Life satisfaction of informal care recipients: Findings from the German Ageing Survey

Larissa Zwar*, Hans-Helmut König and André Hajek

Department of Health Economics and Health Services Research, University Medical Center Hamburg-Eppendorf, Germany

**Objectives.** Global judgements of life satisfaction are a core aspect of subjective well-being, and of central relevance to understanding how those in need of care view their lives. Therefore, this study aimed to investigate the association between the receipt of informal care and life satisfaction in a longitudinal setting.

**Design.** Longitudinal analysis of a population-based data set of community-dwelling individuals aged 40 years and older.

**Methods.** Data from the German Ageing Survey were used (Waves 2002, 2008, 2011, 2014). Fixed effects regression analysis was implemented to investigate the longitudinal association between receipt of informal care (no/yes) and life satisfaction (Satisfaction with Life Scale), while controlling for sociodemographic data (e.g., age) and health-related factors (e.g., physical and mental health).

**Results.** Results from fixed effects longitudinal models revealed that transitioning from not receiving informal care to receiving informal care predicted a decrease in life satisfaction. This result remained stable when specific types of receipt of informal care were used as predictors.

**Conclusions.** Receiving informal care is associated with a decrease in life satisfaction, irrespective of the type of informal care received. These results highlight the necessity of taking the care recipient’s perception into consideration, and indicate the imminent need for the care situation to be improved, if the life satisfaction of care recipients is to be maintained.

**Statement of contribution**

What is already known on the topic?
In general, few studies investigate the care recipients’ perspective regarding outcomes associated with the receipt of informal care. Particularly, studies on the association between receipt of informal care and life satisfaction, and especially longitudinal population-based studies, are rare.

What does this study add?
- Evidence of a population-based longitudinal study in a sparsely investigated field of research
- Our longitudinal study found recipients of informal care to report reduced life satisfaction
- This negative association remained stable when investigating different tasks of informal care

In Germany, like in many other industrial countries, a demographic change is currently...
taking place. Due to this, the proportion of the population that is older is growing, while
the proportion of individuals in younger age groups is declining (Federal Statistical Office
of Germany, 2015). As a result, an increase in the demand for care is expected, especially
the demand for informal care.

In this study, informal care is defined as relatives, friends, or neighbours providing care
to a person in need of care due to health impairments. This care can involve help with
household chores, transportation, supervision, and basic personal care (e.g., bathing,
dressing, and eating).

In view of the central role informal care already plays in the German care system
(Federal Statistical Office of Germany, 2017), its consequences are gaining importance.
While various studies investigate the impact of providing care on caregivers (Pinquart &
Sörensen, 2003; Zwar, König, & Hajek, 2018), research on the care recipients’
perspective is less comprehensive.

While one aim of informal care is to fulfil a person’s basic needs, for example feeding,
hygiene, and medical care, it can be argued that another important aspect is to enable the
individual in need of care to still lead a satisfying life despite their impairments. When
asked why informal caregivers provide care, they name various reasons. Predominant
amongst these is that they perform care out of love for the care recipient (Guberma,
Maheu, & Maillé, 1992; Piercy, 2007), to reciprocate past kindness and care from the care
recipient, or simply to do something good for the relative or friend to whom they provide
care (Noonan et al., 1996). In sum, one can conclude from these reports that caregivers
wish to do the best for the care recipient because he or she is important to them, and the
 provision of informal care is seen as beneficial for the care recipient (Piercy, 2007). Thus, it
is important to investigate whether the provision of informal care really has a beneficial
effect for the care recipient. One relevant aspect in this regard is the life satisfaction of the
care recipient.

Life satisfaction is also associated with various beneficial factors, such as health and
social integration (Diener & Seligman, 2004), and has repeatedly been shown to be a good
predictor of mortality (Hulur et al., 2017; Mete, 2005). Thus, we think it is of central
importance to investigate the influence the receipt of informal care has on the life
satisfaction of care recipients.

Life satisfaction is one aspect of subjective well-being (Diener, 1984; Pavot & Diener,
1993), which includes both affective and cognitive components. The affective aspect can
refer to feelings of happiness, sadness, and stress (Diener, 1984), while the cognitive
aspect expresses the satisfaction with one’s life, based on a subjective cognitive
evaluation of one’s life (Pavot & Diener, 1993).

With the start of receiving informal care, an individual’s life changes in many
fundamental ways, for example the social relationship with the caregiver changes, and
the level of independency changes. While this can also influence the individual’s
affective status, we think life satisfaction is the more important aspect to investigate in
this context. Research has shown that life satisfaction is a separate aspect of well-being
that is distinct from the affective aspects of well-being (Lucas, Diener, & Suh, 1996).
Despite both aspects being linked, they are not completely dependent on each other.
Specifically, life satisfaction is a conscious cognitive evaluation of one’s life, which is
conducted based on an individual’s own criteria on what defines a good life (Pavot &
Diener, 1993), and uses mainly chronically accessible information about one’s life
(Schimmack & Oishi, 2005). Due to this, life satisfaction is also more stable than the
affective aspect of well-being (Anusic & Schimmack, 2016; Koivumaa-Honkanen, Kaprio,
Honkanen, Viinamäki, & Koskenvuo, 2005; Lucas et al., 1996). Thus, while the affective aspect would show the emotional reaction to the situational change to informal care, life satisfaction might differ substantively, as a general cognitive judgement of one’s life is made. Life satisfaction thereby provides important information regarding the care recipient’s global appraisal of their life’s circumstances. On this basis, we will focus solely on life satisfaction and its association with receipt of informal care.

To date, only a few studies have investigated this association in care recipients. One study, using one wave of the China Health and Retirement Longitudinal Study (CHARLS) data and an instrumental variable approach, found life satisfaction to decrease when care was received (Ouyang, Sun, & Wang, 2019). However, life satisfaction was only assessed with a single-question measure. Single-item measures have various disadvantages compared with multi-item scales. These include lower validity and reliability, and they can more easily be biased by errors (Sarstedt & Wilczynski, 2009). Weick (2006) also used data from a single-question measure of life satisfaction, using the German Socio-Economic Panel. Results indicate decreased life satisfaction in individuals in need of care. Although mixed effects regression analysis was conducted, no covariates seem to have been controlled for and only the need for care and its association with life satisfaction was analysed. Another study, questioning individuals living at home, found no association between receipt of care and life satisfaction (Bennett & Riedel, 2013). This cross-sectional study, again, used only a single-item measure.

