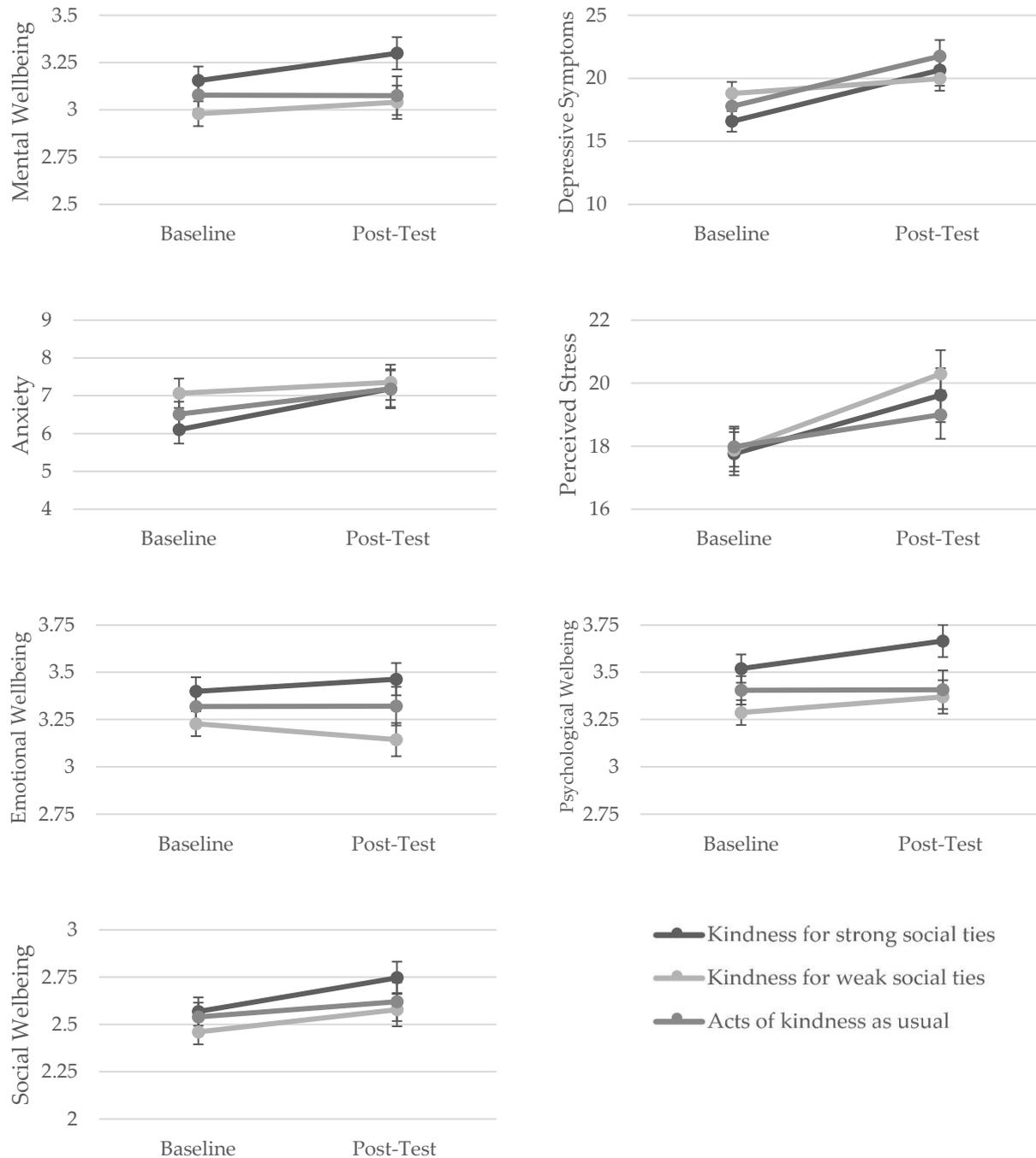
#### 3.1 Efficacy of performing kind acts

Table 2 shows that all three kindness conditions showed some significant changes over time, but most were not in the expected direction. Participants in the *kindness for strong social ties* condition reported significant improvements in mental wellbeing,  $t(75) = -2.07, p = .042, d = 0.26$ , but also increases in depressive symptoms,  $t(75) = -4.21, p = <.001, d = 0.47$ , anxiety,  $t(75) = -2.01, p = .048, d = 0.26$ , and perceived stress,  $t(75) = -2.73, p = .008, d = 0.38$ . In addition, *kindness for weak social ties* demonstrated an increase in perceived stress,  $t(75) = -4.01, p = <.001, d = 0.43$ , while *kindness for unspecified receivers* showed an increase in depressive symptoms,  $t(69) = -3.10, p = .003, d = 0.39$ . No significant changes were found for positive relations.

**Table 2. Means, standard deviations (SD) and within-group results (paired t-test) for each outcome per condition and time point**

	Kindness for strong social ties ( <i>n</i> = 76)			Kindness for weak social ties ( <i>n</i> = 76)			Kindness for unspecified receivers ( <i>n</i> = 70)		
	<i>M</i>	<i>SD</i>	<i>p</i>	<i>M</i>	<i>SD</i>	<i>p</i>	<i>M</i>	<i>SD</i>	<i>p</i>
<i>Mental wellbeing</i>									
Baseline	3.15	0.65		2.98	0.69		3.08	0.68	
Posttest	3.30	0.49	<b>.042</b>	3.04	0.60	.343	3.07	0.59	.973
<i>Emotional wellbeing</i>									
Baseline	3.40	0.82		3.23	0.88		3.32	0.89	
Posttest	3.46	0.57	.461	3.14	0.76	.350	3.32	0.76	.986
<i>Social wellbeing</i>									
Baseline	2.57	0.77		2.46	0.81		2.54	0.77	
Posttest	2.75	0.72	<b>.023</b>	2.58	0.66	.138	2.53	0.69	.898
<i>Psychological wellbeing</i>									
Baseline	3.52	0.76		3.29	0.75		3.40	0.75	
Posttest	3.67	0.55	.129	3.37	0.67	.296	3.41	0.61	.974
<i>Positive relations</i>									
Baseline	48.80	9.80		48.83	6.92		47.46	8.46	
Posttest	47.70	9.14	.201	48.44	6.62	.630	47.70	7.74	.800
<i>Depressive symptoms</i>									
Baseline	16.58	9.40		18.79	10.54		17.77	10.67	
Posttest	20.65	7.82	<b>&lt;.001</b>	19.97	7.71	.276	21.75	9.52	<b>.003</b>
<i>Anxiety</i>									
Baseline	6.11	4.56		7.07	4.92		6.51	5.01	
Posttest	7.19	3.55	<b>.048</b>	7.36	3.08	.573	7.19	4.01	.296
<i>Perceived stress</i>									
Baseline	17.76	5.61		17.88	5.99		17.99	6.33	
Posttest	19.62	4.13	<b>.008</b>	20.29	5.16	<b>&lt;.001</b>	19.00	5.31	.143

