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Examining the Pathways between Gratitude and Self-Rated Physical Health across Adulthood

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Abstract

The current study examined whether dispositional gratitude predicts physical health among adults, and if so, whether this relationship occurs because grateful individuals lead healthier lives, either psychologically or physically. Specifically, we examined whether psychological health, healthy activities, and willingness to seek help for health concerns mediated the link between gratitude and self-reported physical health, as well as if these mediational pathways are moderated by age, in a broad sample of Swiss adults ($N = 962$, $M_{\text{age}} = 52$ years, age range: 19 to 84). Dispositional gratitude correlated positively with self-reported physical health, and this link was mediated by psychological health, healthy activities, and willingness to seek help for health concerns. However, the indirect effects for psychological health and healthy activities were stronger for older than younger adults. In other words, the mechanisms explaining why gratitude predicts health appear to differ across adulthood.

Keywords

gratitude; health behaviors; physical health; conditional indirect effect models

Introduction

Grateful individuals experience a wide variety of social and psychological health benefits (see e.g., Emmons & Mishra, 2011; Wood, Froh, & Geraghty, 2010 for a review). However, few studies have examined whether dispositional gratitude might also predict *physical* health benefits. One possible reason is that the pathways between gratitude and physical health are less easily described than those between the trait and either social or psychological health. The current study sought to test whether grateful individuals report better physical health, and explain why these effects might occur, focusing on psychological health and health behaviors as possible intervening mechanisms. Moreover, we tested whether these pathways differ across adulthood, following recent suggestions in the personality and health literature (Hill & Roberts, 2011).

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Dispositional gratitude can be defined as “part of a wider life orientation towards noticing and appreciating the positive in the world” (Wood et al., 2010). Grateful individuals tend to count their blessings (Emmons & McCullough, 2003) and thus are more likely to see their lives and experiences as “gifts” for which to be thankful. Moreover, dispositional gratitude demonstrates a profile of correlates seemingly indicative of better physical health (McCullough, Emmons, & Tsang, 2002). For instance, grateful individuals tend to report greater vitality and agency, along with less anxiety. In addition, gratitude is linked to traits indicative of better physical health, including conscientiousness, emotional stability, and optimism. Accordingly, one would predict that a grateful disposition should be a healthy one.

Given this background, it is surprising that almost no studies have examined whether grateful individuals experience better physical health, and this remains a “key understudied area of research” (Wood et al., 2010). That said, there are some indications that grateful individuals might experience physical health benefits. For example, intervention work suggests that participants asked to create daily or weekly lists of things they are grateful for report fewer physical ailments at the end of the study (Emmons & McCullough, 2003). Furthermore, grateful individuals tend to report less stress (Krause, 2006) and better sleeping habits (Wood, Joseph, Lloyd, & Atkins, 2009a). Such results are in line with work noting the ability of general positive affect to promote physical health (e.g., Tugade, Fredrickson, & Feldman Barrett, 2004). While these findings are promising, further research is needed to confirm a relationship between gratitude and physical health, and to describe why this link might occur.

Why Dispositional Traits Influence Health Outcomes

When considering why dispositions predict physical health, researchers tend to focus on how traits predict intermediary mechanisms by which to promote health, rather than asserting direct effects. As noted above, grateful individuals experience a number of psychological health benefits, which in turn should promote physical health. For instance, gratitude predicts greater psychological well-being even when controlling for other traits (Wood, Joseph, & Maltby, 2009b), and predicts greater optimism across the adult years (e.g., Hill & Allemand, 2011), which is a known predictor of positive physical health outcomes (e.g., Rasmussen, Scheier, & Greenhouse, 2009). As such, psychological health could prove one explanation for any link between gratitude and physical health. However, work is still needed to examine whether psychological health serves to describe linkages between positive psychology constructs, like gratitude, and physical health (Schmidt, Raque-Bogdan, Piontkowski, & Schaefer, 2011).