There are also studies investigating the association between social support (e.g., Chalise, Saito, Takahashi, & Kai, 2007; Chao, 2012; Revicki & Mitchell, 1990) or intergenerational social exchange (e.g., Chen & Jordan, 2018; Katz, 2009; Kim & Kim, 2003; Lowenstein, Katz, & Gur-Yaish, 2007; Ng & Hamid, 2013; Silverstein, Cong, & Li, 2006) and life satisfaction. However, informal care differs from these concepts in various ways: While social support is relevant for all types of relationships, irrespective of health or age, and focuses more on emotional and social support (e.g., having someone to talk to, and expressions of love and understanding (e.g., Lubben, 1988; Shumaker & Brownell, 1984), informal care is specific to the presence of a need for care and instrumental and personal care. Furthermore, informal care focuses on the provision of care by the caregiver, and can include inter- and intra-generational support, as well as support by non-relatives. In contrast, intergenerational social exchange focuses on the exchange of support and only between parents and children. Like with social support, intergenerational social exchange can occur at different times of life and is independent of the health status of any of the parties.

Thus, these concepts and the studies examining them differ decisively from informal care. Specific conclusions for the health care system cannot easily be drawn from them. Therefore, we will not elaborate further on these studies.

In sum, studies focusing on the receipt of informal care specifically and life satisfaction are rare. The findings from former studies regarding informal care and life satisfaction indicate a negative association, but further research is needed. Prior research has relied on single-item measures and, with one exception (Weick, 2006), has drawn only on cross-sectional samples. However, estimates of cross-sectional analyses can be severely biased, due to unobserved heterogeneity (Gangl, 2010). The only study to examine this topic with longitudinal data did not control for covariates, and only the need for care was investigated (Weick, 2006). While the association between the need for care and life satisfaction is of interest, it provides no information on the association between actual receipt of informal care and life satisfaction. Thus, there is still a gap in research regarding
the longitudinal investigation of the association between the receipt of informal care and life satisfaction specifically.

Therefore, the purpose of our study was to investigate whether the receipt of informal care was negatively associated with changes in the life satisfaction of care recipients, within a longitudinal setting.

**Methods**

**Participants**

Data from waves 2002, 2008, 2011, and 2014 of the German Ageing Survey, collected by the German Centre of Gerontology in Berlin since 1996, were used. The German Ageing Survey is a cohort-sequential unbalanced panel study. In addition to the panel sample which is reassessed at every assessment point, a new sample is added and assessed at every assessment point (more details in Klaus and Engstler 2017 or Klaus *et al.* 2017). A two-stage national probability sampling method is used to choose the participants from community-dwelling individuals aged 40 years or older, stratified according to age, gender, and region. Our analytical sample is drawn from this group of community-dwelling individuals. Due to our analysis method, only those participants who experience a change in at least one of the variables of our model are included in our analytical sample. Participants with only one observation cannot contribute to the calculation of the estimates of the fixed effects (FE) regression; therefore, we excluded them from the analytical sample before conducting the calculations. The participants included into the study had on average 2.4 observations (min. = 2, max. = 4).

The response rate of the DEAS data was between 37.8% (2002) and 27.1% (2014). However, this is in accordance with the declining willingness to participate in surveys that have been found in Germany (Neller, 2005). Also, although there is sample selectivity due to gender, age, and size of city, this bias is small. The structure of the panel still remains representative of the German population (Klaus *et al.*, 2017).

Participants were questioned via structured face-to-face interviews and a drop-off questionnaire. All participants gave written informed consent. The standing council of the German Ageing Survey resolved that an ethics vote was not necessary.

**Instruments**

**Dependent variable**

Life satisfaction was assessed with the Satisfaction With Life Scale (SWLS) (Pavot & Diener, 1993). Life satisfaction is the cognitive aspect of subjective well-being (Diener, 1984; Pavot & Diener, 1993). Accordingly, the participants were asked to evaluate and judge their own satisfaction with their life, for example an item they were asked to rate using a scale (response categories: 1 *strongly disagree* – 5 *strongly agree*) was ‘The conditions of my life are excellent’. A mean value is calculated based on the results of its five items with higher scores representing higher life satisfaction (range: 1–5). The SWLS has been widely used (Pavot & Diener, 2008) and has demonstrated high levels of reliability and construct validity (Pavot & Diener, 1993). Cronbach’s alpha in our sample was .85.
Independent variable

The independent variable receipt of informal care was generated based on two questions. The first question asked the individual whether he or she was in need of assistance due to health impairments (no; yes). If they answered no, they were included into the ‘no, not receiving informal care’ group. If they answered yes, that they were in need of assistance due to health impairments, then they were asked the second question. The second question asked about the receipt of different types of informal care and individuals could indicate that they receive more than one type of informal care. If they received at least one type of informal care, they were included into the ‘yes, receiving informal care’ group. Please note that individuals who reported a need for care in the first question but did not report receiving any of these types of informal care were excluded from the sample, since they might not receive any informal care at all. Based on these two questions, we created the variable of receipt of informal care with the categories ‘no, not receiving informal care’ (0) and ‘yes, receiving informal care’ (1). For more details, see Figure A1 (Appendix).

In further analyses, we replaced receipt of informal care as the central predictor with specific types of informal care. With these analyses, we aimed to test whether a possible association with life satisfaction is dependent on the type of informal care received. We used three different types of informal care (help with household chores (e.g., preparing meals), being looked after (e.g., supervision), and personal care (e.g., bathing)). Participants were asked to report for all three types of informal care if they were receiving it or if they were not receiving any informal care (Yes/No).