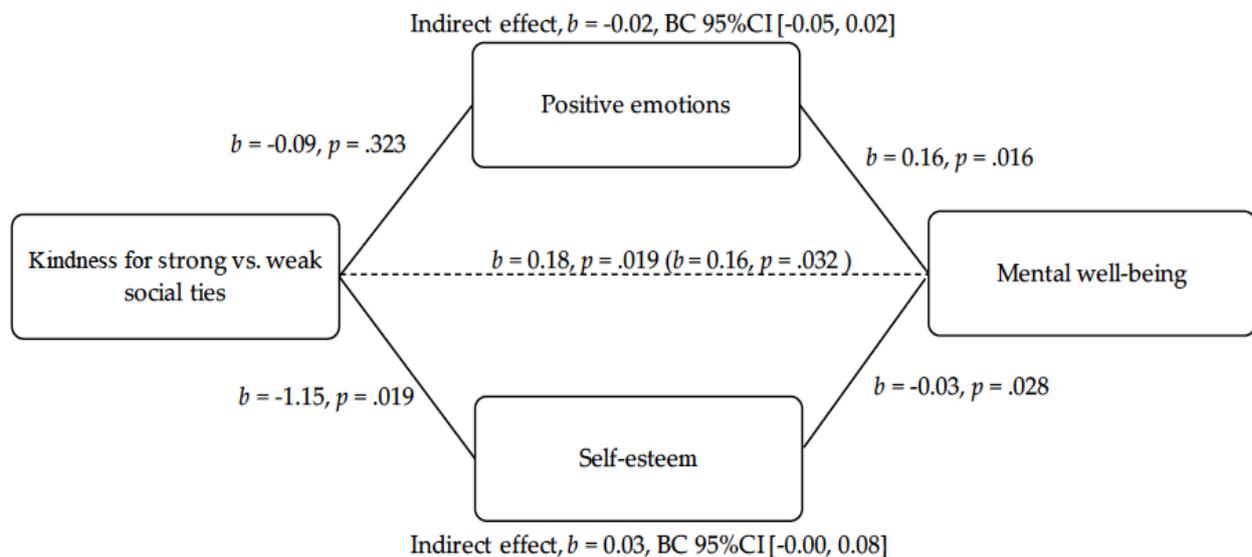
In addition, changes over time did not significantly differ between the three kindness conditions for depressive symptoms, anxiety, perceived stress, and positive relations ( $F < 0.02$ ,  $ps > .176$ ; see Figure 2). However, changes in mental wellbeing,  $F(2, 218) = 3.70$ ,  $p = .026$ —and in particular emotional wellbeing,  $F(2, 218) = 3.19$ ,  $p = .043$ , and psychological wellbeing,  $F(2, 218) = 3.82$ ,  $p = .023$ —significantly differed between the kindness conditions. Post-hoc tests revealed marginal improvements in mental wellbeing ( $p_{\text{strong vs. weak}} = .065$ ,  $d = 0.13$ ;  $p_{\text{strong vs. usual}} = .054$ ,  $d = 0.24$ ) and psychological wellbeing ( $p_{\text{strong vs. weak}} = .050$ ,  $d = 0.09$ ;  $p_{\text{strong vs. usual}} = .056$ ,  $d = 0.18$ ) in favor of *kindness for strong social ties*. Significant improvements were also found for emotional wellbeing ( $p_{\text{strong vs. weak}} = .037$ ,  $d = 0.18$ ), but only relative to weak social ties.



**Figure 2.** Main effects of performing kind acts on mental wellbeing, depressive symptoms, anxiety and perceived stress from baseline to 4-week posttest.

### Mediation and Moderation Analyses

The simple mediation model revealed that changes in self-esteem mediated the effects of kindness for strong social ties versus weak social ties on mental wellbeing,  $b = 0.04$ , BC 95%CI [0.00, 0.09]. During the intervention, levels of self-esteem reduced more in the *weak social ties* condition compared to the *strong social ties* condition (see Supplemental Table),  $F(2, 151) = 9.88$ ,  $p = .002$ . However, when positive emotion was added to the model, the mediating effect of self-esteem was attenuated,  $b = 0.03$ , BC 95%CI [-0.00, 0.08] (see Figure 3). There was no mediating effect of positive emotions in either the simple,  $b = -0.02$ , BC 95%CI [-0.06, 0.02], or the multiple,  $b = -0.02$ , BC 95%CI [-0.05, 0.02], mediation model. It is noteworthy that positive emotions were significantly reduced within the *kindness for weak social ties* condition up to posttest,  $t(75) = 2.73$ ,  $p = .008$  (see Supplemental Material), but not within the *kindness for strong social ties* condition.

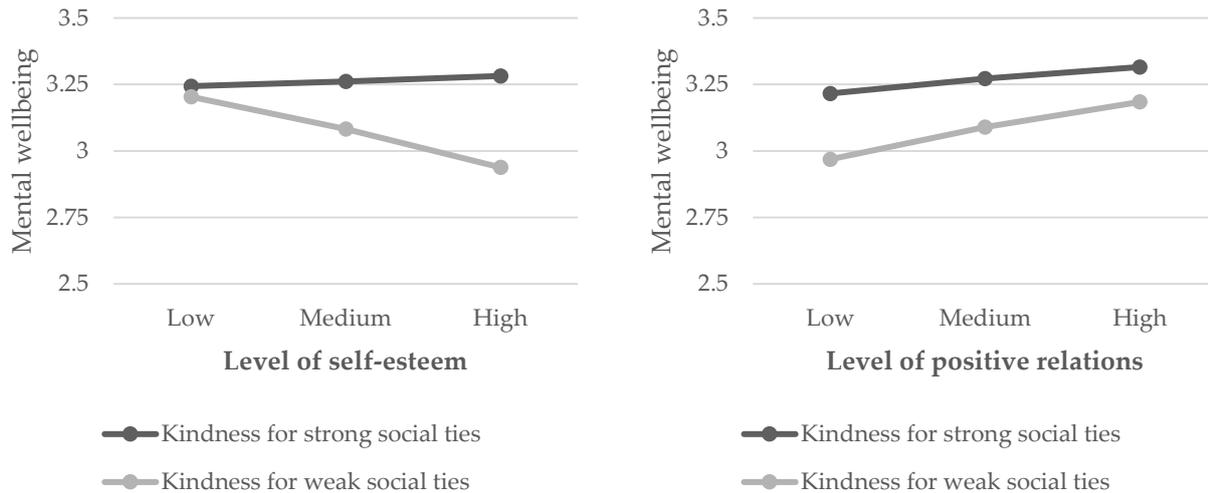


**Figure 3.** Multiple mediation for the relationship between performing kind acts for strong (1) versus weak social ties (0) on mental wellbeing at posttest, mediated by self-esteem and positive emotions as measured during the intervention. The effects are controlled for the outcome measures at baseline.