In addition, dispositional traits often identify which individuals take part in healthier activities (e.g., Adler & Mathews, 1994), such as staying active, getting good nutrition, maintaining a social support base, and visiting the doctor. For example, conscientiousness is linked to a variety of health behaviors (Bogg & Roberts, 2004), which in turn serves to mediate the link between this trait and physical health outcomes (Lodi-Smith et al., 2010). In the current study, we examined two forms of health behaviors as possible mediators: participants’ propensity for health promoting activities, and their willingness to seek help for health conditions.

Moreover, work is needed that goes beyond simply identifying mediational mechanisms, and toward understanding when and for whom such effects are important for health. Specifically, mediators may have stronger effects on health during those developmental periods for which health is in greater decline, or for which the behavior of interest is particularly salient. For instance, one study found that conscientious individuals reported greater medical adherence, but whether and when this variable explained the link between

conscientiousness and health depended on the type of adherence (Hill & Roberts, 2011). For instance, adherence to a medication regimen better explained the health benefits afforded by conscientiousness in older adulthood, a period of greater health decline and one during which individuals are more frequently placed on medication regimens. However, adherence to your doctor's orders appears to help explain the health benefits of conscientiousness throughout adulthood. Given the possibility that indirect effects differ throughout the life course, we tested whether our mediational pathways of interest differed across the adult years.

Current Study

The current study sampled Swiss participants across the adult years (range: 19 to 84) with respect to their levels of gratitude, psychological health, health behaviors, and self-reported physical health. From this data, we examined three primary questions of interest. First, do grateful individuals report better physical health? Moreover, we tested whether this relation held when controlling for the Big Five personality traits, to examine whether studying gratitude is meaningful for health psychologists, above traditional trait measures. Second, if so, why does this relationship hold? Specifically, we tested three variables as possible mediators: psychological health, healthy activities, and the willingness to seek help for health concerns. Third, are these possible mediators better explanatory variables during some periods of adulthood more than others? In other words, we were interested in knowing whether gratitude predicts physical health, why it might, and whether these explanations differ across the adult years.

Method

Sample and Procedure

Nine hundred sixty-two Swiss adults (57% Female; $M_{\text{age}} = 52.4$ years, range: 19 to 84 years, $SD = 17.7$) participated in a large-scale survey, after providing informed consent. With respect to educational attainment, 7% reported having a basic education (i.e., primary and secondary school) as the highest level of education, 40% reported attending high school education or equivalent (e.g., vocational school), 24% completed a degree from a technical school, and 29% attended university. Regarding marital status, 35% participants were single, 46% were married, 13% were either separated or divorced, and 7% were widowed. The sampling procedure included an age-stratified random selection of prospective study participants accomplished by the city registration office. Full details of the data collection for this study have been described elsewhere (Hill & Allemand, 2011).

Measures

Gratitude—The Gratitude Questionnaire (GQ-6; McCullough et al., 2002) was used to assess participants' disposition toward gratitude. Participants rated their level of agreement to the six-item scale using a 6-point Likert-scale from 1 ("Strongly Disagree") to 6 ("Strongly Agree"). Sample items include "I have so much in life to be thankful for" and "I am grateful to a wide variety of people." Reliability for the measure was acceptable ($\alpha = .68$). The GQ-6 has consistently demonstrated strong predictive validity across multiple studies (e.g., McCullough et al., 2002; Wood et al., 2009a).

Psychological and Physical Health—Subjective psychological and physical health was measured using the Short Form-12 Health Survey (SF-12; Bullinger & Kirchberger, 1998; Ware, Kosinski & Keller, 1995). We separated the six items that tap general physical health from the six that assess psychological health. The response scales of the items range between 2- and 6-point Likert-type scales, and we used the mean score of the standardized items as a measure of perceived physical health. Reliability for the psychological health

subscale was good ($\alpha = .87$). Sample items include asking participants how much time over the last month “have you felt calm and peaceful?” or “have you felt downhearted and low?” on a scale from “All of the time” to “None of the time”. Reliability for the physical health subscale was good ($\alpha = .81$). Sample items include “In general, would you say your health is,” rated on a scale from “Poor” to “Excellent,” and “During the past 4 weeks how much did pain interfere with your normal work (including both outside the home and housework)?” rated on a scale from “Not at All” to “Extremely.”