Covariates

As covariates, we included age, employment (employed, retired, otherwise unemployed), marital status (married, living together; married, living separately; divorced; widowed; single), and two health variables (morbidity, physical functioning). Gender and education were not included, since both were assessed as time-constant variables. Due to our analysis method, all time-constant variables are already controlled in our analyses ([Brüderl & Ludwig, 2015]; for more details, see Statistics).

Morbidity was assessed with a self-reported 11-item list of chronic physical illnesses (Appendix, Table A1), which are added to create a sum score with higher values indicating higher morbidity. A sum score of illnesses has been shown to be a good predictor for 1-year mortality (Charlson, Pompei, Ales, & MacKenzie, 1987).

Depressive symptoms were not included in the main analysis as a covariate, because literature indicates that a reverse influence is possible, with life satisfaction influencing depressive symptoms (Koivumaa-Honkanen, Kaprio, Honkanen, Viinamaki, & Koskenvuo, 2004). Due to this, we added depressive symptoms only in another set of sensitivity analyses. Depressive symptoms were assessed with the Center for Epidemiologic Studies – Depression Scale (CES-D) (Hautzinger & Bailer, 1993; Radloff, 1977). Results of its 15 items are used to create a sum score (range: 0–45), with higher values showing a higher number of depressive symptoms. The CES-D is a widely used instrument with good reliability (Hautzinger & Bailer, 1993); in our data set, Cronbach’s alpha was .87.

Physical functioning was assessed using the subscale for physical functioning of the SF-36 (Bullinger & Kirchberger, 1998). Higher values imply higher physical functioning (range: 0–100). It has shown to be reliable in former research (Morfeld, Kirchberger, & Bullinger, 2011), with Cronbach’s alpha = .93 in our study.
Statistics

While cross-sectional data can easily be biased by unobserved heterogeneity, panel data reduce this danger by enabling the analysis of intraindividual changes over time. Panel data allow to differentiate between a person-specific time-constant error term $\alpha$ and a time-varying idiosyncratic error term $\varepsilon$ (equation 1).

$$y_{it} = \beta x_{it} + \alpha_i + \varepsilon_{it} \quad (1)$$

For our analyses, we used FE regression analysis. FE regression analysis is more conservative in its assumptions than, for example, random effects (RE) regression analysis (Brüderl & Ludwig, 2015; Cameron & Trivedi, 2009). For RE regression, it is assumed that none of these errors are associated with the explanatory variables, which is an assumption that is rarely fulfilled and can therefore easily lead to biased estimates. However, for FE regressions the weaker assumption is made that correlations between unobserved time-constant heterogeneity and explanatory variables exist. Due to this, FE regression analysis uses only within variance for the estimation. To achieve this, first the between transformation is performed (equation 2), by calculating the mean values pooled over all assessment times. Then, the within transformation is performed by subtracting the second from the first formula, resulting in the FE regression formula (equation 3).

$$\bar{y}_i = \beta \bar{x}_i + \alpha_i + \bar{\varepsilon}_i \quad (2)$$

$$y_{it} - \bar{y}_i = \beta(x_{it} - \bar{x}_i) + (\varepsilon_{it} - \bar{\varepsilon}_i) \quad (3)$$

As the FE regression formula (equation 3) shows, all time-constant (observed and unobserved) variables are removed from the model and are thus implicitly controlled. An average treatment effect on the treated is estimated (Brüderl & Ludwig, 2015). This is of great advantage, since unobserved heterogeneity can be a major problem (Cameron & Trivedi, 2009), especially in cohort studies, in which time-constant variables such as genetic dispositions can often not be assessed and remain uncontrolled. By using only within variance, unobserved time-constant heterogeneity cannot bias the estimation. Insofar as strict exogeneity for the time-varying error component is fulfilled, FE regression estimates consistent coefficients (Brüderl & Ludwig, 2015).

Since FE regression uses only within variance, the analytical sample consists only of those individuals who experience a change in at least one of the variables we included into our model. The coefficient of our main predictor variable receipt of informal care is estimated based only on those participants who experience a change in the receipt of informal care in the FE regression.

Cluster-robust standard errors were calculated to account for potential heteroscedasticity and serial autocorrelation. A Sargan–Hansen test (an adapted form of the Hausman test; Schaffer & Stillman, 2016) was employed, which allows the use of cluster-robust standard errors. The test of the main model showed a significant chi-square test ($\chi^2(11) = 91.599, p < .001$), thereby affirming the use of FE regression analysis instead of RE regression analysis.
The significance level was set at \( \alpha = .05 \). All analyses were calculated with Stata 15.0 (Stata Corp., College Station, TX, USA).

Results

Descriptive statistics
The basic features of the analytical sample, pooled over all four assessment points, are summarized in Table 1. The analytical sample (\( N = 1,457 \)) consists of 52.74% women, with an average age of 65.86 (\( SD = 11.26 \)) and the majority of the sample were retired (63.05%), while 24.72% were employed (12.23% otherwise not employed). About 10% of the sample received informal care. Life satisfaction was on average 3.67 (\( SD = .77; \) range: 1–5). For general receipt of care, 207 transitions from no receipt of informal care to receipt of informal care were found. Further information on the transitions in the variables assessing receipt of care can be found in Table 2.

