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Playing it safe: Dispositional mindfulness partially accounts for age differences in health and safety risk-taking propensity

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Abstract

Older adults consistently report a lower likelihood of engaging in health and safety risks (e.g., substance use, not wearing seatbelts) than younger adults. However, the mechanisms that explain this age difference are not clear. Greater dispositional mindfulness is associated with lower engagement in health risk behaviors, and older adults tend to score higher in dispositional mindfulness than younger adults. Thus, we tested whether older adults' greater dispositional mindfulness helped to explain their lesser health and safety risk-taking propensity. Two community-dwelling samples of younger (25–36 years) and older (60+ years) adults completed self-report measures of dispositional mindfulness and health and safety risk-taking propensity. In Study 1, older adults reported greater dispositional mindfulness and a lower likelihood to engage in health and safety risk behaviors than younger adults. Greater dispositional mindfulness was associated with lesser health and safety risk-taking propensity. Importantly, older adults' greater dispositional mindfulness partially accounted for their lesser health and safety risk-taking propensity. These findings were replicated in Study 2, and an alternative mechanism (i.e., perceived health) was ruled out. The results suggest that age-related decreases in health and safety risk behaviors may be statistically explained, in part, by dispositional mindfulness. The current research has implications for behavioral interventions intended to increase preventative health behaviors and decrease health risk behaviors.

Keywords Mindfulness · Aging · Health and safety risk · Risk taking · Mediation

Introduction

It is often assumed that older adults engage in less risky behavior than younger adults, but the empirical literature is somewhat mixed (Best and Charness 2015; Mata et al. 2011). One domain for which the cautious older adult stereotype regularly holds true is health and safety behaviors (e.g., eating high cholesterol foods, wearing a seatbelt). Older adults consistently report a lower propensity for risky health and safety behaviors than younger adults (Bonem et al. 2015; Josef et al. 2016; Rolison et al. 2013). What remains unknown is the reason for this age difference (e.g., Pachur et al. 2017). Identifying factors that underlie this age difference is important as it may highlight modifiable targets for interventions intended to reduce risky behavior and improve health in older and younger adult populations. Recent evidence indicates that older adults report greater dispositional mindfulness than younger adults (e.g., Shook et al. 2017), and mindfulness is associated with positive health behaviors (e.g., Murphy et al. 2012). Thus, the purpose of this research was to determine whether dispositional mindfulness accounted for age differences in health and safety risk-taking propensity.

Age Differences in Health and Safety Risk-Taking Propensity

Part of the inconsistency regarding age differences in risky behavior may be due to variability in risk-taking tendencies across domains (e.g., Blais and Weber 2006). Weber and colleagues (Weber et al. 2002) categorized risk-taking propensity into five domains: ethical, financial, social, recreational, and health/safety. Individuals who engage in risky behaviors in one domain do not necessarily engage in similar levels of risk

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in other domains (see Figner and Weber 2011, for a review). For example, although individuals may be willing to gamble a large portion of their income at a casino, they are not necessarily willing to try bungee jumping. Thus, it is important to take a domain-specific approach to understanding risk-taking tendencies.

A few studies have examined age differences in domain-specific risky behavior, finding that the presence and direction of age differences varies by domain (Bonem et al. 2015; Josef et al. 2016; Rolison et al. 2013). A consistent finding across these studies is that older adults report lower risk-taking propensity than younger adults in the health and safety domain (e.g., excessive alcohol consumption, not wearing sunscreen). Epidemiologic data also indicate that older adults consume less alcohol (Eigenbrodt et al. 2001), are more likely to wear seat belts (CDC Vital Signs 2011), and are more likely to use sunscreen (Lazovich et al. 2011) than younger adults. Additionally, longitudinal data indicate that health risk-taking propensity declines with age (Josef et al. 2016).