Additionally, the moderation analyses indicated that self-esteem at baseline moderated the effect of kindness on mental wellbeing,  $b = 0.03$ , BC 95%CI [0.00, 0.05],  $t = 2.12$ ,  $p = .036$ , but no moderation effect was found for positive relations,  $b = -0.01$ , BC 95%CI [-0.03, 0.01],  $t = -0.77$ ,  $p = .445$ . Figure 4 (below) shows that the effects of prosocial behaviour on mental wellbeing were reduced in the *weak social ties condition* when baseline levels of self-esteem were medium,  $b = 0.18$ , BC 95%CI [0.02, 0.31],  $t = 2.39$ ,  $p = .018$ , or high,  $b = 0.34$ , BC 95%CI [0.00, 0.13],  $t = 3.24$ ,  $p = .002$ , while the level of mental wellbeing did not seem to be influenced by the level of self-esteem at baseline in the *strong social ties condition*.

## 4. Discussion

This 3-armed randomized trial found that prosocial behaviour for strong social ties could boost mental wellbeing more than performing kind acts for weak social ties or unspecified social ties. A closer examination of the strong versus weak social tie conditions revealed that neither positive emotions nor self-esteem mediated the effects of kindness on mental wellbeing when both mediators were taken into account. Further, the intervention seemed to be least effective for



**Figure 4.** Moderation analyses showing the effects of self-esteem and positive relations at baseline on improving mental wellbeing at posttest via performing kind acts for strong or weak social ties.

esteem. An additional, noteworthy observation is the increase of psychological distress that was detected in the whole sample throughout the intervention, independent of the kindness condition. Based on these findings, the question arises whether acts-of-kindness interventions are a suitable method to improve students’ mental health and if so, how to integrate their practical implementation into a university context which is characterized by various stressors. Overall, the current study provides new evidence about the role of social ties in kindness interventions in several ways.

First, our study demonstrated a trend towards a larger increase in mental wellbeing in favour of kindness for strong social ties. This finding is in line with a recall prosocial spending experiment by Aknin et al. (2011), showing that strong social ties boost positive feelings more compared to weak social ties. Our study adds that not only emotional wellbeing but also psychological and multifaceted mental wellbeing were marginally more improved when performing acts-of-kindness towards strong social ties was compared to weak or unspecified ties. A possible explanation for these findings is that kindness might enhance wellbeing by promoting a more charitable perception of others and one’s own community, leading to a sense of cooperation and awareness of what is good in one’s life (Lyubomirsky et al., 2005). This effect might be more prominent if it relates to the person’s own social network rather than to weaker ties, in which feelings of community and connectedness to one’s own life have yet to develop. According to the Broaden-and-Build Theory (Fredrickson, 2001), the experience of love and connectedness within social bonds leads to the desire to further explore and strengthen these relationships, leading to building personal resources (Lyubomirsky et al., 2011). Being kind to strangers may entail a positive experience, but opportunities may be limited to build on those sole experiences to enhance wellbeing. Further, being kind might satisfy the human need for connectedness and lead to greater liking and peer-acceptance by others (Layous et al., 2012; Lyubomirsky et al., 2005). Strangers or weak social ties may not have the opportunity to reciprocate the kindness that was shown to them towards the initial performer. For example, Binfet and Whitehead (2019) demonstrated that adolescents used the kindness intervention to strengthen and invest in their pre-existing relationships instead of connecting with new people.

By contrast, two prior studies—in which participant instructions for performing kind acts aligned most strongly to ours—found no differences between weak and strong social ties (Alden & Trew, 2013; Rowland & Curry, 2019). One possibility for the contradictory findings is that

kindness to strong social ties might work differently for university students (Akkin et al., 2011) than for adults (Rowland & Curry, 2019), as the structure of the personal social network might change over time. Another explanation might be that participants in the kindness for strong social ties condition may have put in more effort in the intervention because increased motivation, effort and engagement can positively influence mental wellbeing (Lyubomirsky et al., 2011; Lyubomirsky & Layous, 2013; Sheldon et al., 2010). Although we found some indications that invested time played a role in the intervention effects, results indicated that only participants in the weak social ties condition had put in less time compared to the other conditions. Indicators of effort and engagement were, however, limited by high drop-out rates during the intervention. Taken together, kindness to strong social ties might act more self-serving to meet university students' social needs than being kind to weak social ties and enhances wellbeing more effectively by addressing the broadened effect of positive emotions.

Secondly, the findings of the mediation and moderation effects contribute to the literature examining how and for whom performing kind acts work best. Positive emotions and self-esteem were not significant mediator variables in the current study. This finding is in contrast with prior research (e.g., Datu et al., 2021; Duronto et al., 2005; Fu et al., 2017), of which the lack of effect of positive emotions was most surprising based on the abundant theoretical and empirical evidence demonstrating the benefits of positive emotions on mental wellbeing (e.g., Fredrickson, 2013; Nelson et al., 2016). A possible explanation for this contradictory finding might be that the current sample size was too small to detect mediation and moderation effects (Brown et al., 2012; Schoemann et al., 2017). The sample sizes at the time-points during the intervention focusing on the mediator outcomes were in particular low. More importantly, positive emotions and self-esteem decreased or stayed relatively the same during the intervention indicating that the intervention was not effective in helping students improving their levels of positive emotions and self-esteem in the first place. When no effect of the intervention on mediators occurs, it is also more difficult to detect a mediating effect, albeit not automatically excluded, making it legitimate to still test (Hayes, 2009). Finally, it might be that for self-esteem, a gender effect occurred. Our study consisted mainly of female students, and a prior one-year longitudinal study demonstrated that self-esteem did not affect job satisfaction among female employees. In contrast, it did have a positive mediating effect for male employees (Mäkikangas & Kinnunen, 2003).

