The Role of Meaning Perception for Informal Caregivers' Happiness

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Abstract

Providing informal care for a close other is related to decreased well-being. However, it potentially also elicits meaningful experiences that may increase happiness directly or buffer against the negative impact of a caregiver's burden. This study is the first to test the causal link between perceived meaning in informal caregiving and happiness of informal caregivers in a self-administered, 2-week online intervention. Adult informal caregivers ($N = 375$, 78.9% female) were randomly assigned to a meaning intervention, where they remembered a daily meaningful caregiving experience, a placebo group that objectively described caregiving tasks, or a control group without intervention. Happiness was measured before, directly after, and 1 and 3 months later. Meaning in informal caregiving correlated positively with happiness but the intervention did not significantly enhance the perception of meaning in caregiving or happiness. Over time, meaning in caregiving positively predicted meaning in life, which in turn positively predicted happiness. The findings imply that even in situations that are also experienced as burdensome, people can perceive meaning and the association between meaning and happiness persists. Features of the intervention or sample, or partly negative affective responses may explain why the intervention did not show the expected effects.

Keywords: Happiness; informal caregiving; randomized clinical trial (RCT); positive psychology; meaning in life

The Role of Meaning Perception for Informal Caregivers' Happiness

Across the globe, healthcare systems depend on informal caregivers; people who provide unpaid care for a close other (e.g., relative, partner, friend, neighbor) with psychological or physical health issues, a disability or because of old age. In the Netherlands, roughly two million people provide this support for at least 3 months or for 8 hours or more per week (14.2% of the population; Centraal Bureau voor de Statistiek [Netherlands Statistics], 2017). Patients receive more hours of informal than formal care, making informal caregivers economically indispensable.

Due to an increasing life expectancy, pressure on informal caregivers is expected to rise in the near future (Colombo Llena-Nozal, Mercier, & Tjadens, 2011). This is an alarming trend because informal caregivers have worse physical health (Vitaliano, Zhang, & Scanlan, 2003), are more often depressed, and at higher risk for psychological disorders than comparable controls (Russo, Vitaliano, Brewer, Katon, & Becker, 1995). In general, happiness decreases with hours of informal caregiving (de Boer & van Campen, 2007; Sociaal en Cultureel Planbureau [The Netherlands Institute for Social Research], 2016) and informal caregivers are on average slightly but significantly less happy than matched non-caregivers (Verbakel, 2014). Unfortunately, existing support programs to help informal caregivers cope with their situation fail to significantly enhance happiness (Verbakel, 2014). Therefore, this research investigated determinants of happiness among informal caregivers and tested the effects of an intervention to alleviate the negative impact of informal caregiving on happiness by stimulating positive experiences.

Theory on the Negative Impact of Informal Caregiving

Theoretical models that describe the negative effects of informal caregiving on well-being outcomes have been tested widely. These informal caregiver well-being models describe a pathway from primary situational stressors to well-being outcomes via *primary*

appraisal and, in turn, *secondary appraisal.* The primary appraisal refers to the hours of informal care and the secondary appraisal refers to the subjective caregiver burden, that is, the personal evaluation of the caregiving situation (Lawton, Moss, Kleban, Glicksman, & Rovine, 1991; Verbakel, Metzelthin, & Kempen, 2016; Yates, Tennstedt, & Chang, 1999). Typically, within the informal caregiver well-being models, researchers have identified negative predictors of well-being such as personal problems and financial strain and focused on negative outcomes, like depression (e.g., Fauth et al., 2012; Pinquart & Sörensen, 2004; Van der Lee, Bakker, Duivenvoorden, & Dröes, 2014)).

The Relationship between Meaning and Happiness of Informal Caregivers

Although the focus on the burden that informal caregiving entails is understandable, current research fails to consider the positive experiences of informal caregivers (see, e.g., Kruithof, Visser-Meily, & Post, 2012; Verbakel et al., 2016). For example, positive experiences of informal caregiving include companionship and rewarding feelings (Cohen, Colantonio, & Vernich, 2002). A recent model by Carbonneau, Caron, and Desrosiers (2010) focused on positive aspects of caregiving, and proposed that meaning of the caregiver role in daily life determines caregivers' happiness. Specifically, the concept "meaning" constitutes the feeling to be significant and part of something larger (Seligman, Parks, & Steen, 2012), and the experience of pursuing valuable goals (Wrosch, Scheier, Miller, Schulz, & Carver, 2003). It can be experienced in life as a whole and in specific life-domains (Seligman, 2011).

The suggestion that meaning of the informal caregiver role positively predicts happiness is in line with findings about meaning in life. Experiencing meaning in life is not equivalent to happiness (or to eudaimonic well-being) but has been shown to contribute to happiness by satisfaction of people's need for purpose in life. Thereby, it is one of the five routes to happiness as identified by Seligman's (2011) Well-Being Theory. The other four routes are positive emotions, engagement, positive relationships and accomplishment.

Additionally, compared to hedonic experiences, experiencing meaning in life contributes to a more durable form of happiness by helping to achieve self-actualization (Deci & Ryan, 2008; Park, Peterson, & Ruch, 2009; Ryan & Deci, 2001).

Meaning in caregiving is less general than meaning in life, but diverse lines of research tentatively showed a positive relationship between meaning in specific life domains and well-being outcomes (other than happiness). In a longitudinal study with a community sample, perceptions associated with helping, including a sense of meaning, predicted decreased depressive symptoms (Taylor & Turner, 2001). Additionally, clinical studies have identified the process of making meaning of adverse life events as an effective coping strategy, measuring mostly situation-specific coping outcomes like acceptance of the event (Park, 2010; Park & George, 2013). Furthermore, industrial psychology research indicated that informal caregiving should be more satisfactory to the extent that people experience task significance (Fried & Ferris, 1987; Hackman & Oldham, 1976). The most direct evidence comes from an experiment where meaning in participants' careers was manipulated. More meaning in work, referred to as "calling", increased meaning in life and decreased depressive symptoms, especially for those who were searching meaning in life (Steger & Dik, 2009). Providing informal care thus is a potential source of meaning, and individual differences in perceived meaning in informal caregiving might explain variations in happiness as well.

As yet, it remains unclear how exactly meaning experiences of informal caregivers relate to happiness and two possibilities can be deduced from existing theory. A first possible relationship is a direct association, in which perceived meaning in informal caregiving relates positively to happiness. Notwithstanding the subjective caregiver burden, higher perceived meaning in informal caregiving may be associated with higher levels of happiness because this is an important part of a caregiver's life, and perceiving meaning in life contributes directly to happiness (Seligman, 2011). The second possibility is a buffer effect; perceived

meaning in informal caregiving compensates for the negative impact of caregiver burden on happiness. Caregiver well-being models usually mark positive caregiver experiences as a moderating variable, decreasing burden effects on well-being outcomes (Carbonneau et al., 2010; Pearlin, Mullan, Semple, & Skaff, 1990; Verbakel et al., 2016). This moderating effect has been shown for social support (Verbakel et al., 2016) and self-esteem derived from caregiving (Kruithof, Visser-Meily, & Post, 2012). In this case, meaning would not necessarily have a direct relationship with happiness, but would interact with the impact of burden. Hence, the more meaning caregivers perceive, the weaker the negative relationship between subjective caregiver burden and happiness.

Supporting Informal Caregivers through Meaning Making

Positive psychology research suggests that training perceived meaning may be an effective way to increase happiness. A well-validated and frequently used happiness intervention is the three-good-things intervention, in which participants are asked to reflect on three positive experiences of that day (e.g., Seligman, Steen, Park, & Peterson, 2005). In a modification of the three-good-things intervention, participants were asked to write down meaningful experiences each day for a week. This "meaningful-things intervention" increased happiness in the 2 weeks afterwards compared to a placebo and passive control condition (Giannopoulos & Vella-Brodrick, 2011). Gander, Proyer, and Ruch (2016) extended these findings and showed a significant effect on happiness that lasted up to the last measurement at 3 months after the intervention.

A driving mechanism of the three-good-things intervention is positive reappraisal of the situation (Gander, Proyer, & Ruch, 2017; Quoidbach, Mikolajczak, & Gross, 2015), and two reasons indicate that meaning in informal caregiving forms a promising target evaluation for reappraisal. Firstly, appraisals of the caregiving situation (i.e., secondary appraisals) have been shown to determine happiness of informal caregivers (Verbakel, 2016). Secondly, the

work of informal caregivers is demonstrably meaningful, implying that it can unquestionably

be interpreted positively. Thus, a reappraisal intervention targeting meaning in caregiving

may be an easy and cost-effective method to enhance happiness of informal caregivers.