Despite consistent age-related declines in health and safety risk behaviors, underlying reasons have not been elucidated. Bonem and colleagues (Bonem et al. 2015) speculated that older adults' poorer health may account for age differences in health and safety behaviors. That is, older adults may avoid health and safety risks due to concerns of exacerbating health problems, but this idea has not been tested. Another potential mechanism, that has not previously been considered, is dispositional mindfulness. As mindfulness is generally associated with positive health behaviors and differs by age, it may contribute to age differences in health and safety behaviors.

Age, Mindfulness, and Health

Mindfulness is a nonjudgmental, receptive attention to and awareness of internal and external experiences as they occur in the present moment (Brown and Ryan 2003; Kabat-Zinn 1994). That is, mindful individuals are focused on their current physical and emotional experiences in a non-biased manner, rather than ruminating about the past or deliberating about the future. Some recent studies have found that older adults (60+ years) are higher in dispositional mindfulness than younger adults (17–35 years; Hohaus and Spark 2013; Mahoney et al. 2015; Prakash et al. 2015). Older adults' greater mindfulness could reflect increased motivation to maximize experiences in the present moment due to age-related increases in awareness of life's finitude (Carstensen 2006). Consistent with this, other research shows that older age is associated with thinking more about the present and ruminating less about the past (Bruine de Bruin et al. 2014; Grühn et al. 2016).

Mindfulness has been conceptualized as both a state that can be cultivated in the moment (e.g., Bishop et al. 2004) and a dispositional trait that individuals reliably differ in without intervention or practice (e.g., Brown and Ryan 2003). Importantly, state and dispositional mindfulness are related. Repeated practice of state mindfulness (e.g., regular mindfulness exercises, completion of mindfulness-based intervention) results in increased dispositional mindfulness (Kiken et al. 2015; Quaglia et al. 2016).

Extensive research has demonstrated the benefits of mindfulness for both psychological and physical health (see Crowe et al. 2016; Tomlinson et al. 2017, for reviews). Greater dispositional mindfulness and state mindfulness practice are associated with less anxiety, depression, and stress (e.g., Brown and Ryan 2003; Kiken and Shook 2012; Segal et al. 2002). Older adults' greater mindfulness partially accounted for their greater positive affect (Shook et al. 2017) and lesser negative affect (Raes et al. 2013) compared to younger adults. Mindfulness-based stress reduction is also associated with decreases in a number of physical complaints, such as insomnia (Gross et al. 2011), pain (Reibel et al. 2001), and irritable bowel (Zernicke et al. 2013).

In addition to conferring these benefits to psychological and physical health, a small body of research suggests that mindfulness is also associated with engaging in more positive health behaviors and fewer risky health behaviors. For example, greater dispositional mindfulness is associated with eating more fruits and vegetables, engaging in more physical exercise, and better sleep (Gilbert and Waltz 2010; Heppner et al. 2016; Murphy et al. 2012). Furthermore, an eight-week Mindfulness-based Stress Reduction course resulted in participants eating a better diet and engaging in more physical exercise (Salmoirago-Blotcher et al. 2013). A few studies suggest that greater dispositional mindfulness is associated with less alcohol use and substance dependence (Bowen and Enkema 2014; Fernandez et al. 2010). Greater dispositional mindfulness is also associated with less nicotine use (Heppner et al. 2016; Jacobs et al. 2016; Roberts and Danoff-Burg 2010), and mindfulness-based interventions effectively reduce smoking behavior (Bowen and Marlatt 2009; Brewer et al. 2011; Tang et al. 2013; Ussher et al. 2009). Together, these studies suggest that greater dispositional mindfulness may be associated with lower health risk-taking propensity.

Given the evidence linking dispositional mindfulness with positive health behaviors, it is possible that older adults' lower propensity to engage in risky health and safety behaviors may in part be due to their greater dispositional mindfulness. However, to date, no studies have examined whether dispositional mindfulness is related to health and safety risk-taking propensity or if dispositional mindfulness explains the association between age and health and safety risk-taking propensity. Thus, the goal of the present research was to determine the extent to which dispositional mindfulness accounted for age differences in health and safety risk-taking propensity.