In addition, the current study suggests that people with high or medium levels of self-esteem at baseline benefited less from performing kindness to weak social ties. It is tempting to conclude that people with low levels of self-esteem thus benefit more, but this hypothesis could not be confirmed in the current study. However, the findings indicate that it seems less effective to allocate people already high in self-esteem to a kindness intervention in which they have to focus on being kind to strangers. These people might already engage more in prosocial behaviour compared to people low in self-esteem (Marshall et al., 2014; Zuffianò et al., 2014) and could perhaps benefit more from other wellbeing interventions (Hendriks, Warren et al., 2019; van Agteren et al., 2021). Researchers should consider personal characteristics and preferences of participants when designing their study (Elwyn et al., 2012), as well as designing kindness intervention studies in which a greater variety of possible moderators are assessed in large samples.

Lastly, we found elevated levels of depressive symptoms, anxiety, and perceived stress in one or more of the kindness conditions. These elevated levels of psychological distress did not differ between groups, suggesting that all undergraduate students reported similar experiences during the intervention. However, no control condition was included, which makes it unclear whether the increase in psychological distress was either directly triggered by the intervention,

occurred in all students throughout the course of a semester, or was an interaction of the two. Assuming that the current findings pointed towards a causal link between the kindness intervention and heightened symptoms of depression, anxiety, and stress, this is largely in contrast with prior studies in which kindness reduced depressive symptoms (Chancellor et al., 2018; Mongrain et al., 2011), anxiety (Kerr et al., 2015; Trew & Alden, 2015), and perceived stress (Kerr et al., 2015) over time. However, some studies reported little to no effect of performing kindness on psychological distress; Mongrain et al. (2011) found decreased depressive symptoms within individuals who performed kind acts for others, but this decrease did not significantly differ compared to an early-memory control condition. Similarly, Kerr et al. (2015) found neither an effect of kindness on depression over time nor compared to a mood-tracking control condition, while the reduced effect on perceived stress was visible in both conditions.

The increase in psychological distress might be explained by the context in which the intervention was performed (Gruber et al., 2011; McNulty & Fincham, 2012). As the intervention was conducted over the course of a semester, the posttest date coincided with the midterm examination period, which is a well-known academic stressor that increases students' stress, depression and anxiety (Trueba et al., 2013). Van Zyl (2021) argued that study-related demands systematically increasing throughout the semester, starting low initially and systematically increases over time as work pressure, deadlines, study-life conflict, and study stress start to combine. This compounded experience of psychological distress peaks during the exam period (Landow, 2006). As such, the benefits of the acts-of-kindness intervention may therefore not be sufficient to completely counteract the adverse effects their educational program may have had on their mental health. On top of that, the additional intervention instructions—which might have felt as external pressure instead of being intrinsically motivated—could also have further added to the examination period's academic demands (Bergin & Pakenham, 2015; Deci & Ryan, 2000; Roddenberry & Renk, 2010). All of these arguments could also apply to the high drop-out rates during the study and thereby a lack of information about students' engagement in the kindness intervention.

These findings also raise the question if there is a time during the semester in which it is effortless and natural for students to engage in prosocial behaviour to reap the most benefits from kindness interventions. This is important because a prior study demonstrated that high-adherers profited the most from engaging in kind behaviour compared to low-adherers and non-adherers (Binfet & Whitehead, 2019). Previous studies have shown that individuals who go through acute phases of stress show increased interest in prosocial behaviour in a tend-and-befriend pattern (Tomova et al., 2017; von Dawans et al., 2019). However, the time leading up to the examination period is for most students likely characterized by an increased learning effort and, as a result, leads to a reduction in joyful and social activities. Furthermore, the instructions of the kindness intervention in the current study may have been confrontational because they made the students aware of how little time they spend with others which might have triggered feelings of social isolation (Bergin & Pakenham, 2015; Darling et al., 2007). Based on the Study-Demands-Resources Framework which views prosocial behaviour as a potential personal resource that can be used to cope with high study demands, it could be argued that engaging in prosocial behaviour should be cultivated as resource before entering phases of acute stress, so that the benefits of it are retrievable when needed (Lesener et al., 2020). Taken together, these findings highlight the importance of understanding the situational context in which university students may find themselves in and the importance of understanding how to optimize the implementation of effective kindness interventions not merely to increase wellbeing but also to alleviate distress. The findings also suggest that kindness interventions can only realize their full

potential when they are performed by intrinsically motivated students and who have sufficient time and personal engagement, rather than being performed half-heartedly and by students who are primarily extrinsically motivated as part of a study program.

#### 4.1 Limitations

Several potential limitations need to be acknowledged when interpreting these results. First, the current study did not include a neutral control group, limiting the interpretability of the pre-post effects in particular. Second, the use of a psychology student sample consisting of young and predominantly White female participants restricts the generalizability of the findings to the general or even student population. The current findings are potentially less generalizable to male university students, as previous studies have shown that prosocial behaviour during adolescents depends on gender and gender roles (Van der Graaff et al., 2018). In adulthood, some differences between gender remain; women tend to demonstrate higher rates of prosocial behaviour generally and have shown greater person-activity fit for positive interventions, including acts-of-kindness (Thompson et al., 2015). In addition, the current study, as well as positive psychology in general, have not yet been successful in examining the effect of kindness interventions in a non-WEIRD context (Hendriks, Schotanus-Dijkstra et al., 2019). Third, the significant drop-out rates during the intervention and at posttest, as well as at follow-up time points, represented a unique challenge. Although multiple imputations were used to align with the intention-to-treat principle and decrease chances for bias, the data quality may still have been impaired. Also, the follow-up data was not suitable, so no conclusions about the sustainability of effects can be drawn. Finally, we do not know how successful the performed kind acts were. If receivers do not acknowledge or do not respond positively to a kind act, the performer might feel worse or demotivated because they could not positively impact the recipient (Aknin et al., 2013; Wiwad & Aknin, 2017).

#### 4.2 Implications for Future Research

Future research should include a neutral control condition, larger and more heterogeneous samples recruited among different educational programs and from different cultures, and incentives to motivate participants to complete weekly diaries and surveys over a more extended period of time. To ensure higher rates of adherence, the intervention instructions could be tailored more personally to the participants needs and should be communicated in a more personal way than via texts by e-mail (e.g., using an instruction video or an interactive App; Kelders, 2019; Ludden et al., 2015). Other recommendations to increase adherence include building in more variety (e.g., vary the type of recipient, the number of acts to perform; Lyubomirsky & Layous, 2013) and a social component such as an (online) group discussion or involvement of role models who motivate the students (Morgenroth et al., 2015).

The findings indicate that the effects on mental wellbeing, as well as for whom kindness works least well, differs dependent on the social tie. Additional research is needed to further explore which facets of mental wellbeing are affected, which working mechanisms underlie this relation, and who benefits most from which type of kindness intervention. In addition, examination of the long-term effects of kindness interventions on the quantity and quality of person's social ties could be a fruitful field for prospective studies. It would be particularly interesting to use various constructs of connectedness to measure the characteristics and the changes in participants' social networks, as neither social wellbeing nor positive relationships were affected in the current study.