The Present Study

The purpose of the current study was two-fold. First, the role of meaning in informal

caregiving for informal caregivers' happiness was examined. Thereby, it was tested whether

this relation is compatible with the moderating role of positive caregiving experiences in

caregiver literature, or with a direct influence, as posited in happiness theories. This led to the

first research question (RQ):

RQ1. How does perceived meaning in the caregiver role relate to happiness of

informal caregivers? We aimed to distinguish between two alternative hypotheses:

Hypothesis 1a is a direct positive association (e.g., Park et al., 2009; Seligman, 2011),

and Hypothesis 1b is the buffer effect of the negative impact of subjective burden (e.g.,

Verbakel et al., 2016), as described above.[1]

Second, we conducted a meaningful-things intervention to investigate the causal

relationship between meaning in informal caregiving and happiness. With this randomized,

placebo-controlled intervention, we aimed to extend conclusions about effectiveness of a

popular positive psychology intervention to a sample that could potentially benefit greatly

from it (Bolier et al., 2013). The intervention effects on happiness were assessed in a mixed

design of three intervention conditions (meaning, placebo, and control; between-subject) and

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[1] We preregistered a third option, which is left out because it was found to be redundant for

the question at hand; it repeated Hypothesis 1a (direct relation) and added a hypothesis for the

direct negative relation of burden with happiness, but investigating burden is not the focus

point of this question.

four time points (pre-intervention, post-intervention, 1-month and 3-month follow-up; within-subject). We investigated the following questions and hypotheses:

RQ2. To what extent can a meaningful-things intervention increase happiness of informal caregivers?

Hypothesis 2: Participants in the meaning intervention condition will have a significant increase in happiness level between directly before (T1) and directly after (T2) the intervention compared to participants in the placebo and control condition, as was found by Gander et al. (2016), and Giannopoulos and Vella-Brodrick (2011).

RQ3. Are the effects of a meaningful-things intervention on happiness maintained for a longer time? Based on Gander et al. (2016), we proposed:

Hypothesis 3: The increase in happiness levels of participants in the meaning condition after T1, as compared to the placebo and control condition, will still be visible at the 1- and 3-month follow-up measurements (T3 and T4, respectively).

RQ4. How does the meaningful-things intervention influence happiness?

Hypothesis 4: The increase in happiness from T1 to T2 in the meaning condition as compared to the placebo and control condition will be partially mediated by the increase from T1 to T2 in two variables: the perception of meaning in informal caregiving and perception of meaning in life, both having a significant positive effect on happiness. The positive effect of perception of meaning in caregiving on happiness, in turn, will be partially mediated by more perceived meaning in life. Finally, the paths from perceived meaning in caregiving and life to happiness will be moderated by the T1-level of search for meaning in life so that people who seek meaning in life show a stronger relation between perceived meaning in informal caregiving and happiness. These paths correspond to the associations that Steger and Dik (2009) identified for meaning in work.

Lastly, as a secondary study aim, we investigated correlations between happiness and psychological needs applied to informal caregiving that potentially could explain individual differences in happiness. A complete overview of these hypotheses and results is provided in the supplementary online materials, to be found at the end of the manuscript.

Method

The research questions, hypotheses, sample size, method and analysis strategy were preregistered in the Open Science Framework (https://osf.io/3bnz6/). Ethical approval was gained from the Ethics Committee of the Faculty of Social Sciences (ref.no: ECSW-2017-026) at Radboud University, Nijmegen, The Netherlands.

Participants

The sample consisted of Dutch adults who provided informal care for a close other (e.g., relative, partner, friend, neighbor). In accordance with the definition of informal caregivers used by Statistics Netherlands (2017), they had been providing support for at least 3 months or for 8 hours or more per week. Additionally, participants were only selected if they reported to usually provide informal care multiple times a week. Informal caregivers with severe psychological issues themselves, or under psychological or psychiatric treatment or medication, could not participate. All participants who completed the first survey were entered into a draw to win one of six 50-euro cheques.

Recruitment

Participants were recruited using a snowball sampling technique (Goodman, 1961). Approximately 200 Dutch organizations (caregiver support centers, well-being institutes, elderly homes, revalidation clinics, patient organizations, magazines and newspapers) were contacted and were encouraged to engage other organizations as well. At least 80 of those organizations invited informal caregivers through their (online) network, using promotional materials provided by the researchers. Until the final participation date, the registration page

had 1732 views, leading to 461 registrations. In exchange for their assistance, organizations

that cooperated were offered a report of the aggregate findings and implications for practice.

Sample size

The sample size was determined by a priori power analyses and attrition estimations.

In order to reach the power criterion of $1-\beta = .80$ at $p = .05$, the largest number of participants

was needed to test Hypothesis 2 (as calculated using G*power; Faul, Erdfelder, Lang, &

Buchner, 2007). In a 3 (conditions) x 2 (T1, T2) repeated measures analysis of variance

(ANOVA) with a correlation among repeated measures of 0.5, non-sphericity correction of 1

and a small effect-size of $f = 0.2$ (as was reported in a similar intervention by Gander et al.,

2016), the required sample size was 201. Adding the planned 5 covariates (number of

caregiving hours, self-efficacy, closeness to care-recipient, person-activity fit and age) to an

ANOVA with the same number of variables and effect size, increased the required sample

with factor 1.5. Therefore, it was estimated that approximately $200 * 1.5 = 300$ participants

would be needed to test Hypothesis 2 with sufficient power. The attrition rate was anticipated

at 25% (Gander et al., 2016). Consequently, we recruited a sample of 400 participants to start

the study. Of the 400 informal caregivers that started the study, 25 were excluded because

they did not finish the pre-intervention questionnaire.

Sample characteristics

The 375 participants in the remaining sample (296 female, 75 male, 4 no gender

indicated) were between 20 and 92 years old ($M_{age} = 59.5$, $SD = 11.8$). Most participants had

had higher professional education (45%) or basic vocational education (32%), 20% had

completed high school and 3% only elementary school. Most participants (53%) did not work

or study and just over half of those participants was retired (28% of the total sample). Only

1% and 12% of the participants worked full-time or studied full-time, respectively, 26%

worked part-time, and 8% did additional volunteering work. Descriptive statistics of the

caregiving situation of the sample are displayed in Table 1.

Materials

A pilot study among informal caregivers ($N = 10$) was conducted to test the materials

and intervention. The study took place in December 2017. The pilot participants had different

caregiving situations (e.g., they supported a child, father or partner; with autism, bipolar

disorder, a physical disability, cerebral infarct or dementia; their ages ranged between 42 and

76; and they had different social economic backgrounds). With their input, some questions

were further clarified, and the option of multiple care recipients was added. Participants

received a personal Christmas card in exchange for their participation.

Measures used in the survey

Happiness. The Dutch version of the Subjective Happiness Scale (SHS; Lyubomirsky

& Lepper, 1999; Dutch version: Spronken, Holland, Figner, & Dijksterhuis, 2016) was used.

It measures global subjective happiness using 4 items rated on a 7-point Likert scale. The first

item reads "In general, I consider myself: not a very happy person – a very happy person", the

second item asks for happiness in comparison to peers (*less happy* to *more happy*), and the

third and fourth item ask to what extent participants recognize themselves in descriptions of a

very happy and very unhappy person, respectively (*not at all* to *a great deal*), with the fourth

item reverse coded. Validity and reliability of the scale have been shown for adults and a

retired U.S. community sample (Lyubomirsky & Lepper, 1999), and reliability in the current

study was good with Cronbach's α between .78 and .84 at the four different time points.

Perception of and search for meaning in life. The Dutch version of the Meaning in

Life Questionnaire (MLQ; Steger, Frazier, Oishi, & Kaler, 2006; Dutch version: Van den

Heuvel, Demerouti, Schreurs, Bakker, & Schaufeli, 2009) was used to assess how participants

make sense of their existence and feel the significance of it. It consists of two subscales:

search for meaning (MLQ-S, e.g.: "I am always looking to find my life's purpose") and perception of meaning (MLQ-P, e.g.: "I understand my life's meaning"), both consisting of 5 items rated on 7-point Likert scale ranging from 1 (*completely disagree*) to 7 (*completely agree*). Steger et al. (2006) showed that the two subscales can be used separately. The current study confirmed internal consistency of both subscales with Cronbach's α for the MLQ-S between .85 and .89, and for the MLQ-P between .82 and .89.

Meaning in caregiving. The Dutch MLQ-P was adapted to assess the perception of meaning in the role as informal caregiver, hence called Perceived Meaning in Caregiving Questionnaire (MCQ-P). The wording was changed from *life* to *informal caregiving*, for example: "I have a good sense of what makes *life* meaningful" was changed to "I have a good sense of what makes *informal caregiving* meaningful." The scale had good reliability with Cronbach's α between .78 and .87.