Study 1

Study 1 aimed to investigate relations among age, dispositional mindfulness, and health and safety risk-taking propensity. Of particular interest was the extent to which dispositional mindfulness explained age differences in health and safety risk-taking propensity. We hypothesized that older adults would report less health and safety risk-taking propensity than younger adults. We also hypothesized that greater dispositional mindfulness would be associated with less health and safety risk-taking propensity. Our prior research with this sample showed that older adults reported greater dispositional mindfulness than younger adults did (Shook et al. 2017). In the current research, we hypothesized that this age difference in dispositional mindfulness would statistically account for age differences in health and safety risk-taking propensity.

Method

Participants

Participants were community-dwelling younger ($n = 121$; 25–35 years, $M = 28.64$, $SD = 3.14$) and older ($n = 122$; 60–91 years, $M = 68.30$, $SD = 7.61$) adults from the South Atlantic division of the US.[1] Participants were recruited using newspaper, electronic, and in-person appeals for a larger study on age differences in information processing and decision making. They received a $50 honorarium in exchange for approximately 2 hours of their time. Inclusion criteria specified younger adults ages 25 to 35 years old and older adults 60 years or older. For older adults, a score of 24 or higher on the Mini-Mental State Exam (MMSE; Folstein et al. 1975) was required to ensure a sample free of significant cognitive impairments. Exclusion criteria were significant visual impairments that could not be corrected or not speaking English fluently. Data from one older adult was excluded from analyses because of missing data on the health and safety risk-taking propensity measure. Thus, the final sample consisted of 121 older adults ($M = 68.21$, $SD = 7.63$). Demographic variables for each age group are shown in Table 1. Informed consent was obtained from all individual participants in the study.

Sample size was determined based on the larger research project that required a minimum sample size of 150. For the current study, a minimum sample size of 162 was required to detect an indirect effect when α and β paths are small to medium sized with power = .80 using bias-correcting bootstrapping (Fritz and MacKinnon 2007).

Measures

Mindful Attentional Awareness Scale (MAAS, Brown and Ryan 2003) Due to a technical error, an abbreviated version of the 15-item MAAS, consisting of the first 11 items on the scale, measured dispositional mindfulness. Participants rated their present-moment oriented attention and awareness in everyday experiences (e.g., *I find it difficult to stay focused on what's happening in the present*) on a 1 (*almost always*) to 6 (*almost never*) scale. The MAAS has established reliability and validity in both younger and older adult samples (Brown and Ryan 2003; Mahoney et al. 2015; Prakash et al. 2015). Higher mean scores indicated greater dispositional mindfulness ($M = 3.85$, $SD = 0.70$, $\alpha = .80$).

Health and Safety Risk-Taking Propensity Participants completed the Domain Specific Risk-Taking scale (DOSPERT; Weber et al. 2002), which includes an 8-item Health/Safety subscale (see Appendix).[2] This subscale was used to assess health and safety risk-taking propensity. Participants rated their likelihood of engaging in risky health and safety behaviors (e.g., *Exposing yourself to the sun without using sunscreen*) on a scale from 1 (*very unlikely*) to 5 (*very likely*). Higher mean scores indicated greater health and safety risk-taking propensity ($M = 2.15$, $SD = 0.76$, $\alpha = .75$).

Demographics Participants reported their age, gender, race/ethnicity, marital status, income, and education.

Procedure

The authors' university Institutional Review Board approved all procedures for the study. Participants completed study measures at a location of their choosing (home, senior center, university research lab). Results did not significantly differ by testing location. After providing their informed consent, participants completed computer tasks for the larger study on information processing and decision making (see Supplemental Material for a list of additional measures included for the larger project). They then completed measures of dispositional mindfulness and health and safety risk-taking propensity in a random order on the researcher's laptop computer. Demographic information was collected at the end of the study.

[1] Shook et al. (2017) reported associations among age, positive affect, negative affect, and mindfulness using data that included five younger adults who reported ages outside of the 25–35 year inclusion criteria.