## 5. Conclusion

The current study results indicate that the act of kindness intervention directed at *strong social ties* can promote mental wellbeing more than kindness directed to *weak social ties* or the acts-of-kindness intervention as usual with *unspecified receivers*. The effect of kindness on mental wellbeing appears to be embedded in a complex relationship between the giver and the personal characteristics and circumstances of the receiver. Future research should identify different models of interaction between giver and receiver that influence the mechanisms of kindness. By understanding the various working mechanisms and beneficial and detrimental consequences of prosocial behaviour, kindness interventions could be personalized to maximize the benefits of kindness on mental health.

### Conflict of interest statement

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Data Availability Statement

Data is available upon request via the corresponding author.

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### Authors' Contributions

Schotanus-Dijkstra initiated the study. Schotanus-Dijkstra, Van Zyl and Radstaak were responsible for data collection. Wieners performed the statistical analyses and wrote the first draft of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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### References

Aknin, L. B., Dunn, E. W., Whillans, A. V., Grant, A. M., & Norton, M. I. (2013). Making a difference matters: Impact unlocks the emotional benefits of prosocial spending. *Journal of Economic Behavior & Organization*, 88(4), 90-95. <https://doi.org/https://doi.org/10.1016/j.jebo.2013.01.008>

- Aknin, L. B., Sandstrom, G. M., Dunn, E. W., & Norton, M. I. (2011). It's the recipient that counts: Spending money on strong social ties leads to greater happiness than spending on weak social ties. *PLoS One*, *6*(2), e17018.
- Alden, L. E., & Trew, J. L. (2013). If it makes you happy: Engaging in kind acts increases positive affect in socially anxious individuals. *Emotion*, *13*(1), 64-75.
- Algoe, S. B., Haidt, J., & Gable, S. L. (2008). Beyond reciprocity: Gratitude and relationships in everyday life. *Emotion*, *8*(3), 425-429. <https://doi.org/10.1037/1528-3542.8.3.425>
- Arnett, J. J. (2015). *Emerging adulthood: The winding road from the late teens through the twenties (Second edition)*. Oxford University Press.
- Auerbach, R. P., Alonso, J., Axinn, W. G., Cuijpers, P., Ebert, D. D., Green, J. G., Hwang, I., Kessler, R. C., Liu, H., & Mortier, P. (2016). Mental disorders among college students in the World Health Organization world mental health surveys. *Psychological Medicine*, *46*(14), 2955-2970.
- Bergin, A., & Pakenham, K. (2015). Law student stress: Relationships between academic demands, social isolation, career pressure, study/life imbalance and adjustment outcomes in law students. *Psychiatry, Psychology and Law*, *22*(3), 388-406. <https://doi.org/10.1080/13218719.2014.960026>
- Binfet, J.-T., & Whitehead, J. (2019). The effect of engagement in a kindness intervention on adolescents' well-being: A randomized controlled trial. *International Journal of Emotional Education*, *11*(2), 33-49.
- Blanco, C., Okuda, M., Wright, C., Hasin, D. S., Grant, B. F., Liu, S.-M., & Olfson, M. (2008). Mental health of college students and their non-college-attending peers: Results from the national epidemiologic study on alcohol and related conditions. *Archives of General Psychiatry*, *65*(12), 1429-1437.
- Brown, K. M., Hoyer, R., & Nicholson, M. (2012). Self-esteem, self-efficacy, and social connectedness as mediators of the relationship between volunteering and well-being. *Journal of Social Service Research*, *38*(4), 468-483.
- Buchanan, K. E., & Bardi, A. (2010). Acts of kindness and acts of novelty affect life satisfaction. *The Journal of Social Psychology*, *150*(3), 235-237.
- Chancellor, J., Margolis, S., Jacobs Bao, K., & Lyubomirsky, S. (2018). Everyday prosociality in the workplace: The reinforcing benefits of giving, getting, and glimpsing. *Emotion*, *18*(4), 507-517.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Erlbaum.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, *24*(4), 385-396.
- Cohen, S., Kessler, R. C., & Gordon, L. U. (1997). *Measuring stress: A guide for health and social scientists*. Oxford University Press on Demand.
- Curry, O. S., Rowland, L. A., Van Lissa, C. J., Zlotowitz, S., McAlaney, J., & Whitehouse, H. (2018). Happy to help? A systematic review and meta-analysis of the effects of performing acts of kindness on the well-being of the actor. *Journal of Experimental Social Psychology*, *76*(5), 320-329. <https://doi.org/10.1016/j.jesp.2018.02.014>
- Darling, C. A., McWey, L. M., Howard, S. N., & Olmstead, S. B. (2007). College student stress: The influence of interpersonal relationships on sense of coherence. *Stress and Health: Journal of the International Society for the Investigation of Stress*, *23*(4), 215-229.
- Datu, J. A. D., Wong, G. S. P., & Rubie-Davies, C. (2021). Can kindness promote media literacy skills, self-esteem, and social self-efficacy among selected female secondary school students? An intervention study. *Computers & Education*, *16*(2), e104062.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, *11*(4), 227-268.
- Dovidio, J. F., Piliavin, J. A., Schroeder, D. A., & Penner, L. A. (2017). *The social psychology of prosocial behavior*. Psychology Press.
- Duronto, P. M., Nishida, T., & Nakayama, S.-i. (2005). Uncertainty, anxiety, and avoidance in communication with strangers. *International Journal of Intercultural Relations*, *29*(5), 549-560.
- Ebert, D. D., Van Daele, T., Nordgreen, T., Karekla, M., Compare, A., Zarbo, C., Brugnera, A., Øverland, S., Trebbi, G., & Jensen, K. L. (2018). Internet- and mobile-based psychological interventions: applications, efficacy, and potential for improving mental health. *European Psychologist*, *23*(2), 167-187.