Results of FE regression analyses
The results from our main analysis can be found in Table 3. When controlling for age, marital status, employment status, morbidity, and physical functioning, the FE regression

| Characteristic                          | M (SD)/Freq. (%) |
|----------------------------------------|------------------|
| Life satisfaction                      | 3.67 (.77)       |
| Receipt of informal care (yes) (%)     | 361 (10.54)      |
| Age                                    | 65.86 (11.26)    |
| Gender (female) (%)                    | 1,807 (52.74)    |
| Marital status (%)                     |                  |
| - Married, living together             | 2,484 (72.50)    |
| - Married, living separately           | 45 (1.31)        |
| - Divorced                             | 302 (8.81)       |
| - Widowed                              | 439 (12.81)      |
| - Single                               | 156 (4.55)       |
| Employment status (%)                  |                  |
| - Employed                             | 847 (24.72)      |
| - Retired                              | 2,160 (63.05)    |
| - Otherwise unemployed                 | 419 (12.23)      |
| Morbidity                              | 3.37 (1.94)      |
| Depressive symptoms                    | 8.74 (6.83)      |
| Physical functioning                   | 67.58 (27.25)    |

Note. Morbidity = number of chronic illnesses; mean (standard deviation) is given for continuous variables (life satisfaction, age, morbidity, depressive symptoms, physical functioning); frequency (per cent) is given for categorical variables (receipt of informal care, gender, marital status, employment status). The descriptive statistics give an overview over the characteristics of the analytical sample that was used in our main model, which includes all individuals that experienced a change in at least one of the variables that we included into our model – pooled over all assessment points. Individuals who had only one observation in the variables were excluded.
analysis demonstrated a significant negative association between receipt of informal care and life satisfaction \( (b = -0.16, p < .01) \).

Additionally, we tested the following sensitivity analyses. Instead of general receipt of informal care, three FE regressions were calculated using the receipt of three different types of informal care as an independent variable, while controlling for the covariates age, marital status, employment status, morbidity, and physical functioning (Table 4). Results revealed a significant negative association between receiving help with household chores and life satisfaction \( (b = -0.17, p < .01) \), a significant negative association between being looked after and life satisfaction \( (b = -0.21, p < .05) \), and a significant negative association between receiving personal care and life satisfaction \( (b = -0.28, p < .01) \).

Further sensitivity analysis was conducted, in which depressive symptoms were added as another covariate (Appendix, Table A2). The results remained virtually the same, with receipt of care in general being negatively associated with life satisfaction \( (b = -0.15, p < .05) \). All three types of receipt of informal care remained negatively associated as well.

### Table 2. Transitions in the informal care variables from ‘no receipt of informal care’ to ‘receipt of (specific type of) informal care’

| Type of informal care                      | Number of transitions |
|-------------------------------------------|-----------------------|
| Receipt of informal care                  | 207                   |
| Receiving help with household chores      | 182                   |
| Being looked after                        | 103                   |
| Receiving personal care                   | 67                    |

Note. Participants can receive more than one type of informal care.

### Table 3. Fixed effects regression analysis of the link between receipt of informal care and life satisfaction

|                                      | (1) Life satisfaction |
|--------------------------------------|-----------------------|
| Receipt of informal care (ref. no informal care) | -0.16** (0.06)       |
| Age                                   | -0.00 (0.00)          |
| Marital status (ref. married, living together) |                        |
| - Married, living separately         | -0.46* (0.23)         |
| - Divorced                           | -0.21 (0.19)          |
| - Widowed                             | -0.14+ (0.08)         |
| - Single                              | 0.03 (0.28)           |
| Employment status (ref. otherwise unemployed) |                        |
| - Employed                           | 0.15** (0.06)         |
| - Retired                             | 0.18*** (0.05)        |
| Morbidity                             | -0.05*** (0.01)       |
| Physical functioning                  | 0.00* (0.00)          |
| Constant                              | 3.86*** (0.22)        |
| Observations                          | 3,426                 |
| Number of individuals                 | 1,457                 |
| \( R^2 \)                             | 0.0563                |

Note. Unstandardized regression coefficients are reported, robust standard errors in parentheses; morbidity = amount of physical chronic illnesses.

Level of significance: ***\( p < .001 \); **\( p < .01 \); *\( p < .05 \); +\( p < .10 \).
Discussion

The purpose of this study was to investigate the association between receipt of informal care and the life satisfaction of informal care recipients, longitudinally. Our results revealed that receipt of informal care was associated with a decrease in life satisfaction. This association was found again when different types of informal care (help with household chores, being looked after, and personal care) were investigated. Namely, the receipt of any type of informal care was associated with lower life satisfaction.

Our results confirm and extend the findings from former research (e.g., Ouyang et al., 2019) by using a longitudinal data set, controlling for covariates and using a multi-item life satisfaction scale. Multi-item scales tend to be more reliable and valid than single-item questions (Sarstedt & Wilczynski, 2009). Furthermore, we extend the results from Weick (2006), who tested the life satisfaction of individuals in need of care without controlling for confounders. In our study, we analyse the actual receipt of care, and test the association between receipt of informal care and life satisfaction with FE regression analysis while controlling for various possible influences, such as physical and mental health.
Yet, our results are in contrast to Bennett and Riedel (2013), who found no association between receipt of care and life satisfaction. One possible reason for this difference is the cross-sectional design of their study. Cross-sectional results can easily be biased due to unobserved heterogeneity (Gangl, 2010).

The results of our main analysis, as well as our sensitivity analyses, indicate that informal care is negatively associated with the care recipients’ life satisfaction. One explanation for the negative association between receipt of informal care and life satisfaction might be the decreasing ability of taking care of oneself, as former findings suggest. For example, Borg, Hallberg, and Blomqvist (2006) found a lack of being able to care for oneself is associated with lower life satisfaction. Further research suggests that perceived control over one’s life is associated with life satisfaction (Hulicka, Morganti, & Cataldo, 1975; Wallhagen, 1992). Based on these results, we argue that one explanation for the negative association we found might be that care recipients perceive an inability to manage their own life due to receiving informal care and this negatively affects the cognitive evaluation of their satisfaction with life. Further research is recommended to test this hypothesis.

A different explanation for the negative effect of receiving informal care on life satisfaction could be the increasing dependence on one’s relatives and friends who provide the informal care. When questioned, informal care recipients often report feeling guilty for needing assistance with daily living tasks or worrying about being a burden on their relatives (Barken, 2017; Cahill, Lewis, Barg, & Bogner, 2009; Lee, Barken, & Gonzales, 2018). Care recipients have also reported to prefer not to combine supportive family relationships with caregiving (Barken, 2017). In addition to feeling guilty for relying on relatives and friends to master their daily life, turning a social relation into a caregiver–care recipient relationship might also negatively impact the social relationship and as a consequence diminish their social support network.