[2] For the current studies, we were only interested in, and had hypotheses regarding, the health and safety subscale, given the large literature linking mindfulness with health benefits. However, we did explore whether dispositional mindfulness accounted for age differences in any of the other domains of the DOSPERT. For both Studies 1 and 2, dispositional mindfulness did not explain any other age differences, except for in the domain of ethics.

Table 1 Study 1 sample characteristics and key variables for younger adults ($n = 121$) and older adults ($n = 121$)

Measure	Younger adults			Older adults			Group
	M (*n*)	*SD* (%)	α	*M* (*n*)	*SD* (%)	α	Comparison
Age	28.64	3.14	–	68.27	7.63	–	$t(240) = -52.82$***
Gender							$\chi^2(1) = .003$
Female	75	62%	–	76	62.8%	–	
Male	46	38%	–	45	37.2%	–	
Race/Ethnicity							$\chi^2(4) = 16.76$**
White	100	82.6%	–	117	96.7%	–	
Black	4	8.3%	–	0	0%	–	
Latino(a)	10	3.3%	–	0	0%	–	
Asian	2	1.7%	–	1	0.8%	–	
Native Am.	0	0%	–	0	0%	–	
Not reported	5	4.1%	–	3	2.5%	–	
Income							$\chi^2(5) = 2.81$
> $20,000	24	19.8%	–	20	16.5%	–	
$20,000–$39,000	39	32.2%	–	34	28.1%	–	
$40,000–$59,000	20	16.5%	–	25	20.7%	–	
$60,000–$79,000	13	10.7%	–	11	9.1%	–	
$80,000–$99,000	10	8.3%	–	16	13.2%	–	
> $100,000	15	12.4%	–	15	12.40%	–	
Education[a]							$\chi^2(7) = 15.16$*
Some high school	1	2.4%	–	0	0%	–	
High school grad	3	7.3%	–	12	17.6%	–	
Some college	7	17.1%	–	12	17.6%	–	
Associate degree	1	2.4%	–	3	4.4%	–	
Bachelor's degree	22	53.7%	–	18	26.5%	–	
Master's degree	7	17.1%	–	13	19.1%	–	
Professional degree	0	0%	–	4	5.9%	–	
Doctorate	0	0%	–	6	8.8%	–	
Marital status							$\chi^2(4) = 98.21$***
Single	82	67.8%	–	12	9.9%		
Married	33	27.3%	–	60	49.6%		
Separated	2	1.7%	–	1	0.8%		
Divorced	3	2.5%	–	26	21.5%		
Widowed	1	0.8%	–	22	18.2%		
Mindfulness	3.71	.72	.80	4.00	.65	.79	$t(240) = -3.16$**
Health/Safety	2.54	.75	.70	1.76	.52	.61	$t(240) = 9.39$***

* $p < .05$, ** $p < .01$, *** $p < .001$

[a] Education level based on 41 participants for younger adults and 68 for older adults

Results

Descriptive statistics for each measure by age group are presented in Table 1. To determine whether there were age differences in health and safety risk-taking propensity and dispositional mindfulness, two independent samples *t*-tests were conducted (see Table 1). Older adults reported less health and safety risk-taking propensity than younger adults, as expected ($d = 1.21$). As reported in prior research with this sample, older adults reported significantly greater dispositional mindfulness than younger adults [$d = .40$; Shook et al. 2017]. Greater dispositional mindfulness was significantly correlated with reporting less health and safety risk-taking propensity, $r = -.27$, $p < .001$.