- Elwyn, G., Frosch, D., Thomson, R., Joseph-Williams, N., Lloyd, A., Kinnersley, P., Cording, E., Tomson, D., Dodd, C., & Rollnick, S. (2012). Shared decision making: a model for clinical practice. *Journal of General Internal Medicine*, 27(10), 1361-1367.
- Franck, E., De Raedt, R., Barbez, C., & Rosseel, Y. (2008). Psychometric properties of the Dutch Rosenberg self-esteem scale. *Psychologica Belgica*, 48(1), 25-35.
- Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *The American Psychologist*, 56(3), 218-226.  
<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3122271/>
- Fredrickson, B. L. (2013). Positive emotions broaden and build. In E. A. Plant & P. G. Devine (Eds.), *Advances on experimental social psychology* (Vol. 47, pp. 1-53). Academic Press.
- Fu, X., Padilla-Walker, L. M., & Brown, M. N. (2017). Longitudinal relations between adolescents' self-esteem and prosocial behavior toward strangers, friends and family. *Journal of Adolescence*, 57(4), 90-98.
- Galanakis, M., Stalikas, A., Pezirkianidis, C., & Karakasidou, I. (2016). Reliability and validity of the modified differential emotions scale (mDES) in a Greek sample. *Psychology*, 7(1), 101-113.
- Gilbert, E., & Karahalios, K. (2009). Predicting tie strength with social media. In *Proceedings of the SIGCHI conference on human factors in computing systems* (pp. 211-220), ACM, New York.
- Goette, L., Huffman, D., & Meier, S. (2012). The impact of social ties on group interactions: Evidence from minimal groups and randomly assigned real groups. *American Economic Journal: Microeconomics*, 4(1), 101-115.
- Grant, A. M., & Berry, J. W. (2011). The necessity of others is the mother of invention: Intrinsic and prosocial motivations, perspective taking, and creativity. *Academy of Management Journal*, 54(1), 73-96.
- Grant, A. M., & Sonnentag, S. (2010). Doing good buffers against feeling bad: Prosocial impact compensates for negative task and self-evaluations. *Organizational Behavior and Human Decision Processes*, 111(1), 13-22.
- Gray, K., Ward, A. F., & Norton, M. I. (2014). Paying it forward: Generalized reciprocity and the limits of generosity. *Journal of Experimental Psychology: General*, 143(1), 247-254.
- Gruber, J., Mauss, I. B., & Tamir, M. (2011). A dark side of happiness? How, when, and why happiness is not always good. *Perspectives on Psychological Science*, 6(3), 222-233.
- Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. *Communication Monographs*, 76(4), 408-420.
- Hayes, A. F. (2012). *PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling*. Retrieved September 18, 2015, from <http://www.afhayes.com/public/process2012.pdf>
- Hendriks, T., Schotanus-Dijkstra, M., Hassankhan, A., de Jong, J., & Bohlmeijer, E. (2019). The efficacy of multi-component positive psychology interventions: A systematic review and meta-analysis of randomized controlled trials. *Journal of Happiness Studies*, 21(2), 357-390.  
<https://doi.org/10.1007/s10902-019-00082-1>
- Hendriks, T., Warren, M. A., Schotanus-Dijkstra, M., Hassankhan, A., Graafsma, T., Bohlmeijer, E., & de Jong, J. (2019). How WEIRD are positive psychology interventions? A bibliometric analysis of randomized controlled trials on the science of well-being. *The Journal of Positive Psychology*, 14(4), 489-501.
- Hui, B. P., Ng, J. C., Berzaghi, E., Cunningham-Amos, L. A., & Kogan, A. (2020). Rewards of kindness? A meta-analysis of the link between prosociality and well-being. *Psychological Bulletin*, 146(12), 1084-1116.
- Hurling, R., Linley, P. A., Dovey, H., Maltby, J., & Wilkinson, J. (2015). Everyday happiness: Gifting and eating as everyday activities that influence general positive affect and discrete positive emotions. *International Journal of Wellbeing*, 5(2), 28-44.
- Iasiello, M., van Agteren, J., Keyes, C. L. M., & Cochrane, E. M. (2019). Positive mental health as a predictor of recovery from mental illness. *Journal of Affective Disorders*, 251(5), 227-230.  
<https://doi.org/10.1016/j.jad.2019.03.065>

- Kashdan, T. B., Farmer, A. S., Adams, L. M., Ferssizidis, P., McKnight, P. E., & Nezlek, J. B. (2013). Distinguishing healthy adults from people with social anxiety disorder: Evidence for the value of experiential avoidance and positive emotions in everyday social interactions. *Journal of Abnormal Psychology, 122*(3), 645-655. <https://doi.org/10.1037/a0032733>
- Katrevich, A. V., & Aruguete, M. S. (2017). Recognizing challenges and predicting success in first-generation university students. *Journal of STEM Education: Innovations and Research, 18*(2), 40-44.
- Kelders, S. M. (2019). Design for engagement of online positive psychology interventions. In L. E. Van Zyl & S. Rothmann (Eds.). *Positive psychological intervention design and protocols for multi-cultural contexts* (pp. 297-313). Springer International Publishing.
- Kerr, S. L., O'Donovan, A., & Pepping, C. A. (2015). Can gratitude and kindness interventions enhance well-being in a clinical sample? *Journal of Happiness Studies, 16*(1), 17-36.
- Kessler, R. C., Angermeyer, M., Anthony, J. C., De Graaf, R. O. N., Demyttenaere, K., Gasquet, I., De Girolamo, G., Gluzman, S., Gureje, O. Y. E., Haro, J. M., Kawakami, N., Karam, A., Levinson, D., Medina Mora, M. E., Oakley Browne, M. A., Posada-Villa, J., Stein, D. J., Adley Tsang, C. H., Aguilar-Gaxiola, S., ... & on behalf of For the WHO World Mental Health Survey Consortium (2007). Lifetime prevalence and age-of-onset distributions of mental disorders in the World Health Organization's World Mental Health Survey Initiative. *World Psychiatry, 6*(3), 168-176. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2174588/>
- Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior, 43*(2), 207-222.
- Keyes, C. L., Wissing, M., Potgieter, J. P., Temane, M., Kruger, A., & van Rooy, S. (2008). Evaluation of the mental health continuum-short form (MHC-SF) in Setswana-speaking South Africans. *Clinical Psychology and Psychotherapy, 15*(3), 181-192. <https://doi.org/10.1002/cpp.572>
- Keyes, C. L. M., Dhingra, S. S., & Simoes, E. J. (2010). Change in level of positive mental health as a predictor of future risk of mental illness. *American Journal of Public Health, 100*(12), 2366-2371. <https://doi.org/10.2105/AJPH.2010.192245>
- Klimecki, O. M., Leiberg, S., Lamm, C., & Singer, T. (2013). Functional neural plasticity and associated changes in positive affect after compassion training. *Cerebral Cortex, 23*(7), 1552-1561.
- Lamers, S. M. A., Westerhof, G. J., Bohlmeijer, E. T., ten Klooster, P. M., & Keyes, C. L. M. (2011). Evaluating the psychometric properties of the Mental Health Continuum-Short Form (MHC-SF). *Journal of Clinical Psychology, 67*(1), 99-110. <https://doi.org/10.1002/jclp.20741>
- Landow, M. V. (2006). *Stress and mental health of college students*. Nova Publishers.
- Layous, K., Nelson, S. K., Oberle, E., Schonert-Reichl, K. A., & Lyubomirsky, S. (2012). Kindness counts: Prompting prosocial behavior in preadolescents boosts peer acceptance and well-being. *PLoS One, 7*(12), e51380.
- Lesener, T., Pleiss, L. S., Gusy, B., & Wolter, C. (2020). The study demands-resources framework: An empirical introduction. *International Journal of Environmental Research and Public Health, 17*(14), 5183.
- Lipson, S. K., Lattie, E. G., & Eisenberg, D. (2019). Increased rates of mental health service utilization by US college students: 10-year population-level trends (2007–2017). *Psychiatric Services, 70*(1), 60-63.
- Löwe, B., Decker, O., Müller, S., Brähler, E., Schellberg, D., Herzog, W., & Herzberg, P. Y. (2008). Validation and standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the general population. *Medical Care, 46*(3), 266-274.
- Ludden, G. D., Van Rompay, T. J., Kelders, S. M., & van Gemert-Pijnen, J. E. (2015). How to increase reach and adherence of web-based interventions: a design research viewpoint. *Journal of Medical Internet Research, 17*(7), e172.
- Lyubomirsky, S., Dickerhoof, R., Boehm, J. K., & Sheldon, K. M. (2011). Becoming happier takes both a will and a proper way: an experimental longitudinal intervention to boost well-being. *Emotion, 11*(2), 391-402. <https://doi.org/10.1037/a0022575>
- Lyubomirsky, S., & Layous, K. (2013). How do simple positive activities increase well-being? *Current Directions in Psychological Science, 22*(1), 57-62. <https://doi.org/10.1177/0963721412469809>

- Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology, 9*(2), 111-131. <https://doi.org/10.1037/1089-2680.9.2.111>
- Mäkikangas, A., & Kinnunen, U. (2003). Psychosocial work stressors and well-being: Self-esteem and optimism as moderators in a one-year longitudinal sample. *Personality and Individual Differences, 35*(3), 537-557.
- Marshall, S. L., Parker, P. D., Ciarrochi, J., & Heaven, P. C. (2014). Is self-esteem a cause or consequence of social support? A 4-year longitudinal study. *Child Development, 85*(3), 1275-1291.
- Mayer, F. B., Santos, I. S., Silveira, P. S., Lopes, M. H. I., de Souza, A. R. N. D., Campos, E. P., de Abreu, B. A. L., Hoffman II, I., Magalhães, C. R., & Lima, M. C. P. (2016). Factors associated to depression and anxiety in medical students: a multicenter study. *BMC Medical Education, 16*(1), 1-9.
- McNulty, J. K., & Fincham, F. D. (2012). Beyond positive psychology? Toward a contextual view of psychological processes and well-being. *American Psychologist, 67*(2), 101-110.
- Moher, D., Hopewell, S., Schulz, K. F., Montori, V., Gotzsche, P. C., Devereaux, P. J., Elbourne, D., Egger, M., & Altman, D. G. (2010). CONSORT 2010 explanation and elaboration: Updated guidelines for reporting parallel group randomised trials. *BMJ, 340*, c869. <https://doi.org/10.1136/bmj.c869>
- Mongrain, M., Chin, J. M., & Shapira, L. B. (2011). Practicing compassion increases happiness and self-esteem. *Journal of Happiness Studies, 12*(6), 963-981.
- Morgenroth, T., Ryan, M. K., & Peters, K. (2015). The motivational theory of role modeling: How role models influence role aspirants' goals. *Review of General Psychology, 19*(4), 465-483.
- Morris, S. B. (2008). Estimating effect sizes from pretest-posttest-control group designs. *Organizational Research Methods, 11*(2), 364-386.
- Nelson, S. K., Bohlmeijer, E., & Schotanus-Dijkstra, M. (2021). Other-focused kindness versus self-focused kindness among those at risk for mental disorders: Results of a randomized controlled trial [Manuscript accepted for publication]. *Frontiers in Psychology, section Positive Psychology*.
- Nelson, S. K., Della Porta, M. D., Jacobs Bao, K., Lee, H. C., Choi, I., & Lyubomirsky, S. (2015). 'It's up to you': Experimentally manipulated autonomy support for prosocial behavior improves well-being in two cultures over six weeks. *Journal of Positive Psychology, 10*(5), 463-476. <https://doi.org/10.1080/17439760.2014.983959>
- Nelson, S. K., Layous, K., Cole, S. W., & Lyubomirsky, S. (2016). Do unto others or treat yourself? The effects of prosocial and self-focused behavior on psychological flourishing. *Emotion, 16*(6), 850-861. <https://doi.org/10.1037/emo0000178>
- O'Connell, B. H., O'Shea, D., & Gallagher, S. (2016). Enhancing social relationships through positive psychology activities: A randomised controlled trial. *The Journal of Positive Psychology, 11*(2), 149-162.
- Ouweneel, E., Blanc, P., & Schaufeli, W. (2014). On being grateful and kind: results of two randomized controlled trials on study-related emotions and academic engagement. *The Journal of Psychology, 148*(1), 37-60.
- Petersen, M. B. (2012). Social welfare as small-scale help: evolutionary psychology and the deservingness heuristic. *American Journal of Political Science, 56*(1), 1-16.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*(3), 385-401.
- Roddenberry, A., & Renk, K. (2010). Locus of control and self-efficacy: Potential mediators of stress, illness, and utilization of health services in college students. *Child Psychiatry & Human Development, 41*(4), 353-370. <https://doi.org/10.1007/s10578-010-0173-6>
- Rosenberg, M. (1965). Rosenberg self-esteem scale (RSE). *Acceptance and Commitment Therapy. Measures Package, 61*(52), 18-19.
- Rowland, L., & Curry, O. S. (2019). A range of kindness activities boost happiness. *The Journal of Social Psychology, 159*(3), 340-343. <https://doi.org/10.1080/00224545.2018.1469461>
- Russell, G., & Shaw, S. (2009). A study to investigate the prevalence of social anxiety in a sample of higher education students in the United Kingdom. *Journal of Mental Health, 18*(3), 198-206.
- Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology, 57*(6), 1069.