Caregiving situation. Appropriate items for the current research were extracted from The Older Persons and Informal Caregivers Minimum Dataset (TOPICS-MDS; Lutomski et al., 2013), asking about the relation to the care recipient (e.g., parent, partner); co-residing with the care recipient; caregiver's health on a Likert scale ranging from 1 (*very poor*) to 5 (*very good*); and weekly caregiver hours (divided in 3 categories: household chores, personal and medical care, logistics and administration). The Topics-MDS has been implemented in over 41 research projects and offers a standardized format for gathering data on caregiver situations on an individual level (Lutomski et al., 2013). Additionally, we enquired about the care recipient's diagnosis and the number of care recipients.

Subjective caregiver burden. The CarerQol (Brouwer, Van Exel, Van Gorp, & Redekop, 2006) was used to measure subjective caregiver burden via a visual analogue scale ("How heavy is the burden of caring for your close one to you?") from 0 (*not heavy at all*) to 10 (*very heavy*). It also includes seven items about different aspects of caregiving

experiences: gratification (reverse scored), personal problems with care recipient, own psychological health, own physical health, problems in combining daily activities, financial issues, and social support (reverse scored). Items are rated on a 3-point scale (none, some, many problems). Though Hoefman, Van Exel, and Brouwer (2013) found this instrument to be valid, the current study showed that the reliability of the seven separate items varied between unacceptable and acceptable, with a Cronbach's α of .67, .71, .71, and .47 on the respective measurements. The seven separate items were left out of all analyses because they mainly measured constructs that were also assessed by other scales used in this study that were found to be more reliable.

Caregiving self-efficacy. The Dutch General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995; Dutch adaptation: Schwarzer, 1999) was adapted to measure how capable caregivers felt in dealing with their situation, e.g., "I can solve most problems in *my work as informal caregiver* if I put in enough effort". The scale consists of 10 items rated on a 4-point Likert scale (0 = *completely incorrect* to 3 = *completely correct*). A previous study with informal caregivers reported excellent reliability of the general scale (Van Der Veek, Kraaij, & Garnefski, 2009). The current study had a similar finding of the adapted scale with a Cronbach's α of .89.

Perceived social support. The Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet, & Farley, 1988) assesses support from a significant other, friends and family on separate subscales. Each subscale has 4 items on a 5-point Likert scale from 0 (*completely incorrect*) to 4 (*completely correct*), for example: "There is a special person who is around when I am in need". Pedersen, Spinder, Erdman, and Denollet (2009) validated the Dutch version in cardiac patients and their partners. In the current study, the scale had excellent reliability with a Cronbach's α of .93 for the total scale (ranging between .92 and .94 for the subscales).

Closeness with care recipient. The Inclusion of Other in Self Scale (IOS; Aron, Aron, & Smollan, 1992) was used to measure the relationship closeness between the caregiver and care recipient. It depicts seven pictures of two circles that increasingly overlap from picture 1 to picture 7. Participants selected the set of circles that best reflected the relationship between themselves and the care recipient. Gächter, Starmer, and Tufano (2015) found significant positive correlations between the IOS and other closeness scales.

Autonomy in caregiving. The six autonomy items of the Work-related Basic Need Satisfaction scale (Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010) were used, measuring the extent to which respondents experience satisfied autonomy at work. Wording was adapted to suit the context of the current study, e.g.: "I feel free to take care of the care recipient the way I think it could best be done". Level of agreement for each item is rated on a Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Broeck et al. (2010) showed validity and reliability of this subscale, and Cronbach's α was .76 in the current sample.

Freedom of adopting the informal caregiving role. One item assessed how much freedom participants experienced in their decision to take on informal caregiving, which was rated on a Likert scale from 1 (*not at all free*) to 5 (*completely free*).

Person-activity fit. The person-activity fit refers to the fit between participants and the intervention. It was described by four dimensions that predicted intervention effects on well-being after 3.5 years (Proyer, Wellenzohn, Gander, & Ruch, 2015). Directly after the intervention, pleasantness and perceived benefits of the intervention were judged on 5-point Likert scales (1 = *not at all* and 5 = *very much*), and compliance to the intervention was self-rated as well (yes, no). The follow-up measures asked for voluntary repetition of the intervention after it had ended (yes, no; if yes: how often and how long ago).

Intervention

The intervention closely resembled the meaningful-things intervention as designed by Giannopoulos and Vella-Brodrick (2011) and used by Gander et al. (2016). Participants were assigned to one out of three intervention conditions: meaning, placebo or control (i.e., no intervention). Similar to Giannopoulos and Vella-Brodrick, two non-experimental conditions were included in the current study. Specifically, the placebo condition was included to compare to the hypothesized effective component and the control condition to control for mere effects of receiving daily messages or taking a moment for yourself, since both Gander and colleagues and Giannopoulos and Vella-Brodrick found that participants in comparable placebo conditions tended to become happier over time.

The complete intervention was delivered online. Participants received a daily email with a personal link to the intervention website. In the email, they were thanked for their participation thus far and encouraged to participate in the intervention each day that they provided informal care within 2 weeks. The 2-week period was established to enable caregivers who did not provide daily care to also participate for 7 days, similar to previous tests of the intervention.

The intervention instructions were tested in the pilot study in which participants received a shortened, 1-week version of the meaning ($n = 5$) and placebo ($n = 5$) intervention. Based on their feedback, the instructions for the meaning condition were rephrased to make it explicit that it concerned positive feelings. Furthermore, participants indicated that the opportunity to complete the intervention at night only was too restrictive and they should be afforded the ability to participate in the intervention during the day also. Subsequently, the time to complete the intervention was extended and participation was possible anytime between 6 PM to 12 PM the next day. Instructions were repeated daily, and for the meaning condition instructions were as follows:

Think back to one situation today, while providing informal care, that was meaningful for you. Describe this activity and how you felt. It can be any activity like helping the patient, putting the patient before yourself, a smile, something that made you feel you made a difference, or any moment that left you with a feeling of worth and value. Informal caregiving can be tough, but here we ask you to really consider a positive moment that made you feel that informal caregiving had value and meaning. Try to think of one event, this can be difficult but try to think of something each day. Also, try to focus on your feelings and to go back to how you felt after that moment. Please take 10 minutes to do this and describe the moment and your feelings at that moment by typing in the field below.

This instruction involved both a cognitive reflection and emotional component, because this combination was shown to be most efficacious in an experiment that compared different instructions (Gander, Proyer, & Ruch, 2017). Caregivers were asked to reflect on one event instead of three, as was the case in the original intervention, because multiple meaningful events might be too difficult to find in the limited time that participants engaged in caregiving per day. Due to an ease-of-retrieval bias (Schwarz et al., 1991), this difficulty to retrieve information could lead participants to underestimate the meaningfulness of their informal caregiver role. In the placebo condition, participants were asked to think back to one situation that day while providing informal care. The instruction continues:

Describe this activity in detail and as objectively as you can. Objective means that you describe the event without considering your own opinion or feelings. You can do this by describing it step-by-step. It can be any activity as long as you were in your role as informal caregiver, like doing groceries or how you helped the patient shower. It may also have happened without the patient being present. The goal is to provide a good image of what you did during this activity. Please take 10 minutes to do this and describe the activity by typing in the field below.

Procedure

Data collection for the main study took place between January and June 2018. The study was conducted on the online survey platform LimeSurvey (LimeSurvey Project Team, 2018) and was accessible on any electronic device including desktops and mobile devices with an internet connection. Potential participants received access to the information and registration page by following a link in the recruitment materials. On that page, they could register for the study by indicating that they met the selection criteria. Once it was determined that the potential participants met the inclusion criteria, they gained access to an electronic informed consent form they could sign. When informed consent was obtained, participants received an invitation to the pre-intervention questionnaire. For each further questionnaire, participants were invited to continue participating in the study by an automatically generated encouraging and personalized e-mail sent at fixed times. The e-mails also served to minimize attrition.

Participants were requested to complete the pre-intervention questionnaire at a time when they were able to engage in the intervention for the subsequent 2 weeks. They received a maximum of six weekly reminders to participate. The pre-intervention questionnaire typically took 30 minutes to complete. However, once started, participants were given 24 hours to finish it. This questionnaire consisted of demographic questions and all measures mentioned in the materials section above in the respective order, except for person-activity fit.

After completing the pre-intervention questionnaire, participants were randomly allocated to one out of three intervention conditions (meaning, placebo or control). The day after the 2-week intervention, or after 2 weeks without questions in case of the control condition, participants were invited for the post-intervention questionnaire. After 1 month and 3 months, participants received the first and second follow-up questionnaires and they were given 2 days to complete them. The post- and follow-up questionnaires consisted of the

measures of happiness, perception of and search for meaning in life, meaning in informal caregiving, caregiver burden, a question if the caregiving situation had changed, and person-activity fit questions.