Healthy Activities—The 5-item healthy activities scale developed for this study sought to capture five different areas of health behavior: nutrition, exercise, personal well-being, social well-being, and drug use. Participants rated how truthfully each item (included in the Appendix) described the participant on a scale from 1 “Not at All” to 5 “Very”. Reliability for this measure was moderate ($\alpha = .64$). Given the heterogeneity of the items and brief format though, one would anticipate lower-than-average reliabilities for the scale.

Willingness to Seek Help for Health Concerns—Willingness to seek help for health concerns was assessed by asking participants to report how likely they are to seek help for five hypothetical case scenarios (included in Appendix). This measure was developed for this study and based on previous research on health care (e.g., Hervé, Mullet, & Sorum, 2004; Marcell & Halpern-Felsher, 2005; Wills & Moore, 1996). These scenarios included concerns with respect to physical health, psychological or mental health, and social health. Participants indicated the likelihood to which they were willing to seek help for the respective health scenario on an 11-point Likert-type scale ranging from 0% (*Definitely not*) to 100% (*Definitely yes*). Reliability for the scale care was good ($\alpha = .80$).

Big Five Personality Traits—Participants completed the German version of the Big Five Inventory (Rammstedt & John, 2005), which consists of 45 items. Participants used a 5-point Likert-type scale ranging from 1 “Disagree strongly” to 5 “Agree strongly” to indicate how well these phrases described their personality. The BFI scales have shown substantial internal consistency, retest reliability, and clear factor structure, as well as considerable convergent and discriminant validity with longer Big Five measures, and substantial agreement between self- and peer-reports (John, Naumann, & Soto, 2008). In our sample, all trait scales demonstrated moderate to good reliability: Extraversion ($\alpha = .83$), Agreeableness ($\alpha = .69$), Conscientiousness ($\alpha = .77$), Neuroticism ($\alpha = .83$), and Openness ($\alpha = .79$).

Plan of Analysis

First, to establish the relations between gratitude, psychological and physical health, and health behaviors (healthy activities and willingness to seek help), we examined whether these variables were positively correlated in our sample. In addition, we tested whether gratitude uniquely predicted greater physical health, when controlling for age and the Big Five traits. Second, assuming that gratitude correlates positively with physical health and our three possible mediators, we performed bootstrapping tests of mediation separately for psychological health, healthy activities, and willingness to seek help, using the Preacher and Hayes (2008) macro with 5000 samples. We still controlled for any possible effects of age and the Big Five traits on the outcome (physical health) in these analyses. This approach provides unstandardized betas for the indirect effect estimates, and the corresponding 95% bias-corrected and accelerated confidence intervals.

Third, we tested possible moderated mediation effects, now using age as a moderator rather than control variable, and again employing a bootstrapping technique (Preacher, Rucker, & Hayes, 2007). This method provides indirect effect estimates for individuals at the mean age of our sample (age 52), as well as for one standard deviation below (age 34) and above the

mean (age 70). In addition, it provides tests of age as a moderator of three different parameters: (a) the effect of gratitude on the mediator, (b) the effect of the mediator on physical health, and (c) the effect of gratitude on physical health with the mediator in the model. A significant positive interaction term would indicate that the pathway of interest is stronger for older adults, while a significant negative pathway would indicate it is stronger for younger adults.