- Schaefer, A., Nils, F., Sanchez, X., & Philippot, P. (2010). Assessing the effectiveness of a large database of emotion-eliciting films: A new tool for emotion researchers. *Cognition and Emotion*, 24(7), 1153-1172.
- Schoemann, A. M., Boulton, A. J., & Short, S. D. (2017). Determining power and sample size for simple and complex mediation models. *Social Psychological and Personality Science*, 8(4), 379-386.
- Schotanus-Dijkstra, M., Keyes, C. L. M., de Graaf, R., & Ten Have, M. (2019). Recovery from mood and anxiety disorders: The influence of positive mental health. *Journal of Affective Disorders*, 252(6), 107-113. <https://doi.org/10.1016/j.jad.2019.04.051>
- Schotanus-Dijkstra, M., Pieterse, M. E., Drossaert, C. H. C., Westerhof, G. J., de Graaf, R., ten Have, M., Walburg, J. A., & Bohlmeijer, E. T. (2016). What factors are associated with flourishing? Results from a large representative national sample. *Journal of Happiness Studies*, 17(4), 1351-1370. <https://doi.org/10.1007/s10902-015-9647-3>
- Schotanus-Dijkstra, M., ten Have, M., Lamers, S., de Graaf, R., & Bohlmeijer, E. T. (2017). The longitudinal relationship between flourishing mental health and incident mood, anxiety and substance use disorders. *European Journal of Public Health*, 27(3), 563-568.
- Senf, K., & Liau, A. K. (2013). The effects of positive interventions on happiness and depressive symptoms, with an examination of personality as a moderator. *Journal of Happiness Studies*, 14(2), 591-612.
- Sheldon, K. M., Abad, N., Ferguson, Y., Gunz, A., Houser-Marko, L., Nichols, C. P., & Lyubomirsky, S. (2010). Persistent pursuit of need-satisfying goals leads to increased happiness: A 6-month experimental longitudinal study. *Motivation and Emotion*, 34(1), 39-48. <https://doi.org/10.1007/s11031-009-9153-1>
- Shiraki, Y., & Igarashi, T. (2018). "Paying it forward" via satisfying a basic human need: The need for relatedness satisfaction mediates gratitude and prosocial behavior. *Asian Journal of Social Psychology*, 21(1-2), 107-113.
- Smarr, K. L., & Keefer, A. L. (2011). Measures of depression and depressive symptoms: Beck Depression Inventory-II (BDI-II), Center for Epidemiologic Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire-9 (PHQ-9). *Arthritis Care & Research*, 63(S11), S454-S466.
- Spitzer, R. L., Kroenke, K., Williams, J. B., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, 166(10), 1092-1097.
- Taylor, K. B., & Baxter Magolda, M. B. (2015). Building educators' capacities to meet twenty-first century demands. *About Campus*, 20(4), 16-25.
- Thompson, R. B., Peura, C., & Gayton, W. F. (2015). Gender differences in the person-activity fit for positive psychology interventions. *The Journal of Positive Psychology*, 10(2), 179-183.
- Tomova, L., Majdandžić, J., Hummer, A., Windischberger, C., Heinrichs, M., & Lamm, C. (2017). Increased neural responses to empathy for pain might explain how acute stress increases prosociality. *Social Cognitive and Affective Neuroscience*, 12(3), 401-408.
- Trew, J. L., & Alden, L. E. (2015). Kindness reduces avoidance goals in socially anxious individuals. *Motivation and Emotion*, 39(6), 892-907.
- Trueba, A. F., Smith, N. B., Auchus, R. J., & Ritz, T. (2013). Academic exam stress and depressive mood are associated with reductions in exhaled nitric oxide in healthy individuals. *Biological Psychology*, 93(1), 206-212.
- van Agteren, J., Iasiello, M., Lo, L., Bartholomaeus, J., Kopsaftis, Z., Carey, M., & Kyrios, M. (2021). A systematic review and meta-analysis of psychological interventions to improve mental wellbeing. *Nature Human Behaviour*, 5(4), 631-652. <https://doi.org/10.1038/s41562-021-01093-w>
- van Buuren, S. (2007). Multiple imputation of discrete and continuous data by fully conditional specification. *Statistical Methods in Medical Research*, 16(3), 219-242. <https://doi.org/10.1177/0962280206074463>
- Van der Graaff, J., Carlo, G., Crocetti, E., Koot, H. M., & Branje, S. (2018). Prosocial behavior in adolescence: gender differences in development and links with empathy. *Journal of Youth and Adolescence*, 47(5), 1086-1099.

- van Dierendonck, D. (2004). The construct validity of Ryff's scales of psychological well-being and its extension with spiritual well-being. *Personality and Individual Differences*, 36(3), 629-643.
- van Zyl, L. E. (2021). Social resources and social wellbeing before and during the Covid-19 lockdown: A piecewise latent growth modelling approach. *Social Indicators Research*. Advance online publication. <https://doi.org/10.1007/s11205-021-02654-2>
- Van Zyl, L. E., Efendic, E., Rothmann, S., & Shankland, R. (2019). Best-practice guidelines for positive psychological intervention research design. In L. E. Van Zyl & S. Rothmann (Eds.). *Positive psychological intervention design and protocols for multi-cultural contexts* (pp. 1-32). Springer International Publishing.
- Van Zyl, L. E., & Rothmann, S. (2019). *Positive psychological intervention design and protocols for multi-cultural contexts*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-20020-6>
- van Zyl, L. E., Rothmann, S., & Zondervan-Zwijnenburg, M. A. (2021). Longitudinal trajectories of study characteristics and mental health before and during the COVID-19 lockdown. *Frontiers in Psychology*, 12(349), <https://doi.org/10.3389/fpsyg.2021.633533>
- von Dawans, B., Ditzen, B., Trueg, A., Fischbacher, U., & Heinrichs, M. (2019). Effects of acute stress on social behavior in women. *Psychoneuroendocrinology*, 99(1), 137-144.
- Waldinger, R. J., & Schulz, M. S. (2016). The long reach of nurturing family environments: Links with midlife emotion-regulatory styles and late-life security in intimate relationships. *Psychological Science*, 27(11), 1443-1450.
- Westerhof, G. J., & Keyes, C. L. (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of Adult Development*, 17(2), 110-119. <https://doi.org/10.1007/s10804-009-9082-y>
- Wiwad, D., & Akinin, L. B. (2017). Motives matter: The emotional consequences of recalled self-and other-focused prosocial acts. *Motivation and Emotion*, 41(6), 730-740.
- Zuffianò, A., Alessandri, G., Luengo Kanacri, B. P., Pastorelli, C., Milioni, M., Ceravolo, R., Caprara, M. G., & Caprara, G. V. (2014). The relation between prosociality and self-esteem from middle-adolescence to young adulthood. *Personality and Individual Differences*, 63, 24-29. <https://doi.org/https://doi.org/10.1016/j.paid.2014.01.041>