Participants were able to contact researchers to report technical issues. Due to two server breakdowns, two participants did not receive intervention invitations for 1 week and 10 participants received no intervention invitations for 3 consecutive nights. Due to a safety certificate issue, 51 participants received the last follow-up measurement 1 to 11 days late. After such interruptions, the intervention schedule continued as normal.

When all participants finished the study, they were debriefed about the precise research aims and the different intervention conditions.

Data Preparation

The data were checked for impossible and duplicate values. One participant completed the pre-intervention questionnaire twice, thus the second was removed. Randomness of missing values was tested by Little's missing completely at random (MCAR) test. The significant outcome, $Chi^2(113) = 800.42$, $p < .001$, indicated that data were not missing completely at random. This was mostly due to the fact that participants in the control group did not complete person-activity fit questions. No imputation strategy was used. For all scales, a composite score was calculated by summing the item scores, some items required reverse scoring.

When testing Hypothesis 2 and 3, we planned to statistically control for caregiving hours, self-efficacy, closeness to the care recipient, age, and person-activity fit as a composite score. We expected a stronger increase in happiness in the meaning intervention (i.e., a stronger Time × Condition effect) for participants who invested more hours in caregiving because it provides more opportunities for finding meaning, participants with higher self-efficacy (Hajek & König, 2016), participants who felt closer to their main care recipient

(Carbonneau et al., 2010), older participants because they tend to benefit more from positive psychology interventions (Sin & Lyubomirsky, 2009). Stronger effects were also expected for participants who experienced a higher person-activity fit (Proyer et al., 2015), but since this was irrelevant in the control condition, it was omitted.

Unexpectedly, relationship closeness did not correlate with happiness (Lyubomirsky, King, & Diener, 2005) or subjective caregiver burden (Whitlatch, Schur, Noelker, Ejaz, & Looman, 2001). Additionally, eight participants indicated that they did not understand the IOS question in their optional final remarks, while there were no comments about any of the other items. Together, this indicated that the IOS may not have provided a valid measure of relationship closeness and therefore it was omitted from the analyses.

Results

Descriptive Results

Of the 400 participants who started the study, 326 completed the final questionnaire. Of the participants who dropped out before any of the post-intervention measurements, 12 were in the meaning condition, seven in the placebo condition, and four in the control condition. Additionally, four participants were excluded from the study due to the passing away of their care recipients. One of those participants was excluded at the intervention stage of the meaning condition, and the others were excluded at the first follow-up stage, one from each condition. A summary of the participant flow and attrition through the different stages and in the different conditions of the study is displayed in Figure 1.

In the general sample, the three intervention groups did not differ significantly in their gender distribution ($Chi^2(4) = 2.62$, $p = .623$, Phi = .08). Univariate ANOVAs showed no differences between conditions in age, T1 happiness, T1 perceived meaning in life, T1 meaning in informal caregiving, T1 subjective burden or number of weekly caregiver hours (all $ps \geq .228$, all $\eta^2_p \leq .008$). In the per-protocol sample, meaning condition participants were

significantly happier (p = .033), experienced more meaning in caregiving (p = .032), and less subjective burden (p = .008) at T1 than participants in the other two conditions. Average scores on the psychological measures are reported in Table 2.

Meaning in Informal Caregiving and Happiness

In order to test Hypothesis 1a and 1b, a multiple linear regression was conducted with happiness as the dependent variable and meaning in caregiving and subjective burden as predictors (centered), all measured at T1, using the function lm() in the package stats in R (version 3.5.0; R Core Team, 2018). The assumptions of linearity, homoscedasticity, and independence of the residuals, and absence of multicollinearity were met. Three outliers were detected, but they did not influence the model heavily (i.e., Cook's distances between 0.01 and 0.12). The residuals were negatively skewed (*2skew.SE* = -1.41) so a bootstrapped regression was conducted to confirm the 95% confidence intervals (CIs) of the predictor weights as recommended by Field, Miles and Field (2012), using the package boot (version 1.3.20; Canty & Ripley, 2017).

The model significantly explained variances in happiness, $F(3, 371) = 18.76$, $p < .001$.[2] Both meaning in caregiving and subjective burden were significantly associated with happiness (see Table 3), indicating that meaning in caregiving had a direct positive relationship with happiness (as displayed in Figure 2), and subjective burden a direct negative relationship with happiness. The interaction between meaning in caregiving and subjective burden was not significant, indicating that there was no buffer effect of meaning. The results

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[2] As preregistered, the analysis was also conducted with outliers excluded. The patterns of results with and without outliers were identical. Only exact results based on all cases are reported here, since the bootstrapping procedure corrects for non-normally distributed residuals and the outliers had no severe impact on the model.

thus showed support for a direct relationship (Hypothesis 1a) and not for a buffer effect

(Hypothesis 1b).

Intervention Effects

Participants completed the placebo and meaning intervention on average on 10 times

($SD = 4.52$) over the 2-week period, whereas participants in the control condition reported

that they engaged in informal caregiving on average on 12 ($SD = 3.18$) out of 14 days.

However, 11.7% of the meaning and placebo condition participants reported that they did not

complete the intervention on all days that they provided informal care.

To estimate the effectiveness of the intervention in practice, intervention effects were

studied in the general sample of all included participants. In addition, efficacy was tested for

the per-protocol sample: participants who participated in the intervention 7 days or more and

who followed the instructions as intended. To compare the meaning and placebo per-protocol

sample to an equal control group, only participants who reported at least 7 days of informal

caregiving were included. The average happiness levels over time are displayed per condition

in Table 4 for the general sample and the per-protocol sample separately.

Hypothesis 2

Two type 3 repeated measures analysis of covariance (ANCOVA) were conducted

using R-package ez (version 4.4.0; Lawrence, 2016) with happiness as the dependent variable,

time (T1, T2) as within-subject variable, and condition (meaning, placebo, control) as

between-subject variable. Number of caregiving hours, self-efficacy, and age were added to

the model as covariates. The general-sample analysis included 92 meaning, 116 placebo and

132 control participants who had participated on both time points. After removal of outliers,

respectively 90, 116 and 130 cases remained. The per-protocol analysis included 41 meaning,

101 placebo and 104 control participants, only the control group was reduced to 102 after outlier removal.[3]

The analysis of the general sample,[4] showed no significant interaction between time and condition, $F(2, 333) = 1.55$, $p = .213$, $\eta^2_g = .001$, indicating that the meaning intervention did not affect happiness over time as expected. The main effects on happiness were not significant (for time: $F(1, 333) = 1.99$, $p = .159$, $\eta^2_g < .001$; for condition: $F(2, 333) = 1.12$, $p = .328$, $\eta^2_g = .006$) as well, indicating that happiness did not significantly differ across time or between conditions.

In the per-protocol sample, the repeated measures ANCOVA did not reveal the hypothesized Time × Condition effect on happiness either, $F(2, 241) = 0.50$, $p = .607$, $\eta^2_g < .001$. Neither the main effect of time on happiness nor the effect of condition was significant (respectively, $F(1, 241) = 0.77$, $p = .381$, $\eta^2_g < .001$; $F(2, 241) = 2.43$, $p = .090$, $\eta^2_g = 0.017$). The meaning intervention did not enhance happiness; thus Hypothesis 2 was not confirmed.

Hypothesis 3

Two other repeated measures ANCOVAs were conducted, with the same variables but now including T1, T3 and T4 as levels of time. The first analysis included the general sample,

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[3] For all repeated measures ANOVAs, all assumptions were checked. For the analysis of Hypothesis 2 in the general sample, the happiness distributions were negatively skewed in the meaning condition of the general sample and in the control condition of the general and control sample. Removing outliers normalized the distributions.

[4] As preregistered, the results were analyzed with and without outliers included. The unequal group sizes made the analyses less robust for violations of normality and increased the chance of false positives. Because removing outliers normalized the data distributions, the results are described without outliers. Moreover, all analyses with outliers included yielded equal results.

which consisted of 84 meaning, 113 placebo and 119 control participants who had values on all three time points. When outliers were removed, respectively 82, 113 and 118 participants remained. The second analysis included the per-protocol sample with 37 meaning, 96 placebo and 92 (91 if the only outlier was removed) control participants.[5] In the general sample, sphericity was violated for the effects involving time and a Huynh-Feldt correction of these significance levels was applied.

In the general sample, the interaction effect between condition and time on happiness was significant ($F(4, 609.88) = 2.57$, $p = .038$, $\eta^2_g = .003$), but not in the expected direction. The means indicated that happiness slightly decreased from T1 to T3 in the meaning and control condition but not in the placebo condition, whereas happiness slightly increased from T3 to T4 for the control condition only. Bonferroni-corrected post-hoc tests showed that none of the pairwise comparisons were significant (all $ps \geq .570$). There was a significant main effect of time ($F(2, 609.88) = 6.02$, $p = .003$, $\eta^2_g = 0.004$). The means indicated that participants' happiness decreased over time, but these differences were not significant in Bonferroni-corrected post-hoc tests (all $ps \geq .450$). The main effect of condition on happiness was not significant ($F(2, 310) = 0.55$, $p = .585$, $\eta^2_g = 0.003$), meaning that happiness did not differ between the intervention conditions.