To determine whether dispositional mindfulness statistically accounted for the older adults' lesser reported health and safety risk-taking propensity compared to younger adults, we used Hayes' (2013) bootstrapping procedure with 5000

resamples. Age group was coded as a dichotomous variable where 0 = younger adults and 1 = older adults to match the between-subjects study design.[3] As shown in Fig. 1, there was a significant indirect effect of age group on health and safety risk-taking propensity through dispositional mindfulness ($b = -.05$, $SE = .03$, 95% CI [−.12, −.01]). After including the significant indirect path through dispositional mindfulness, the direct effect ($b = -.78$, $SE = .08$, $p < .001$, 95% CI [−.95, −.62]) of age group on health and safety risk-taking propensity was reduced ($b = -.73$, $SE = .08$, $p < .001$, 95% CI [−.90, −.57]).

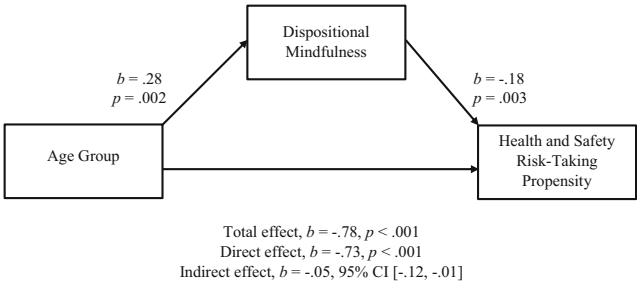

Fig. 1 Study 1: Indirect effect of age group on health and safety risk-taking propensity through dispositional mindfulness. Coefficients are unstandardized, as recommended by Hayes (2013). Age coded such that 0 = younger adults and 1 = older adults

Discussion

The results of Study 1 provided initial evidence for the role of dispositional mindfulness in understanding health and safety risk-taking propensity. Overall, individuals higher in dispositional mindfulness reported they were less likely to engage in health and safety risks. Furthermore, dispositional mindfulness partly accounted for age differences in health and safety risk-taking propensity. Older adults were more mindful than younger adults, which partially explained older adults' lesser propensity for health and safety risks. Although the results of Study 1 aligned with predictions derived from prior research, other mechanisms and alternative explanations were not considered.

Study 2

Older adults' poorer health compared to younger adults has been posited as an explanation for age differences in health and safety risk-taking propensity (Bonem et al. 2015). Perceived health is associated with self-reported health and safety behaviors in older adults (Whitehead 2017). Specifically, poorer perceived health was associated with greater self-reported engagement in healthy behaviors (e.g., flossing, less alcohol consumption, seatbelt use). As dispositional mindfulness did not fully account for age differences in health and safety risk-taking propensity, perceived health may also contribute. Alternatively, the results of the first study may have been due to age differences in health, not mindfulness, given that physical and psychological health are associated with mindfulness (see Crowe et al. 2016; Tomlinson et al. 2017, for reviews). Thus, the second study aimed to replicate the Study 1 findings and test an alternative mechanism – perceived health.

[3] The pattern of results did not change if age was entered as a continuous variable in the mediation analyses.

Method

Participants & Procedure

The authors' university Institutional Review Board approved all procedures for the study. Participants were community-dwelling younger ($n = 75$; 25–36 years) and older ($n = 74$; 60–90 years) adults. The procedure, sample size determination, and inclusion/exclusion criteria were similar to Study 1. However, Study 1 participants were ineligible for Study 2. Again, participants were recruited for a larger study on age differences in information processing and decision making (see Supplemental Material for a list of additional measures included for the larger project). Informed consent was obtained from all individual participants in the study. They received a $50 honorarium in exchange for approximately two hours of their time. Data from five participants were excluded due to univariate outliers.[4] The final sample consisted of 74 younger ($M_{age} = 29.04$ years, 47.3% female) and 70 older ($M_{age} = 68.36$ years, 57.1% female) adults. Demographic variables for each age group are shown in Table 2.

Measures

Mindful Attentional Awareness Scale (MAAS, Brown and Ryan 2003) Correcting the technical error in Study 1, the 15-item MAAS was used to measure dispositional mindfulness ($M = 4.07$, $SD = 0.74$, $\alpha = .80$).