Results

Bivariate Correlations

Table 1 provides the correlations between the variables of interest for our mediation models. Gratitude positively correlated with self-reported physical health ($r(956) = .16$), psychological health ($r(956) = .29$), propensity for healthy activities ($r(953) = .32$), and willingness to seek help for health concerns ($r(952) = .22$). In addition, physical health correlated positively with psychological health, ($r(962) = .48$), healthy activities ($r(956) = .18$), and willingness to seek help ($r(957) = .14$). Thus, with respect to the mediation models, we found positive relations between our predictor (gratitude), possible mediators (psychological health, healthy activities and willingness to seek help), and outcome (physical health). We also tested whether gratitude provides unique predictive value for physical health, when controlling for age and the Big Five traits. As shown in Table 2, gratitude remained a significant predictor even in this analysis ($\beta = .10, p < .05$). Thus, it appears that grateful individuals do tend to report better physical health.

Tests of Mediation

Next we performed bootstrapping tests of mediation separately for psychological health, healthy activities, and willingness to seek help as potential mediators, controlling again for the effects of age and the Big Five on the physical health. Results are presented in Columns 2 and 3 of Table 3. In each case, the variable served as a significant mediator of the link between gratitude and physical health. However, only psychological health served as a full mediator of the link, as gratitude maintained a significant direct effect in the other two models (direct effect B [s.e.] by mediator: psychological health .02 [.03], $p > .05$; healthy activities .06 [.03], $p < .05$; willingness to seek help .08 [.03], $p < .05$).

Moderated Mediation Tests

Finally, we tested whether these three mediational pathways were moderated by age. As noted above, these analyses provide estimates of the indirect effect at different ages, determined by the distribution of age in our sample (Columns 4 to 6, Table 3). In addition, this approach provides tests of whether age moderated either the link between the predictor and mediator (AxG predicting M; Column 7, Table 3), the mediator and outcome (AxM predicting PH; Column 8, Table 2), or the predictor and outcome with the mediator in the model (AxG predicting PH; Column 9, Table 2).

Psychological Health—With respect to psychological health, bootstrapping tests indicated that this variable remained a significant mediator across all three age groups. However, the indirect effect became stronger with age (.12, .14, and .16), in part due to the significant interaction between age and the mediator ($B = .008, p < .05$). This effect suggests that the link between psychological health and physical health was stronger for older than younger adults, and as such, the indirect effect through psychological health was stronger with age.

Healthy Activities—Similar results were evidenced for healthy activities. This variable served as a significant mediator for middle ($B = .06, p < .05$) and older ($B = .11, p < .05$)

adults, but not younger ones ($B = .02$). These differences resulted because the interaction between age and healthy activities significantly predicted physical health ($B = .006, p < .05$). Again, the mediator was a better predictor of health for older than younger adults.

Willingness to Seek Help for Health Concerns—Finally, with respect to willingness to seek help, little evidence was found for moderated mediation. While this indirect effect failed to reach significance in the oldest cohort, the estimates were largely equivalent across the three adult age groups (.024, .023, and .022). Moreover, no interaction terms reached significance in this set of analyses. Therefore, it appears that the indirect effect through willingness to seek help was roughly equal across adulthood.

Discussion

While grateful individuals often fare better with respect to social and psychological health, few studies have tested the possibility that dispositional gratitude also promotes physical health. The current study not only addressed the link between gratitude and perceived physical health, but also why such a link might occur, as well as for whom. Our findings suggest that grateful individuals experience better physical health, in part, because of their greater psychological health, propensity for healthy activities, and willingness to seek help for health concerns. Interestingly, two of these mediators (psychological health and healthy activities) provided better explanations for the gratitude-to-health link later in adulthood than for young adults. In other words, the ways by which gratitude influences physical health differ across the lifespan.

In addition to helping fulfill the need for research on gratitude and physical health, the current work also adds to our understanding of how positive affect, and specific positive affective traits promote physical health. Recent reviews have suggested that one mechanism by which positive affect is beneficial for adult health is that it predicts a greater propensity for health-promoting behaviors (e.g., Ong, 2010; Ong, Mroczek, & Riffin, 2011). Similarly, individuals higher on life satisfaction tend to smoke less and exercise more, results that hold across different global regions (Grant, Wardle, & Steptoe, 2009). Our results then provide further support for Ong and colleagues' claims, by demonstrating that the health benefits associated with gratitude, a trait indicative of a specific positive affect, are partially explained by the fact that grateful individuals engage in healthier activities and seek help when they need it.