The analysis in the per-protocol sample did not show the expected Time × Condition interaction effect on happiness, $F(4, 442) = 2.39$, $p = .051$, $\eta^2_g = .004$. It yielded a significant main effect of time on happiness ($F(2, 442) = 3.67$, $p = .026$, $\eta^2_g = 0.003$), but Bonferroni-

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[5] For the analysis of Hypothesis 3, the happiness distributions of the general sample only were negatively skewed in the meaning and control condition. In the meaning condition, removing outliers almost normalized the distribution (*Skew.2SE* = 1.07). The control condition distribution was normalized after removal.

corrected post-hoc tests showed no significant pairwise differences (all $ps \geq .650$). The main effect of condition was not significant, $F(2,221) = 2.04$, $p = .132$, $\eta^2_g = .015$. In sum, after 1 or 3 months, the meaning intervention did not enhance happiness, so Hypothesis 3 was not supported.

Hypothesis 4

The moderated serial mediation model of Q4 was tested using PROCESS (model 88; version 3.0; Hayes, 2017). Only per-protocol participants would potentially show the mediation via increased perceived meaning because they recalled meaningful experiences in the meaning condition according to the instructions and sufficiently often, so data of this sample were used as input for the mediation model.

The investigated model included condition as exogenous variable, with contrasts set to meaning vs. control and meaning vs. placebo, respectively. Centered T2-T1 difference scores of meaning in informal caregiving and meaning in life were included as mediators, and the happiness T2-T1 difference scores as dependent variable. Search for meaning in life (T1, centered) was included in the model as moderating variable of the impact of meaning on happiness. The number of bootstraps was set to 10000 and CIs were set at 95%.

In contrast to our expectations, the total model did not significantly explain the change in happiness from T1 to T2 ($R^2 = .049$, $F(7, 238) = 1.76$, $p = .096$). Figure 3 depicts the model including direct path coefficients, and all paths are described per outcome variable below.

Meaning in caregiving. The direct path from condition to change from T1 to T2 in meaning in caregiving was not significant (meaning vs. control: bootstrapped CI [-0.652, 1.850]; meaning vs. placebo: bootstrapped CI [-0.985, 1.453]).

Meaning in life. Condition did significantly and positively predict changed meaning in life if the meaning condition was compared to the control condition (bootstrapped CI [0.117, 2.299]), but not for the meaning condition relative to the placebo condition (bootstrapped CI

[-0.591, 1.694]). The means indicate that meaning in life slightly increased in the meaning condition (M_{T1} = 27.46, SD = 4.31; M_{T2} = 27.98, SD = 4.51) and slightly decreased in the control condition (M_{T1} = 25.92, SD = 6.03; M_{T2} = 25.16, SD = 5.98), while happiness levels in the placebo condition remained more constant (M_{T1} = 26.92, SD = 4.67; M_{T2} = 26.86, SD = 4.62). Changed meaning in caregiving significantly and positively predicted changed meaning in life (bootstrapped CI [0.004, 0.210]), indicating that participants who perceived more meaning in caregiving at T2 than at T1 tended to have an increased experience of meaning in life as a whole as well.

Happiness. The direct paths from the condition contrasts were not significant (meaning vs. control: bootstrapped CI [-1.579, 0.441]; meaning vs. placebo: bootstrapped CI [-1.528, 0.373]). The direct path from meaning in caregiving was not significant either (bootstrapped CI [-0.014, 0.205]). However, changed perceived meaning in life positively predicted changed happiness (bootstrapped CI [-0.004, 0.205]), indicating that, on average, participants who perceived their lives to become more meaningful over time, also became happier. Search for meaning in life did not significantly moderate these relationships (Search for Meaning × Meaning in Caregiving: bootstrapped CI [-0.015, 0.009]; Search for Meaning × Meaning in Life: bootstrapped CI [-0.013, 0.022]). None of the relative indirect effects of the meaning vs. control condition on happiness was significant, via meaning in caregiving: bootstrapped CI [-0.016, 0.009]; via meaning in life: bootstrapped CI [-0.019, 0.031]; via meaning in caregiving and meaning in life: bootstrapped CI [-0.001, 0.002]. The relative indirect effects of the meaning vs. placebo condition on happiness were not significant either: via meaning in caregiving: bootstrapped CI [-0.012, 0.008]; via meaning in life: bootstrapped CI [-0.010, 0.021]; via meaning in caregiving and meaning in life: bootstrapped CI [-0.001, 0.002]. Thus, Hypothesis 4 was not confirmed.

Additional Exploratory Analyses

Differences between the general and per-protocol meaning-condition sample. The means suggested that the per-protocol meaning condition sample was happier than the general meaning condition sample. A linear regression analysis confirmed that protocol adherence positively related to happiness in the meaning condition ($b = 1.81$, $p < .001$). Burden, meaning in caregiving and meaning in life were significantly correlated with happiness (for exact values, see the supplementary online materials). Therefore, possible explanations for this happiness gap would be that only relatively happy participants, participants with not too high a burden, or who perceived high levels of meaning in life or in informal caregiving at T1, would find it easier to follow the meaning condition instructions, and thus had a higher probability to adhere. To investigate the odds to adhere to the meaning intervention from a priori levels of these variables, a loglinear analysis was conducted with adherence (yes, no) as dependent variable and the named variables as predictors. Moreover, search for meaning might predict motivation to adhere, so was included as well. The results showed that only perceived meaning in informal caregiving at T1 significantly predicted adherence to the meaning intervention protocol, $b = 0.14$, $SE = 0.06$, $p = .014$ (for all other predictors: $p \geq .212$). Thus, participants who already perceived informal caregiving as meaningful tended to be happier and were more likely to follow the instructions of the meaning intervention.

Potential moderators of intervention effects. Additionally, potential moderators of the intervention effects were explored. Firstly, people in search for meaning would be the ones potentially getting the most gratification from finding meaning in the intervention (Steger & Dik, 2009). Therefore, search for meaning was investigated as moderator of the direct condition effect on T1-T2 changes in happiness. This analysis was conducted in the per-protocol sample using PROCESS (model 1; version 3.0; Hayes, 2017) with centered moderator and 95% CIs set to 10000 iterations, but the results showed no support for the idea

that participants with higher search for meaning benefitted more than participants with lower search for meaning from the meaning intervention (b = -0.10; bootstrapped CI for interaction term [-0.032, 0.246]). Secondly, since the means for perceived meaning in caregiving and of happiness were already relatively high, the intervention might have had ceiling effects and only worked for those who scored lower on those variables. Using the model settings as described above, bootstrapped moderation analyses of the condition effect on the change in happiness were conducted with meaning in caregiving at T1, and next, happiness at T1. Neither meaning in caregiving (b = 0.12; bootstrapped CI for interaction term [-0.107, 0.345]) nor happiness (b = -0.08; bootstrapped CI for interaction term [-0.370, 0.159]) significantly moderated the effect of condition on changes in happiness. All reported results represent the meaning vs. control condition contrast, the meaning vs. placebo contrast results were equal.

The role of experienced freedom to provide informal care. A difference with the study on domain-specific meaning in work (Steger & Dik, 2009) was that people generally voluntarily choose to pursue a career, while the experienced freedom to take on the caregiver role varied largely. Consequently, the possibility existed that caregivers who voluntarily chose to provide informal care drove the positive relation between meaning in caregiving and happiness. Therefore, we conducted a regression analysis with happiness as outcome and freedom and meaning in caregiving as predictors. The model significantly explained happiness (*Adjusted R^2* = .09, $F(3, 371)$ = 12.28, $p < .001$). Both meaning (b = 0.11, p = .024) and freedom (b = 0.59, $p < .001$) significantly positively related to happiness, but the interaction term was not significant (b = -0.01, p = .608). This indicated that meaning was associated with happiness even for informal caregivers that did not voluntary take their role.

Discussion

This study was conducted to investigate the relationship between experiences of meaning in informal caregiving and informal caregivers' happiness. First, we investigated

whether perceived meaning in informal caregiving had a direct relationship with happiness or buffered negative effects of subjective caregiver burden. The results indicated that meaning in informal caregiving related directly and positively to happiness instead of compensating for the impact of burden. Secondly, we assessed the effectiveness and working mechanisms of an intervention targeting meaningful experiences as a caregiver to increase happiness. The results did not show the hypothesized increase in happiness for participants in the meaning condition compared to a placebo and control condition directly after the intervention, or on follow-up measurements up to three months later. Regarding the hypothesized working mechanisms, as expected, changes in perceived meaning in informal caregiving predicted changed perceived meaning in life, which in turn predicted changed happiness. In contrast to our hypothesis, the meaning intervention only predicted changes in meaning in life if compared to the control condition, and all other paths were not significant. The complete model did not significantly explain the variance in happiness changes.