Health and Safety Risk-Taking Propensity Participants completed a revised version of the Domain Specific Risk-Taking scale (Blais and Weber 2006), which included a 6-item Health/Safety subscale (see Appendix). Participants rated how likely they would be to engage in risky health and safety behaviors on a scale from 1 (*extremely unlikely*)

[4] If the outliers are included in the primary analyses, the age difference in mindfulness becomes non-significant ($p = .07$) and the indirect effect is consequently no longer significant.

Table 2 Study 2 sample characteristics and key variables for younger adults ($n = 74$) and older adults ($n = 70$)

Measure	Younger adults			Older adults			Group
	M (*n*)	*SD* (%)	α	*M* (*n*)	*SD* (%)	α	Comparison
Age	29.04	3.06	–	68.36	6.92	–	$t(142) = -44.49$***
Gender							$\chi^2(1) = 1.40$
Female	35	47.3%	–	40	57.1%	–	
Male	39	52.7%	–	30	42.9%	–	
Race							$\chi^2(3) = 10.63$*
White	54	73.0%	–	67	95.7%	–	
Black	8	10.8%	–	1	1.4%	–	
Asian	4	5.4%	–	1	1.4%	–	
Native Am.	2	2.7%	–	0	0%	–	
Not reported	6	8.1%	–	1	1.4%	–	
Ethnicity							$\chi^2(1) = 2.67$
Hispanic/Latino	7	9.5%	–	2	2.9%	–	
Not Hispanic/Latino	67	90.5%		68	97.1%		
Income							$\chi^2(5) = 7.87$
> $20,000	14	19%	–	15	21.4%	–	
$20,000–$39,000	26	35.2%	–	15	21.4%	–	
$40,000–$59,000	16	21.7%	–	10	14.3%	–	
$60,000–$79,000	7	9.5%	–	13	18.6%	–	
$80,000–$99,000	4	5.5%	–	4	5.7%	–	
> $100,000	7	9.5%	–	13	18.6%	–	
Education							$\chi^2(8) = 16.61$*
Elementary to 8th Grade	0	0%	–	2	2.9%	–	
Some high school	0	0%	–	3	4.3%	–	
High school grad	5	6.8%	–	11	15.7%	–	
Some college	15	20.3%	–	4	5.7%	–	
Associate degree	4	5.4%	–	5	7.1%	–	
Bachelor's degree	23	31.1%	–	18	25.7%	–	
Master's degree	21	28.4%	–	16	22.9%	–	
Professional degree	1	1.4%	–	3	4.3%	–	
Doctorate	5	6.8%	–	8	11.4%	–	
Mindfulness	3.86	.79	.85	4.28	.63	.81	$t(142) = -3.45$**
Health/Safety	3.46	1.30	.64	4.28	2.20	.61	$t(142) = 6.41$***
Perceived Health	1.80	.64	–	2.03	.74	–	$t(142) = -2.01$*

* $p < .05$, ** $p < .01$, *** $p < .001$

to 7 (*extremely likely*). Higher mean scores indicated greater health and safety risk-taking propensity ($M = 2.84$, $SD = 1.33$, $\alpha = .74$).

Perceived Health To assess individuals' health status, participants rated their perceived health ("How would you rate your overall health at the present time?") on a scale from 1 (*excellent*) to 4 (*poor*; Lawton et al. 1982). Single item indicators of perceived health are reliable, valid, and robust predictors of morbidity and mortality (DeSalvo et al. 2006; Idler and Benyamini 1997; Lee 2000).

Demographics Participants reported their age, gender, race/ethnicity, marital status, income, and education.

Results

Descriptive statistics for each measure by age group are presented in Table 2. To determine whether there were age differences in dispositional mindfulness, health and safety risk-taking propensity, or perceived health, independent samples *t*-tests were conducted (see Table 2). Consistent with Study 1, older adults reported significantly greater dispositional

mindfulness ($d = .58$) and lower health and safety risk-taking propensity ($d = 1.07$) than younger adults. Older adults reported worse health than younger adults ($d = .33$). Bivariate correlations indicated greater dispositional mindfulness was significantly correlated with lower health and safety risk-taking propensity, $r = -.28$, $p = .001$, which replicated Study 1 findings. Perceived health was not significantly correlated with dispositional mindfulness ($r = -.03$, $p = .68$) or health and safety risk-taking propensity ($r = .02$, $p = .82$).