While the current results help advance the conversation on gratitude and physical health, our study should serve primarily as a catalyst for future work rather than as an end point. Of greatest importance is the need for work examining how gratitude links to more objective measures of physical health, although research suggests that self-reported health provides a good proxy (e.g., Idler & Benyamini, 1997). Moreover, it would be valuable to examine other mechanisms that may underlie the gratitude-health link. For instance, Ong and colleagues (2010; Ong et al., 2011) also noted that positive affect can promote physical health through influences on physiological systems, reducing stress exposure, and attenuating or “undoing” stress. Future work would benefit from including these variables into the causal model, particularly given that our psychological health measure indirectly assesses stress exposure and stress reactivity. In addition, it would be valuable to examine the unique effects of gratitude on physical health, compared to other forms of positive affect. Toward that end, it should be noted that previous work with the current sample has demonstrated that while gratitude is a significant positive predictor of variables such as optimism and positive affect, the magnitudes of these relationships are modest enough to underscore the uniqueness of these constructs (Hill & Allemand, 2011).

Our work is not without its limitations though. First, some measures evidenced less than ideal reliability, which is typical when using briefer measures, as often needed in large-scale studies. Second, it would be valuable to reexamine these findings with longitudinal data, to better assess the mediational pathways we have suggested. For instance, it is plausible that physical health and gratitude demonstrate bidirectional relations, insofar that healthier individuals are grateful for their good health, which in turn motivates them to protect themselves through healthier behaviors. That said, the current work follows the typically assumed directionality between traits and physical health (e.g., Adler & Mathews, 1994). Moreover, intervention work has suggested the potential for gratitude to serve as an antecedent for well-being (e.g., Emmons & McCullough, 2003; Froh, Sefick, & Emmons, 2008), serving as further support for the directional claims examined here. Third, it would be valuable to also include objective measures of the health behaviors of interest (e.g., doctors' report of actual health care use). Fourth, while our moderation effect sizes are small in magnitude, effect sizes for interactions are typically small and yet can still carry practical importance (Chaplin, 1991).

These caveats aside, this study provides some important initial steps toward understanding how being grateful could promote physical health. Moreover, the current work points again to the notion that how personality traits influence health may differ across the adult years. Clearly, the characterization of physical health differs for younger and older adults across multiple variables, including environmental influences and opportunities for health-promoting activities. As such, the current results support calls for further research on how the relationships between health and personality traits differ throughout the life course (Hill & Roberts, 2011).

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References

- Adler N, Mathews K. Health psychology: Why do some people get sick and some stay well? *Annual Review of Psychology*. 1994; 45:229–259.
- Bogg T, Roberts BW. Conscientiousness and health behavior: A meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin*. 2004; 130:887–919. [PubMed: 15535742]
- Bullinger, M.; Kirchberger, I. SF-36. Fragebogen zum Gesundheitszustand. Handanweisung. Göttingen: Hogrefe; 1998.
- Chaplin WF. The next generation of moderator research in personality psychology. *Journal of Personality*. 1991; 59:143–178. [PubMed: 1880698]
- Emmons RA, McCullough ME. Counting blessings versus burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology*. 2003; 84:377–389. [PubMed: 12585811]
- Emmons, RA.; Mishra, A. Why gratitude enhances well-being: What we know, what we need to know. In: Sheldon, KM.; Kashdan, TB.; Steger, MF., editors. *Designing positive psychology: Taking stock and moving forward*. New York, NY: Oxford University Press; 2011. p. 248-262.
- Froh JJ, Sefick WJ, Emmons RA. Counting blessings in early adolescents: An experimental study of gratitude and subjective well-being. *Journal of School Psychology*. 2008; 46:213–233. [PubMed: 19083358]
- Grant N, Wardle J, Steptoe A. The relationship between life satisfaction and health behavior: A cross-cultural analysis of young adults. *International Journal of Behavioral Medicine*. 2009; 16:259–268. [PubMed: 19319695]