Explanation of the Unexpected Intervention Effects

The absence of intervention effects contrasted the robust effects on happiness of the meaningful-things intervention shown in earlier studies (Gander et al., 2016; Giannopoulos & Vella-Brodrick, 2011). Based on Layous and Lyubomirsky's (2014) model of psychological moderators (i.e., intervention and person characteristics) and mediators (in this case, positive reappraisal) of happiness interventions, several possible explanations for this unexpected outcome exist.

Firstly, the dosage of the intervention may have been too weak in comparison to earlier studies. In the current meaning condition of the intervention, participants were required to recall one instead of three meaningful moments per day. While previous studies involved the recall of three events for 7 days (Gander et al., 2016; Giannopoulos & Vella-Brodrick, 2011), the present study consisted of on average 10 intervention days, creating a total of 10

instead of 21 examples. While this adaptation may have helped to prevent ease-of-retrieval biases (Schwarz et al., 1991), the reduction of examples might have given participants too little evidence to change their appraisals substantially (Quoidbach, Mikolajczak, & Gross, 2015). In line with this explanation, changes in perceived meaning in caregiving were not predicted by the intervention condition, and changes in meaning in life were only predicted by the meaning intervention when compared to the control intervention, which involved a reduced sense of meaning in life. However, the number of days that participants completed the meaning intervention was not related to changes in meaning in caregiving, meaning in life, or happiness (respectively: $b = 0.12$, $p = .815$; $b = -0.11$, $p = .550$; $b = 0.09$, $p = .212$) even though this would have led to more practice. Still, the maximum number of recalled moments (14 in this study) may have been insufficient to create durable positive reappraisal.

Secondly, the intervention may have been too burdensome on top of the caregiver demands that the current sample faced. Participants had an additional caregiver burden that the previously tested self-selected community samples did not have (Gander et al., 2016; Giannopoulos & Vella-Brodrick, 2011). Although (subjective) caregiver burden does not equal lower happiness (Chappell & Reid, 2002), it takes considerable time and energy; participants spent on average 29 hours on informal caregiving per week. The intervention did not take long but participating on top of the caregiving work may have been too demanding to yield any positive effects. In line with this explanation, a few participants spontaneously commented that making time for the daily intervention was taxing. Layous and Lyubomirsky (2014) noted correspondingly that overly time-consuming interventions may be experienced as burdensome and thereby have limited effects on happiness.

Thirdly, the premeasure showed that participants already perceived high levels of meaning in informal caregiving before the intervention started, so a ceiling effect of this mediator could have hindered intervention effects. This is problematic, since participants with

lower meaning in caregiving scores were less likely to follow the instructions. Consequently, the participants who might have benefited the most, followed the protocol less often.

A fourth explanation could lie in the possibility that the meaning intervention affected different participant subgroups in distinct ways. Specifically, a dichotomy became apparent in how beneficial the meaning intervention was perceived; the ratings of perceived personal benefit were bimodally distributed, suggesting that the sample may have contained two groups that responded differently to the intervention. Consistent with this suggestion, several participants commented that describing meaningful situations made them see the value of their work and this elicited positive feelings. However, others experienced the meaning intervention as confronting; some participants reported that it was saddening and challenging to write about their caregiver experiences because they were confronted with negative aspects of the situation. Clearly, even though those participants may have reappraised caregiving as meaningful, negative affect elicited in the intervention could have restrained increases in happiness (Diener, Emmons, Larsen, & Griffin, 1985). Thus, even though the intervention may have worked for some participants, it may have had no effects or even reversed effects on happiness for others, which may have cancelled out overall effects.

A Fifth Explanation: Just Not That Good an Intervention?

Although previous research demonstrated the effectiveness of this intervention (Gander et al., 2016; Giannopoulos & Vella-Brodrick, 2011), it may not be the most effective way to increase happiness. Besides timing and dosage of an intervention, variety is an important factor for success (Layous & Lyubomirsky, 2014; Lyubomirsky & Layous, 2013). Happiness interventions that offer a variety of activities have been shown to be most effective because they prevent hedonic adaptation to increases in happiness derived from a single activity (Layous & Lyubomirsky, 2014). The current intervention only taught participants one strategy, while in combination with other activities, it may have stronger effects.

Contributions to Theory

This study adds a positive aspect to theory about how features of the informal caregiving situation relate to happiness. The direct association between meaning in informal caregiving and happiness implies that informal caregiver well-being models might achieve higher accuracy in predicting happiness at a given time by including perceived meaning in informal caregiving as secondary appraisal. Including meaning as appraisal would be compatible with Self-Determination Theory and Well-Being theory that incorporate meaning as a direct predictor of happiness (Deci & Ryan, 2008; Seligman, 2011). The absence of support for meaning as moderator of the negative impact of burden, opposes earlier findings about positive caregiving experiences. Specifically, negative effects of burden on happiness of informal caregivers were reduced by caregiver self-efficacy (Kruithof et al., 2012) and social support (Verbakel et al., 2016). This difference indicates that positive aspects of informal caregiving have varying relations with happiness.

The intervention results are inconclusive about the causal effects of meaning on happiness but extend knowledge about the scope of the relationship. The findings not only confirm the direct relationship between perceived meaning and happiness (Deci & Ryan, 2008; Seligman, 2011), but they also have implications for domain-specific meaning beyond the findings from Steger and Dik (2009). Although Steger and Dik showed that people derived meaning from work if they felt a calling, the present research investigated meaning in a life domain (i.e., informal caregiving) that people did not always voluntarily choose to spend time on, and that also brought a considerable burden. Even in this situation, people could find meaning, which related, via meaning in life, to happiness. Previous studies of stressful life events have investigated similarly negative situations, but focused on the meaning making process and never measured happiness (Park & George, 2013), and previous lab experiments mainly emphasized the importance of positive affect for perceiving meaning

(King, Hicks, Krull, & Del Gaiso, 2006). Consequently, this study is the first to demonstrate, in a natural setting, that the predictive value of perceived meaning for happiness is not restricted to meaning in life overall or domains with exclusively positive aspects.

Practical Implications

For applied researchers, policy makers and health care workers, the findings indicate that this intervention is not ready to be applied. However, targeting perceived meaning in informal caregiving in another way might be effective. The current finding that changes over time in meaning in caregiving predicted changes in happiness via meaning in life, suggest that interventions focusing on meaning in informal caregiving may specifically support caregivers who do not perceive their informal caregiver role as meaningful.

The data of this study provide some starting points for developing such a caregiver-support program. Participants who did not report positive experiences as instructed were less happy than per-protocol participants. Although the reasons for disregarding the protocol could not be inferred from the present data, the set-up was designed to ensure understanding and motivation. Possibly, unhappy people found it too difficult to find meaningful moments, since the intervention mimics happy people's natural cognitions (Lyubomirsky & Layous, 2013). The intervention could be made easier, for instance, by recommending concrete recurring meaningful activities of the present study, e.g., "cooking care recipient's favorite food" or "having a good conversation about the future". Increasing perceived meaning may thus be used to enhance happiness of informal caregivers in an intervention that is aimed at people with low levels of perceived meaning in caregiving.

Strengths, Limitations and Future Directions

The present study advanced positive psychology and informal caregiver research in several ways. This study was the first three-good-things intervention study that collected the intervention data online, which enabled objective evaluation of protocol adherence.

Furthermore, few positive psychology interventions are based on validated, empirically supported principles (Gander et al., 2016). The current study addressed this gap by analyzing possible working mechanisms of the intervention. Additionally, we targeted a sample that may benefit more from a happiness intervention than a general community sample. Studies with informal caregivers mostly have longitudinal or cross-sectional designs, and hopefully this study stimulates a more experimental approach to understanding the impact of informal caregiving.

Besides these strong points, some limitations need to be addressed, that also indicate avenues for future research. Concerning the intervention, technical issues sometimes disrupted the intervention schedule. Besides, the strength of the intervention remains unclear, due to changes in the intervention relative to previous studies. Future research could extend the duration of the intervention and teach additional strategies, which might enhance this intervention's effect on happiness (Layous & Lyubomirsky, 2014). In addition, the intervention might have been more effective in this sample if feedback was provided to participants after their first day of participation, providing an opportunity to correct participants who reported negative feelings or no feelings at all.

Regarding the sample, no normative data of matched non-caregivers were available for the happiness measure that we used, so inferences about the relative happiness levels in the current informal caregiver sample cannot be made. Further, the per-protocol sample size was smaller than expected, especially in the meaning intervention condition, so our conclusions about efficacy are based on a limited and biased (i.e., happier) subsample. Consequently, one may ask whether this study accurately represents how unhappy caregivers would respond to this intervention.