To determine whether dispositional mindfulness statistically accounted for older adults' lesser health and safety risk-taking propensity compared to younger adults, we again tested a mediation model using Hayes' (2013) bootstrapping procedure with 5000 resamples. As perceived health was not significantly correlated with health and safety risk-taking propensity or dispositional mindfulness, it was not tested with dispositional mindfulness as a mediator in parallel or serial models. However, it was included as a covariate to control for the age difference in perceived health. Age group was coded as a dichotomous variable where 0 = younger adults and 1 = older adults, matching the between-subjects design of the study.[5] As shown in Fig. 2, there was a significant indirect effect of age group on health and safety risk-taking propensity through dispositional mindfulness, controlling for perceived health ($b = -.12$, $SE = .08$, 95% CI [−.31, −.01]).[6] After including the significant indirect path through dispositional mindfulness, the direct effect ($b = -1.31$, $SE = .20$, $p < .001$, 95% CI [−1.70, −.94]) of age group on health and safety risk-taking propensity was reduced ($b = -1.19$, $SE = .21$, $p < .001$, 95% CI [−1.59, −.78]).

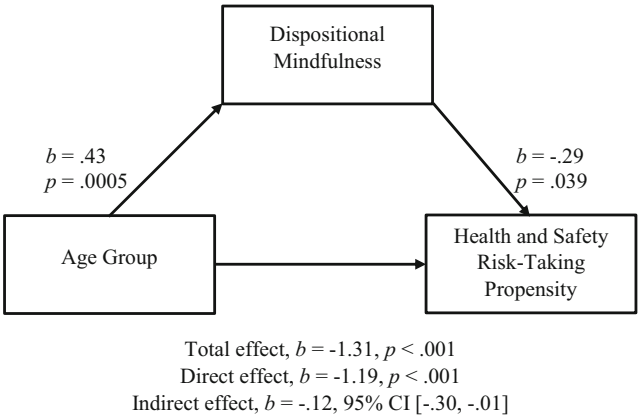

Fig. 2 Study 2: Indirect effect of age group on health and safety risk-taking propensity through dispositional mindfulness, controlling for perceived health. Coefficients are unstandardized, as recommended by Hayes (2013). Age coded such that 0 = younger adults and 1 = older adults

Discussion

The results of Study 2 replicated Study 1. Greater dispositional mindfulness partially accounted for age differences in health and safety risk-taking propensity. Importantly, these findings were not due to age differences in perceived health. Although older adults reported worse health than younger adults, perceived health was not associated with dispositional mindfulness or health and safety risk-taking propensity.

General Discussion

The present research is the first to empirically test mindfulness as a mechanism that contributes to age-related reductions in health and safety risk-taking propensity. Across two studies, we found that older adults reported greater dispositional mindfulness and a lower health and safety risk-taking propensity compared to younger adults. Furthermore, greater dispositional mindfulness partially accounted for age differences in health and safety risk-taking propensity. In Study 2, we ruled out older adults' poorer perceived health as an alternative mechanism. Together, our studies offer insight into one reason why older adults report greater aversion to health and safety risk taking than younger adults and increase understanding of how dispositional mindfulness relates to health and safety behaviors.

Older adults reported greater dispositional mindfulness than younger adults, which is in line with previous research (e.g., Hohaus and Spark 2013; Mahoney et al. 2015). Although research has begun to investigate age differences in mindfulness, the reason(s) why older adults report greater mindfulness is still unclear. Potentially, older adults' greater dispositional mindfulness reflects their greater focus on the present and motivation to make the most of time left in life, rather than ruminating about the past (Bruine de Bruin et al. 2014; Carstensen 2006; Grühn et al. 2016). Alternatively, these findings may reflect a cohort effect of living through different historical periods. Our older adults correspond with Baby Boomers, i.e., individuals who came of age in the 1960s when meditation practices gained prominence in pop culture. Future longitudinal research should explore whether age differences correspond to growth in mindfulness over the adult life span versus historical artifacts associated with different birth cohorts.