- Hervé C, Mullet E, Sorum PC. Age and medication acceptance. *Experimental Aging Research*. 2004; 30:253–273. [PubMed: 15487305]
- Hill PL, Allemand M. Gratitude, forgivingness, and well-being in adulthood: Tests of moderation and incremental prediction. *The Journal of Positive Psychology*. 2011; 6:397–407.
- Hill PL, Roberts BW. The role of adherence in the relationship between conscientiousness and health. *Health Psychology*. 2011; 30:797–804. [PubMed: 21604876]
- Idler EL, Benyamini Y. Self-rated health and mortality: A review of twenty-seven community studies. *Journal of Health and Social Behavior*. 1997; 38:21–37. [PubMed: 9097506]
- John, OP.; Naumann, LP.; Soto, CJ. Paradigm shift to the integrative Big-Five trait taxonomy: History, measurement, and conceptual issues. In: John, OP.; Robins, RW.; Pervin, LA., editors. *Handbook of personality: Theory and research*. 3. New York, NY: Guilford Press; 2008.
- Krause N. Gratitude toward God, stress, and health in late life. *Research on Aging*. 2006; 28:163–183.
- Lodi-Smith J, Jackson J, Bogg T, Walton K, Wood D, Harms P, Roberts BW. Mechanisms of health: Education and health-related behaviours partially mediate the relationship between conscientiousness and self-reported physical health. *Psychology & Health*. 2010; 25:305–319. [PubMed: 20204934]
- Marcell AV, Halpern-Felsher BL. Adolescents' health beliefs are critical in their intentions to seek physician care. *Preventive Medicine*. 2005; 41:118–125. [PubMed: 15917002]
- McCullough ME, Emmons RA, Tsang JA. The grateful disposition: A conceptual and empirical topography. *Journal of Personality and Social Psychology*. 2002; 82:112–127. [PubMed: 11811629]
- Ong AD. Pathways linking positive emotion and health in later life. *Current Directions in Psychological Science*. 2010; 19:358–362.
- Ong AD, Mroczek DK, Riffin C. The health significance of positive emotions in adulthood and later life. *Social and Personality Psychology Compass*. 2011; 5:538–551. [PubMed: 21927620]
- Preacher KJ, Hayes AF. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*. 2008; 40:879–891. [PubMed: 18697684]
- Preacher KJ, Rucker DD, Hayes AF. Addressing moderation mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*. 2007; 42:185–227.
- Rammstedt B, John OP. Kurzversion des Big Five Inventory (BFI-K): Entwicklung und Validierung eines ökonomischen Inventars zur Erfassung der fünf Faktoren der Persönlichkeit. [Short version of the Big Five Inventory (BFI-K): Development and validation of an economic inventory for assessment of the five factors of personality]. *Diagnostica*. 2005:195–206.
- Rasmussen HN, Scheier MF, Greenhouse JB. Optimism and physical health: A meta-analytic review. *Annals of Behavioral Medicine*. 2009; 37:239–256. [PubMed: 19711142]
- Schmidt CK, Raque-Bogdan TL, Piontkowski S, Schaefer KL. Putting the positive in health psychology: A content analysis of three journals. *Journal of Health Psychology*. 2011; 16:607–620. [PubMed: 21346007]
- Tugade MM, Fredrickson BL, Feldman Barrett L. Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of Personality*. 2004; 72:1161–1190. [PubMed: 15509280]
- Ware JE, Kosinski M, Keller SD. A 12-item short-form health survey. Construction of scales and preliminary tests of reliability and validity. *Medical Care*. 1995; 34:220–233. [PubMed: 8628042]
- Wills CE, Moore CF. Perspective-taking judgments of medication acceptance: Inferences from relative importance about the impact and combination of information. *Organizational Behavior and Human Decision Processes*. 1996; 66:251–267.
- Wood AM, Froh JJ, Geraghty AWA. Gratitude and well-being: A review and theoretical integration. *Clinical Psychology Review*. 2010; 30:890–905. [PubMed: 20451313]
- Wood AM, Joseph S, Lloyd J, Atkins S. Gratitude influences sleep through the mechanism of pre-sleep cognitions. *Journal of Psychosomatic Research*. 2009a; 66:43–48. [PubMed: 19073292]
- Wood AM, Joseph S, Maltby J. Gratitude predicts psychological well-being above the Big Five facets. *Personality and Individual Differences*. 2009b; 46:443–447.