Lastly, another explanation could also be that care recipients compare themselves with other individuals in similar situations (Kearl, 1982) and the results of these comparisons influence their life satisfaction (Hajek & König, 2016). When perceiving other individuals in a similar situation to be better off without receiving informal care, they might be less satisfied with their own life. Again, this hypothesis needs further investigation.

Limitations and future research recommendations
Panel attrition due to age, education, income, health, and network size did occur; between 20.5% (2002) and 38.4% (2014) participants remained in the panel. However, the German Ageing Survey seeks to reduce this trend by improving panel maintenance, which has already shown a positive effect (Klaus & Engstler, 2017). Moreover, due to the use of the FE regression analysis method, time-constant factors responsible for panel attrition (e.g., education) cannot bias our estimates. Only time-varying factors that are responsible for panel attrition and have not been controlled for in the analyses could bias the estimates (Brüderl, 2010).

FE regression analyses only analyse within variation; thus, only individuals who show a change in the analysed variables are included. Due to this, the results are only representative for the analysed population, namely individuals starting to receive informal care. However, this is not a shortcoming. Our analyses merely reflect that only a specific group of the German population experience this change in receipt of informal care.
The association between receipt of informal care and life satisfaction could be moderated by further aspects, such as the relation between informal caregiver and care recipients or the personality of the care recipient. Further health-related aspects (e.g., specific illnesses) might influence the association, as well. Additionally, the relative impact of the receipt of professional and informal care on the life satisfaction of the care recipient should be compared. There are already some research findings (Chesterman, Bauld, & Judge, 2001; Lee et al., 2018) indicating individuals receiving formal care might have better life satisfaction than those receiving informal care. However, this information was not available to us. Moreover, it should be noted that the moderating effects and the comparison with professional care have not been the focus of our investigation. Still, we expect these lines of inquiry to be of interest for a more comprehensive understanding of this association. Knowledge on the differences between formal and informal care is important to adequately adapt the health care system to the needs of the care recipients. Therefore, we encourage further research regarding these aspects.

Our sample focused on community-dwelling individuals; thus, while individuals residing in care facilities or being treated in the hospital were not included we cannot rule out that participants might also receive some form of formal care.

Last, individuals reporting to be in need of care but not receiving informal care were excluded from our sample (see method and Figure A1 in Appendix). In our sample, this group was very small and did not allow for meaningful subgroup analysis. Further research with a bigger sample with these criteria is needed to analyse changes in life satisfaction when transitioning from this group to receipt of informal care.

Conclusion and implications
The need for care, especially informal care, is expected to increase, due to the demographic change. Knowledge of the consequences for caregivers, as well as care recipients, is therefore crucial to enable a beneficial care situation. However, previous research has mainly focused on caregivers and less on the recipients themselves. Our study’s results highlight the importance of taking the care recipients’ perspective into consideration when investigating consequences of caregiving.

Furthermore, our study gives first evidence on the association of receipt of informal care and life satisfaction which is a central aspect of life and predictive of mortality (Hulur et al., 2017; Mete, 2005). The results indicate that informal care could have negative effects for the care recipient. This information is crucial for health services and health policy, as it implies the need for an improvement of the care situation if the life satisfaction of care recipients is to be maintained. The consequences for care recipients who are supposed to be the beneficiaries of informal care should not be neglected, especially in the German care system, which relies heavily on informal care (Federal Statistical Office of Germany, 2017; Weick, 2006). Moreover, we demonstrated that this negative association remains stable for different tasks of informal care, including instrumental as well as basic personal care. Possible explanations are given in an earlier paragraph of the discussion. Further research on the reason for this negative association is recommended.

Based on our results and former research findings, we offer the following recommendations for improving the informal care situation.

One possible line of action to improve the care situation might be to enable the care recipient to perform more self-care. Since reduced life satisfaction might be due to the care recipient’s loss of independence, encouraging and promoting the care recipient to use the skills they have retained might help to maintain life satisfaction by preserving their...
autonomy. For example, as Barken (2017) reported, being their own care manager can help them retain a degree of autonomy. Thus, possible actions are, for example, providing information about different care options to the care recipient, and helping informal caregivers to support care recipients in making their own decisions. Other helpful options might be shopping services, which enable care recipients to do their own shopping even if they cannot leave the house. Care recipients who are in need of care due to mental impairments might still be capable of performing physical tasks under supervision and guidance.

Another possible approach could be to intervene at a psychological level. For example, it might be helpful to give support in terms of coaching the care recipients in adapting to the new situation and to their changed relationship with their informal caregivers. It might also be helpful to instruct care recipients in different coping strategies, for example flexible goal adjustment, to enable them to cope with their new situation. Research suggests flexible goal adjustment to be associated with better life satisfaction (Brandstädter & Renner, 1990). Thus, learning flexible goal adjustment could help care recipients to accept their changed life circumstances and to adapt their preferences and goals accordingly. Further research is needed to test this thesis.

Lastly, a distribution of caregiving tasks between formal and informal caregivers might be a good compromise (Barken, 2017). In addition to improving self-care abilities, we suggest supporting the informal caregiver by enabling a formal caregiver to undertake some of their tasks, for example basic personal care tasks. In line with this, increasing the availability and accessibility of formal care options might also be helpful. As a consequence, care recipients might feel less dependent and less like a burden, and life satisfaction might be maintained.