Additionally, informal caregiving experiences vary greatly with the type of care provided (Schulz & Sherwood, 2008) so possible effects of the intervention on a subsample of

caregivers may have been masked by the noise in the current heterogenous sample. Therefore, future research is needed to determine for whom this intervention might work. Speculatively, more demanding caregiver situations may have elicited stronger negative affect, given the more salient negative sides of caregiving in comparison to life before caregiving, and this may require other interventions. Testing this intervention in different participant groups could provide the opportunity to replicate the relation between meaning and happiness for life domains with clear negative sides to it.

Finally, the results provide directions for future research on the impact of informal caregiving. Importantly, further research among informal caregivers could assess the predictions from informal caregiver well-being models with the inclusion of meaning as secondary appraisal, and examine whether the other four happiness determinants of Well-Being Theory (i.e., positive emotions, engagement, positive relations and accomplishment; Seligman, 2011) have similar effects on informal caregivers' happiness.

Conclusion

In conclusion, this study revealed that happier informal caregivers have more positive appraisals of meaning in their caregiver role. However, a meaningful-things intervention adapted to informal caregiving was not sufficient to increase happiness via meaning in informal caregiving, or to extend findings from a community sample to informal caregivers. Still, the present study demonstrates that perceiving meaning is associated to happiness even if it is found in a life domain that also puts a considerable burden on people.

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Table 1

Descriptive Statistics of the Investigated Caregiving Situations

Variable	*M* (*SD*) or percentage
Relation with care recipient: I am…	
Partner	45.9%
Sibling	3.5%
Child	22.4%
Parent	18.9%
Other (e.g., grandparent, friend)	9.3%
Co-residing	57.6%
Condition of the care recipient	
Purely physical	41.3%
Mental issues involved	58.7%
More than 1 care recipient	31.2%
Own health (1-5)	2.93 (0.90)
Caregiving hours per week spent on:	
Household	15 (49)
Personal and medical care	6 (10)
Logistics and administration	6 (8)
Other (e.g., emotional support)	2 (6)
Perceived freedom to provide care (1-5)	2.76 (1.76)

Note. *N* = 375.

Table 2

Average Scores of Psychological Measures

Variable	Range of possible scores	M (SD) at T1 (N = 375)	M (SD) at T2 (N = 341)	M (SD) at T3 (N = 331)	M (SD) at T4 (N = 326)
Happiness	4-28	20.87 (4.35)	20.81 (4.10)	20.63 (4.36)	20.66 (4.04)
Perceived meaning in life	5-35	26.63 (5.31)	26.33 (5.44)	26.26 (5.59)	25.97 (5.81)
Search for meaning in life	5-35	20.79 (7.14)	20.35 (6.70)	20.38 (6.94)	20.33 (6.63)
Meaning in caregiving	5-35	28.52 (5.01)	28.32 (5.26)	28.36 (5.34)	28.14 (5.44)
Burden	0-10	6.39 (2.14)	6.11 (2.47)	6.18 (2.41)	6.16 (2.36)
Multidimensional burden	0-14	5.64 (2.69)	5.42 (2.76)	5.49 (2.78)	6.83 (1.97)
Perceived social support	0-48	29.24 (12.70)			
Friends	0-16	9.49 (4.84)			
Family	0-16	9.03 (6.31)			
Special other	0-16	10.72 (5.12)			
Self-efficacy	0-30	22.67 (5.28)			
Autonomy	6-30	21.36 (4.92)			

Note. T1 is the premeasurement, T2 is the postmeasurement, T3 is one month after the intervention, T4 is three months after the intervention. In deviation from the sample size indicated in the table, average meaning in caregiving at T4 is based on 325 cases.

Table 3

Regression Estimates for Relationships with Happiness

Predictor	*Adj. R²*	*B*	*SE*	β	*p*	95% CI (bootstrapped)
Model 1	0.12					
Meaning in caregiving		.13	.04	.15	.003	[0.04, 0.23]
Burden		-.61	.10	-.30	< .001	[-0.81, -0.43]
Meaning in caregiving × Burden		-.02	.02	-.05	.325	[-0.05, 0.02]

Note. CI = confidence interval.

Table 4

Average Happiness per Participant Group per Time Point

Happiness	T1			T2			T3			T4		
	n	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*
General sample												
Meaning	106	20.89	4.61	92	20.76	4.27	87	20.60	4.77	88	20.57	4.40
Placebo	129	21.16	4.02	116	21.21	3.72	117	21.20	3.78	115	20.85	3.87
Control	140	20.60	4.45	132	20.50	4.29	127	20.11	4.53	123	20.54	3.95
Per-protocol sample												
Meaning	41	22.51	3.39	41	22.05	3.43	39	22.33	3.64	37	21.62	3.34
Placebo	103	21.02	3.98	101	21.14	3.81	100	20.99	3.76	97	20.72	3.89
Control	104	20.48	4.65	104	20.42	4.31	97	19.80	4.79	95	20.42	3.90

Note. Happiness reflects the SHS composite score. T1 is measured before the intervention, T2 directly afterwards, T3 one month after the intervention, T4 three months after the intervention.
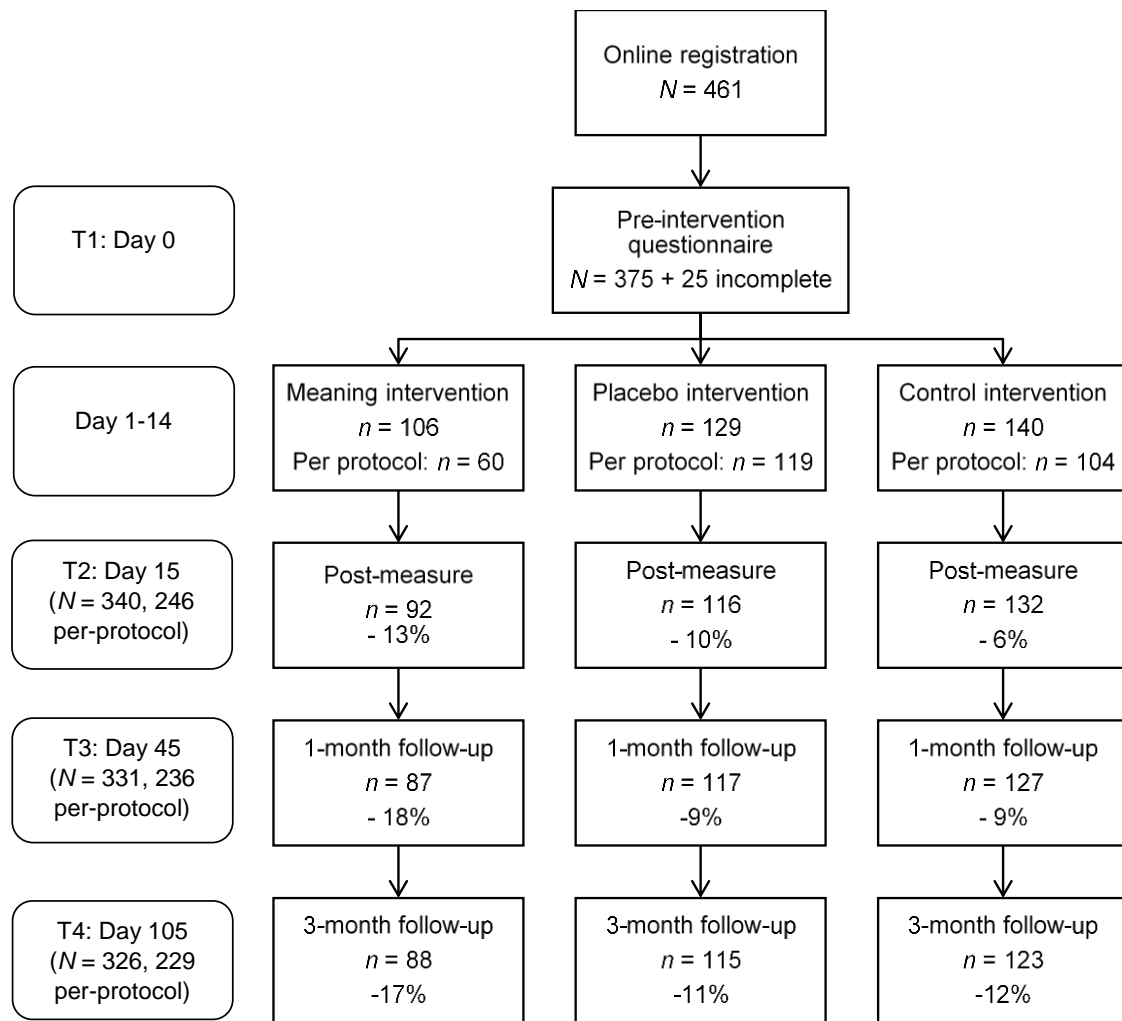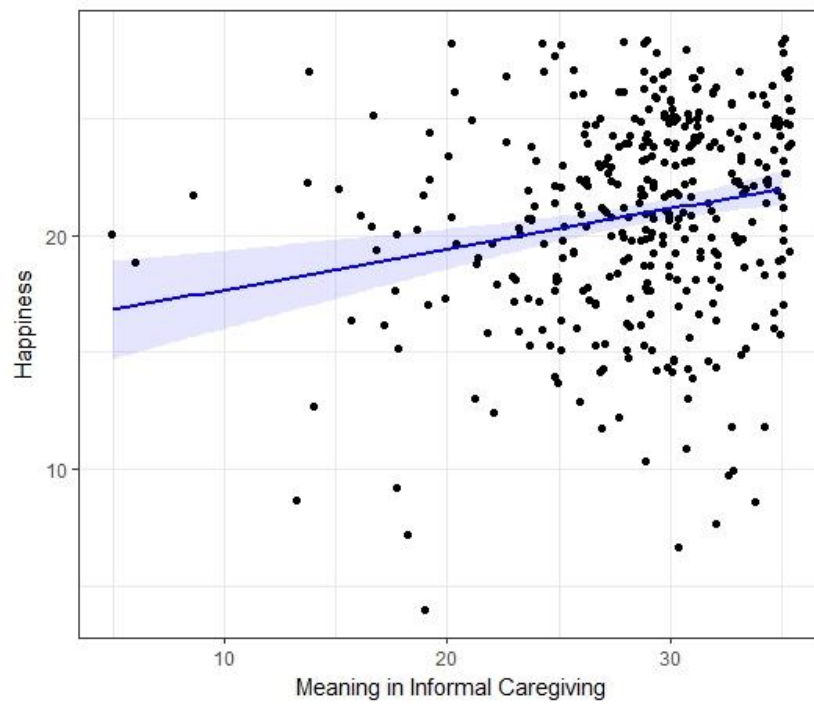
Figure 1. Participant Flow throughout the Procedure. The percentages denote fluctuations in