APPENDIX: Items Included in the Health Behavior Scales Developed for the Current Study

Healthy Activities Scale

1. I make sure to get healthy nutrition.
2. To keep fit I try to stay in motion.
3. To sustain mental well-being, I try to do something good for myself regularly.
4. I regularly meet up with friends.
5. I try to avoid negative influences on my health, such as alcohol consumption and/or the use of drugs.

Willingness to Seek Help for Health Concerns

1. Imagine you have been very sick and weak. For instance, you are affected by frequent and severe abdominal pain and nausea in your daily life.
2. Imagine you have been very sad and depressed. Your sleep and appetite are suffering and it is difficult for you to be pleased about things.
3. Imagine you have been all alone for some time and are very lonely. You have no contact with friends and neighbors, and have not talked to anyone for days.
4. Imagine you do not see any sense in life. You no longer know why you are here.
5. Imagine that after an accident or illness, you must strictly watch what you eat and cannot smoke or drink alcohol. Despite the health risks though, you are unable to give up on your high-fat diet, or give up nicotine or alcohol.

Highlights

Dispositional gratitude predicted better self-reported physical health.

Psychological health and health behaviors helped to explain this relationship.

Some mediators were stronger for older than for younger adults.

Findings suggest the need to examine personality-health links across the lifespan.

Table 1

Means, standard deviations, and correlations between gratitude, self-reported physical health, and the mediators of interest.

	1	2	3	4	5
Gratitude	---				
Physical Health	.16*	---			
Psychological Health	.29*	.48*	---		
Healthy Activities	.32*	.18*	.28*	---	
Willingness to Use Health Care	.22*	.14*	.16*	.23*	---
<i>Mean</i>	4.66	0.00	0.00	4.66	7.89
<i>SD</i>	0.75	0.74	0.78	0.85	2.30

Note: n's range from 952–962, depending on analysis.

* indicates $p < .05$. Health variables have been z-scored.

Table 2

Gratitude predicting physical health, when controlling for age and the Big Five traits.

Predictor	β	t
Age	-.35*	-11.53
Gratitude	.10*	3.02
Extraversion	-.04	-1.07
Agreeableness	-.11*	-3.50
Conscientiousness	.10*	3.13
Neuroticism	-.23*	-6.76
Openness	.03	0.98

Note:

* indicates $p < .05$.

Table 3

Indirect effects for the three mediators of interest, first controlling for age and the Big Five, and then broken down by age group.

Mediator	Ind. Effect B	95% CI	Indirect Effects by Age					Interaction Effects (B (s.e.))		
			Age 35	Age 52	Age 70	AxG → M	AxG → PH	AxM → PH		
Psych Health	.083*	.049 to .127	.120* (.024)	.144* (.021)	.155* (.034)	-.003 (.002)	-.003 (.002)	.008* (.001)		
Healthy Acts	.034*	.017 to .060	.020 (.012)	.060* (.015)	.107* (.029)	.002 (.002)	-.004* (.002)	.006* (.002)		
Willingness	.016*	.005 to .034	.024* (.012)	.023* (.009)	.022 (.013)	.000 (.006)	-.002 (.002)	.000 (.001)		

Note:

* indicates $p < .05$. AxG refers to the age by gratitude interaction, while AxM refers to the age by mediator interaction. PH refers to physical health. Results are reported as unstandardized betas.