References
Anusic, I., & Schimmack, U. (2016). Stability and change of personality traits, self-esteem, and well-being: Introducing the meta-analytic stability and change model of retest correlations. Journal of Personality and Social Psychology, 110(5), 766–781. https://doi.org/10.1037/pspp0000066
Barken, R. (2017). Reconciling tensions: Needing formal and family/friend care but feeling like a burden. Canadian Journal on Aging, 36(1), 81–96. https://doi.org/10.1017/s0714980816000672
Bennett, J., & Riedel, M. (2013). Was beeinflusst die Lebenszufriedenheit im hohen Alter? [What influences life satisfaction in old age?]. Zeitschrift für Gerontologie und Geriatrie, 46(1), 21–26. https://doi.org/10.1007/s00391-012-0457-5
Borg, C., Hallberg, I. R., & Blomqvist, K. (2006). Life satisfaction among older people (65+) with reduced self-care capacity: The relationship to social, health and financial aspects. Journal of Clinical Nursing, 15(5), 607–618. https://doi.org/10.1111/j.1365-2702.2006.01375.x
Brandstädter, J., & Renner, G. (1990). Tenacious goal pursuit and flexible goal adjustment: Explication and age-related analysis of assimilative and accommodative strategies of coping. Psychology and Aging, 5(1), 58–67. https://doi.org/10.1037/0882-7974.5.1.58
Brüderl, J. (2010). Kausalanalyse mit Paneldaten [Causal analysis with panel data]. In C. Wolf & H. Best (Eds.), Handbuch der sozialwissenschaftlichen Datenanalyse [Social science data analysis handbook] (pp. 963–994). Wiesbaden, Germany: VS Verlag für Sozialwissenschaften. https://doi.org/10.1007/978-3-531-92038-2 Brüderl, J., & Ludwig, V. (2015). Fixed-effects panel regression. In H. Best & C. Wolf (Eds.), The SAGE handbook of regression analysis and causal inference (pp. 327–357). London, UK: Sage.
Bullinger, M., & Kirchberger, I. (1998). Der SF-36-Fragebogen zum Gesundheitszustand. Handanweisung [SF-36 Questionnaire on health status. Manual]. Göttingen, Germany: Hogrefe.

Cahill, E., Lewis, L. M., Barg, F. K., & Bogner, H. R. (2009). “You don’t want to burden them”: Older adults’ views on family involvement in care. Journal of Family Nursing, 15(3), 295–317. https://doi.org/10.1177/10748407093537247

Cameron, A. C., & Trivedi, P. K. (2009). Microeconometrics using stata, Vol. 5. College Station, TX: Stata Press.

Cameron, A. C., & Trivedi, P. K. (2009). Microeconometrics using stata, Vol. 5. College Station, TX: Stata Press.

Chalise, H. N., Saito, T., Takahashi, M., & Kai, I. (2007). Relationship specialization amongst sources and receivers of social support and its correlations with loneliness and subjective well-being: A cross sectional study of Nepalese older adults. Archives of Gerontology and Geriatrics, 44(3), 299–314. https://doi.org/10.1016/j.archger.2006.07.001

Chao, S. F. (2012). Functional disability and psychological well-being in later life: Does source of support matter? Aging & Mental Health, 16(2), 236–244. https://doi.org/10.1080/13607863.2011.596809

Chalise, H. N., Saito, T., Takahashi, M., & Kai, I. (2007). Relationship specialization amongst sources and receivers of social support and its correlations with loneliness and subjective well-being: A cross sectional study of Nepalese older adults. Archives of Gerontology and Geriatrics, 44(3), 299–314. https://doi.org/10.1016/j.archger.2006.07.001

Chen, J., & Jordan, L. P. (2018). Intergenerational support and life satisfaction of young-, old- and oldest-old adults in China. Aging & Mental Health, 22(3), 412–420. https://doi.org/10.1080/13607863.2016.1261798

Chesterman, J., Bauld, L., & Judge, K. (2001). Satisfaction with the care-managed support of older people: An empirical analysis. Health & Social Care in the Community, 9(1), 31–42. https://doi.org/10.1046/j.1365-2524.2001.00280.x

Diener, E. (1984). Subjective well-being. Psychological Bulletin, 95(3), 542–575. https://doi.org/10.1037/0033-2909.95.3.542

Diener, E., & Seligman, M. E. P. (2004). Beyond money: Toward an economy of well-being. Psychological Science in the Public Interest, 5(1), 1–31. https://doi.org/10.1111/j.0963-7214.2004.00501001.x

Engstler, H., Groh, A., Klaus, D., Mahne, K., Spuling, S., Wetzel, M.,… Tesch-Römer, C. (2015). German Ageing Survey (DEAS): Instruments of the Fifth Wave 2014. Retrieved from https://www.dza.de/fdz/deutscher-alterssurvey/deas-dokumentation/doi-deas/doi-105156deas2014d001.html

Federal Statistical Office of Germany. (2015). Neue Bevölkerungsvorausberechnung für Deutschland bis 2060 [New population projection for Germany until 2060] [Press release]. Retrieved from https://www.destatis.de/DE/PresseService/Presse/Pressemitteilungen/2015/04/PD15_153_12421.html

Federal Statistical Office of Germany. (2017). Pflegestatistik 2015 – Pflege im Rahmen der Pflegeversicherung – Deutschlandergebnisse [Care Statistics 2015 – caregiving in the context of nursing care insurance – nationwide findings for Germany]. Wiesbaden, Germany: Statistisches Bundesamt.

Gangl, M. (2010). Causal inference in sociological research. Annual Review of Sociology, 36, 21–47. https://doi.org/10.1146/annurev.soc.012809.102702

Guberman, N., Maheu, P., & Maille, C. (1992). Women as family caregivers: Why do they care?. The Gerontologist, 32(5), 607–617. https://doi.org/10.1093/geront/32.5.607

Hajek, A., & König, H.-H. (2016). Negative health comparisons decrease affective and cognitive well-being in older adults Evidence from a population-based longitudinal study in Germany. Frontiers in Psychology, 7, 999. https://doi.org/10.3389/fpsyg.2016.00999.

Hautzinger, M., & Bailer, M. (1993). Allgemeine Depressionsskala – ADS [ADS – General Depression Scale]. Weinheim, Germany: Beltz.