sample size relative to the number of cases that were assigned to each intervention condition.

Figure 2. Relation between meaning in informal caregiving and happiness. The line reflects

the best fitting regression, and the beams around it represent the standard error. Data points

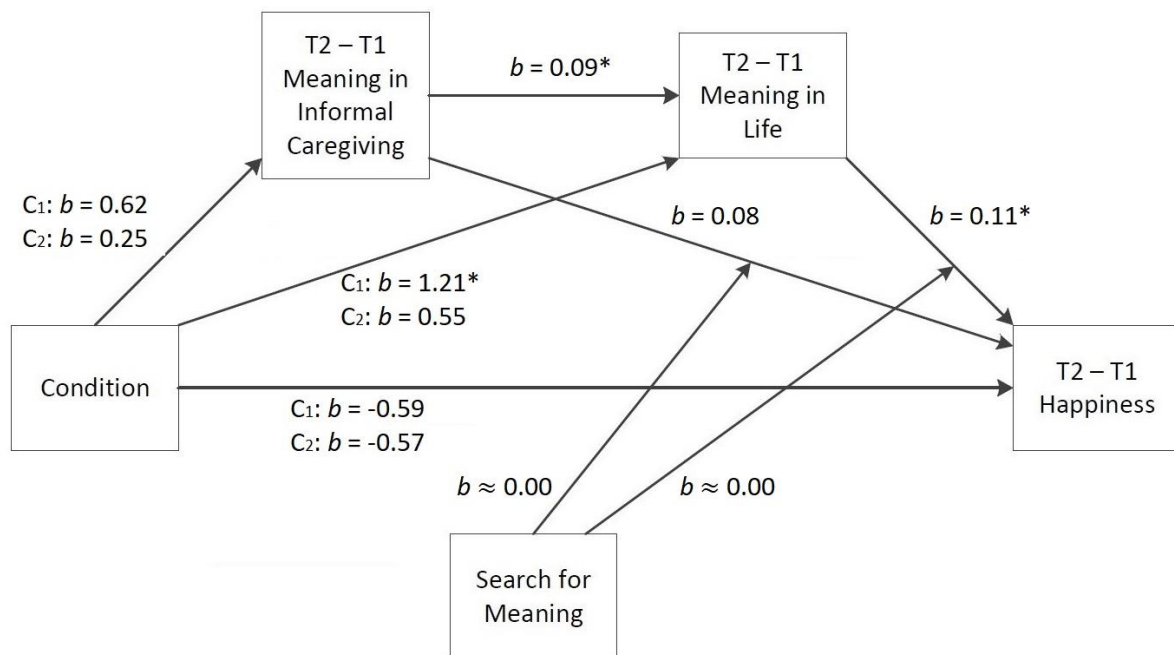are jittered so that all are visible.

Figure 3. Analyzed moderated serial mediation model. Note that C_1 represents the contrast between the meaning and control condition, and C_2 represents the contrast between the meaning and placebo condition. T2 – T1 denotes the average difference between the score on the postmeasurement and the premeasurement.

* $p < .05$.

Supplementary Online Materials: Correlational Findings

In addition to the four main hypotheses of this study, we expected to conceptually replicate findings of previous (qualitative) research among informal caregivers and general happiness theory. Specifically, we hypothesized to find positive correlations between happiness and: meaning in life (Seligman, 2011), meaning in informal caregiving (Carbonneau, Caron, & Desrosiers, 2010), self-efficacy in caregiving (Hajek & König, 2016), gratification, relationship closeness with the care recipient (Carbonneau et al., 2010), perceived social support (Kruithof, Visser-Meily, & Post, 2012), and experienced autonomy in informal caregiving (Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Negative correlations were expected between happiness and subjective caregiver burden and objective burden measured in total hours of caregiving per week. We further expected positive correlations between subjective burden and caregiving hours (Verbakel et al., 2016), and between meaning in informal caregiving and meaning in life and self-efficacy in informal caregiving (Steger & Dik, 2009).

Two-tailed Pearson's correlations are displayed in Table 1. As was hypothesized, happiness significantly and positively correlated with meaning in life, meaning in informal caregiving, self-efficacy, gratification, perceived social support, and autonomy in informal caregiving. The correlations with perceived meaning in life, self-efficacy and autonomy had a medium strength, the other relations were weak. We also found the predicted significant weak negative correlation between happiness and caregiver hours, as well as a significant medium negative correlation between happiness and subjective caregiver burden.

In sum, this means that happier caregivers on average experienced more meaning in life and in caregiving, they had the idea that they were better able to cope with the demands, and had stronger experiences of gratification, social support and autonomy as a caregiver.

Furthermore, the happier people were, the less time people devoted to caregiving and the lighter they experienced the burden of caregiving.

Furthermore, the number of caregiving hours had a weak positive and significant correlation with the subjective burden, confirming the hypothesis that the subjective experience of caregiving was related to the number of hours invested in it. Lastly, as expected, perceived meaning in informal caregiving correlated positively with perceived meaning in life and with self-efficacy in caregiving (respectively weak and medium correlations). This indicated that caregivers who saw more meaning and purpose of informal caregiving, generally also saw this more strongly in their lives as a whole, and had the idea that they were better able to deal with the demands of the caregiving situation.

Table 1 of Supplemental Online Materials

Correlations between the Investigated Variables

Measure	1	2	3	4	5	6	7	8	9	10	11	12
1. Happiness												
2. Meaning in life	.45***											
3. Meaning in informal caregiving	.20***	.20***										
4. Search for meaning	-.10	-.04	.09									
5. Gratification	.28***	.17***	.49***	.10*								
6. Self-efficacy	.33***	.25***	.30***	-.03	.34***							
7. Autonomy	.40***	.22***	.39***	-.08	.43***	.43***						
8. Freedom to start caregiving	.27***	.26***	.29***	.03	.31***	.29***	.43***					
9. CarerQol separate items	-.48***	-.26***	-.32***	.03	-.47***	-.41***	-.59***	-.32***				
10. Subjective burden	-.33***	-.15**	-.18***	.01	-.28***	-.25***	-.51***	-.31***	.59***			
11. Caregiver hours	-.15**	-.10	-.03	.05	-.04	-.06	-.14**	-.10	.21***	.28***		
12. Closeness	.01	-.12*	.19***	.00	.25***	.07	.16**	.04	-.13*	-.10	.08	
13. Social support	.29***	.22***	.14**	-.03	.16**	.20***	.19***	.18***	-.39***	-.16**	-.24***	-.04

Note. N = 375.

* *p* < .05. ** *p* < .01. *** *p* < .001.