Hulicka, I. M., Morganti, J. B., & Cataldo, J. F. (1975). Perceived latitude of choice of institutionalized and noninstitutionalized elderly women. Experimental Aging Research, 1(1), 27–39. https://doi.org/10.1080/03610737508257944

Hulur, G., Heckhausen, J., Hoppmann, C. A., Infurna, F. J., Wagner, G. G., Ram, N., & Gerstorf, D. (2017). Levels of and changes in life satisfaction predict mortality hazards: Disentangling the role
of physical health, perceived control, and social orientation. *Psychology and Aging, 32*(6), 507–520. https://doi.org/10.1037/pag0000187

Katz, R. (2009). Intergenerational family relations and subjective well-being in old age: A cross-national study. *European Journal of Ageing, 6*(2), 79–90. https://doi.org/10.1007/s10433-009-0113-0

Kearl, M. C. (1982). An inquiry into the positive personal and social effects of old age stereotypes among the elderly. *The International Journal of Aging and Human Development, 14*(4), 277–290. https://doi.org/10.2190/lve8-kq7w-nb19-nfj8

Kim, I. K., & Kim, C.-S. (2003). Patterns of family support and the quality of life of the elderly. *Social Indicators Research, 62*, 437–454. https://doi.org/10.1023/A:1022617822399

Klaus, D., & Engstler, H. (2017). Data and methods of the German Ageing Survey. In K. Mahne, J. K. Wolff, J. Simonson & C. Tesch-Romer (Eds.), *Ageing in social change: Two decades of the German Ageing Survey (DEAS)* (pp. 29–45). Wiesbaden, Germany: Springer Fachmedien Wiesbaden.

Klaus, D., Engstler, H., Mahne, K., Wolff, J. K., Simonson, J., Wurm, S., & Tesch-Romer, C. (2017). Cohort profile: The German Ageing Survey (DEAS). *International Journal of Epidemiology, 46*(4), 1105. https://doi.org/10.1093/ije/dyw326

Koivumaa-Honkanen, H., Kaprio, J., Honkanen, R., Viinamaki, H., & Koskenvuo, M. (2004). Life satisfaction and depression in a 15-year follow-up of healthy adults. *Social Psychiatry and Psychiatric Epidemiology, 39*(12), 994–999. https://doi.org/10.1007/s00127-004-0833-6

Koivumaa-Honkanen, H., Kaprio, J., Honkanen, R. J., Viinamaki, H., & Koskenvuo, M. (2005). The stability of life satisfaction in a 15-year follow-up of adult Finns healthy at baseline. *BMC Psychiatry, 5*(1), 4. https://doi.org/10.1186/1471-244X-5-4

Lee, Y., Barken, R., & Gonzales, E. (2018). Utilization of formal and informal home care: How do older Canadians’ experiences vary by care arrangements? *Journal of Applied Gerontology*. https://doi.org/10.1177/0733464817750274

Lowenstein, A., Katz, R., & Gur-Yaish, N. (2007). Reciprocity in parent–child exchange and life satisfaction among the elderly: A cross-national perspective. *Journal of Social Issues, 63*(4), 865–883. https://doi.org/10.1111/j.1540-4560.2007.00541.x

Lubben, J. E. (1988). Assessing social networks among elderly populations. *Family & Community Health, 11*(3), 42–52. https://doi.org/10.1097/00003727-198811000-00008

Lucas, R. E., Diener, E., & Suh, E. (1996). Discriminant validity of well-being measures. *Journal of Personality and Social Psychology, 71*(3), 616–628. https://doi.org/10.1037//0022-3514.71.3.616

Mete, C. (2005). Predictors of elderly mortality: Health status, socioeconomic characteristics and social determinants of health. *Health Economics, 14*(2), 135–148. https://doi.org/10.1002/hec.892

Morfeld, M., Kirchberger, I., & Bullinger, M. (2011). *SF-36 Fragebogen zum Gesundheitszustand: Deutsche Version des Short Form-36 Health Survey [SF-36-Questionnaire on health status: German version of the Short Form-36 Health Survey]*. Göttingen, Germany: Hogrefe.

Neller, K. (2005). Kooperation und Verweigerung: Eine Non-Response-Studie [Cooperation and refusal: A non-response study]. *ZUMA Nachrichten, 29*(57), 9–36.

Noonan, A. E., Tennstedt, S. L., & Rebelsky, F. G. (1996). Making the best of it: Themes of meaning among informal caregivers to the elderly. *Journal of Aging Studies, 10*(4), 313–327. https://doi.org/10.1016/0889-0405(96)90004-3

Ng, S. T., & Hamid, T. A. (2013). Effects of work participation, intergenerational transfers and savings on life satisfaction of older Malaysians. *Australasian Journal on Ageing, 32*(4), 217–221. https://doi.org/10.1111/j.1741-6612.2012.00619.x

Ouyang, P., Sun, W., & Wang, C. (2019). Well-being loss in informal care for the elderly people: Empirical study from China national baseline CHARLS. *Asia-Pacific Psychiatry, 11*(2), e12356. https://doi.org/10.1111/appy.12356

Pavot, W., & Diener, E. (1993). Review of the satisfaction with life scale. *Psychological Assessment, 5*(2), 164–172. https://doi.org/10.1037/1040-3590.5.2.164
Pavot, W., & Diener, E. (2008). The Satisfaction With Life Scale and the emerging construct of life satisfaction. *The Journal of Positive Psychology, 3*(2), 137–152. https://doi.org/10.1080/17439760701756946

Pierce, K. W. (2007). Characteristics of strong commitments to intergenerational family care of older adults. *Journals of Gerontology. Series B, Psychological Sciences and Social Sciences, 62*(6), S381–S387. https://doi.org/10.1093/geronb/62.6.s381

Pinquart, M., & Sörensen, S. (2003). Differences between caregivers and noncaregivers in psychological health and physical health: A meta-analysis. *Psychology and Aging, 18*(2), 250–267. https://doi.org/10.1037/0882-7974.18.2.250

Radloff, L. S. (1977). *The CES-D Scale*. *Applied Psychological Measurement, 1*(3), 385–401. https://doi.org/10.1177/014662167700100306

Revicki, D. A., & Mitchell, J. P. (1990). Strain, social support, and mental health in rural elderly individuals. *Journal of Gerontology, 45*(6), S267–S274. https://doi.org/10.1093/geronj/45.6.s267

Sarstedt, M., & Wilczynski, P. (2009). More for less? A comparison of single-item and multi-item measures. *Die Betriebswirtschaft, 69*(2), 211–227.

Schaffer, M., & Stillman, S. (2016). *XTOVERID: Stata module to calculate tests of overidentifying restrictions after xtreg, xtitreg, xtitreg2, xttaylor*. Retrieved from http://EconPapers.repec.org/RePEc:boc:bocode:s456779

Schimmack, U., & Oishi, S. (2005). The influence of chronically and temporarily accessible information on life satisfaction judgments. *Journal of Personality and Social Psychology, 89*(3), 395–406. https://doi.org/10.1037/0022-3514.89.3.395

Shumaker, S. A., & Brownell, A. (1984). Toward a theory of social support: Closing conceptual gaps. *Journal of Social Issues, 40*(4), 11–36. https://doi.org/10.1111/j.1540-4560.1984.tb01105.x

Silverstein, M., Cong, Z., & Li, S. (2006). Intergenerational transfers and living arrangements of older people in rural China: Consequences for psychological well-being. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 61*(5), 256–266. https://doi.org/10.1093/geronb/61.5.s256

Wallhagen, M. I. (1992). Perceived control and adaptation in elder caregivers: Development of an explanatory model. *The International Journal of Aging and Human Development, 36*(3), 219–237. https://doi.org/10.2190/ba90-aqx3-t6ce-abek

Weick, S. (2006). Starke Einbußen des subjektiven Wohlbefindens bei Hilfe- oder Pflegebedürftigkeit: Verlaufsanalysen mit dem Sozio-ökonomischen Panel [Strong loss of subjective well-being in need for help or care: Progression analysis with the Socioeconomic Panel]. *Informationsdienst Soziale Indikatoren, 35*, 12–15. https://doi.org/10.15464/isi.35.2006.12-15

Zwar, L., König, H., & Hajek, A. (2018). Consequences of different types of informal caregiving for mental, self-rated, and physical health: Longitudinal findings from the German Ageing Survey. *Quality of Life Research, 27*(10), 2667–2679. https://doi.org/10.1007/s11136-018-1926-0

Zwar, L., König, H., & Hajek, A. (2019). The impact of receiving informal care on self-esteem and its moderation by social class. *Aging & Mental Health*, https://doi.org/10.1080/13607863.2019.1617241

Received 22 March 2019; revised version received 9 July 2019

**Appendix**

**Table A1.** List of the chronic physical illnesses as assessed by the morbidity measure (Engstler et al., 2015)

| 1. Cardiac and circulatory diseases |
| 2. Bad circulation |
Figure A1 The construction of the *receipt of informal care* variable (Zwar, König, & Hajek, 2019). The figure outlines how individuals were allocated to the *receipt of informal care* variable (categories: not receiving care, receiving care) based on their answers to the two interview questions (Question 1 and Question 2). \(^a\)Individuals who answered ‘No’ to the first question were not asked the second question. \(^b\)Individuals who reported a need for care but were not receiving any of the types of care outlined in the survey were excluded from the sample. This was decided on the basis that they might not have been receiving informal care at all.

Table A2. Fixed effects regression analyses of the link between receipt of informal care and life satisfaction with adjustment for depressive symptoms

|                           | (1)  | (2)  | (3)  | (4)  |
|---------------------------|-----|-----|-----|-----|
| Receipt of informal care  | -0.15* (0.06) |       |       |       |
| (ref. no informal care)   |     |     |     |       |
| Types of informal care    |     |     |     |       |
| (ref. 0 = ‘no, not receiving this type of care’) |       |       |     |       |
| Receiving help with       | -0.17** (0.06) | -0.23* (0.09) | -0.32** (0.10) |       |
| household chores          |     |     |     |       |
| Being looked after        | -0.00 (0.00) | -0.00 (0.00) | -0.00 (0.00) | -0.00 (0.00) |
| Receiving personal care   |     |     |     |       |
| Age                       |     |     |     |       |
| Marital status (ref. married, living together) |       |     |     |       |
| - Married, living separately | -0.42* (0.20) | -0.36+ (0.19) | -0.36+ (0.20) | -0.39+ (0.21) |
| - Divorced                | -0.21 (0.18) | -0.25 (0.18) | -0.27 (0.18) | -0.33+ (0.19) |
| - Widowed                 | -0.08 (0.08) | -0.10 (0.08) | -0.08 (0.08) | -0.04 (0.08) |
| - Single                  | -0.18 (0.25) | -0.19 (0.25) | 0.04 (0.22)  | -0.16 (0.25) |
| Employment status         |     |     |     |       |
| (ref. otherwise unemployed) |       |     |     |       |

*Continued*
Table A2. (Continued)

|                      | Life satisfaction |   |   |   |
|----------------------|------------------|---|---|---|
|                      | (1)             | (2) | (3) | (4) |
| - Employed           | 0.12* (0.05)    | 0.11* (0.05) | 0.10+ (0.05) | 0.09 (0.05) |
| - Retired            | 0.15** (0.05)   | 0.16** (0.05) | 0.15** (0.05) | 0.14** (0.05) |
| Morbidity            | -0.05*** (0.01) | -0.05*** (0.01) | -0.05*** (0.01) | -0.05*** (0.01) |
| Depressive symptoms  | -0.02*** (0.00) | -0.02*** (0.00) | -0.02*** (0.00) | -0.02*** (0.00) |
| Physical functioning | 0.00 (0.00)     | 0.00 (0.00)  | 0.00 (0.00)  | 0.00 (0.00)  |
| Constant             | 4.19*** (0.22)  | 4.20*** (0.22) | 4.19*** (0.23) | 4.27*** (0.23) |
| Observations         | 3.279           | 3.227         | 3.032         | 2.968         |
| Number of individuals| 1,399           | 1,381         | 1,308         | 1,281         |
| $R^2$                | 0.0908          | 0.0893        | 0.0880        | 0.0975        |

Note. Unstandardized regression coefficients are reported, robust standard errors in parentheses; morbidity = amount of chronic physical illnesses.
Level of significance: ***$p < .001$; **$p < .01$; *$p < .05$; +$p < .10$. 