Greater mindfulness was related to reporting a lesser health and safety risk-taking propensity. Prior studies demonstrated that dispositional mindfulness was linked to better diet, less cigarette use, and lower alcohol consumption (e.g., Bowen and Enkema 2014; Brewer et al. 2011). Our study extends the literature by using a measure that encompassed not only diet, smoking, and alcohol use, but also preventative safety

[5] The pattern of results did not change if age was entered as a continuous variable in the mediation analyses.

[6] The indirect effect was also significant when not controlling for perceived health.

behaviors, such as using sunscreen and wearing a seatbelt. Thus, mindfulness also appears to play a beneficial role in preventative safety behaviors as well.

To address the gap in the literature for reasons why older adults report less health and safety risk-taking propensity than younger adults, dispositional mindfulness and perceived health (in Study 2) were examined as explanatory mechanisms. Across both studies, greater mindfulness was found to partly explain older adults' greater aversion to health and safety risk behaviors. Older adults' heightened attention and awareness in the present not only maximizes their emotional well-being (Raes et al. 2013; Shook et al. 2017), but also is linked to avoiding health and safety risk behaviors. As older adults are more likely to focus on the present moment than younger adults, they may be more aware of the consequences of poor health and safety behaviors, like not wearing a seatbelt. Given the limited research examining mindfulness across the life span, it is important to explore dispositional mindfulness as a mediator of other age-related differences in health outcomes and behaviors (e.g., stress, disease management). Such work could inform interventions such as using mindfulness training to reduce risky health and safety behaviors in at-risk groups.

In Study 2, perceived health was considered as a potential explanatory mechanism given that older adults report poorer health than younger adults (Chen et al. 2007; Fylkesnes and Førde 1991), which in turn could affect their willingness to engage in behaviors that exacerbate current health problems. Although older adults reported poorer health than younger adults, perceived health was not significantly associated with health and safety risk-taking propensity. This lack of association is inconsistent with previous work that found older adults' perceived health was related to health and safety behaviors, regarding smoking, alcohol consumption, sleep, flossing, and seatbelt use (Whitehead 2017). However, perceived health was assessed with four items in the previous study, rather than a single item as in the current study, and the results were found while accounting for several covariates (e.g., affect, objective health, aging attitudes). These differences may explain the discrepancy in the results. Our findings support the importance of mindfulness in understanding age differences in health and safety risk behaviors, above and beyond older adults' perceived health.

Limitations and Future Directions

The present research has strengths and limitations that provide a foundation for future research. First, our data are self-report and are therefore susceptible to social desirability and may not reflect real-world risk behaviors. Future studies could test the replicability of findings using behavioral assessments of health or safety risk (e.g., Stoplight Task; Reilly et al. 2006). Moreover, although perceived health is a robust indicator of objective health (Idler and Benyamini 1997; Jylhä 2009), studying objective indicators of health (e.g., physical limitations, chronic health condition) and other risky health behaviors, such as avoiding flu vaccinations or annual health exams, may provide additional insight into associations among aging, health, and risk-taking propensity. Second, we utilized a unidimensional measure of dispositional mindfulness. Others have conceptualized mindfulness as a multidimensional construct (Baer et al. 2006). Future research should examine these relations with other mindfulness measures to determine whether the findings replicate and whether the effects are due to specific components of mindfulness. Third, our correlational, cross-sectional data do not address causation and confound age differences with birth cohort (Lindenberger et al. 2011; Maxwell and Cole 2007; Schaie 1983). Experimental manipulations of mindfulness (e.g., Gross et al. 2011) are required to test causal relations between mindfulness and health and safety risk-taking propensity.

Conclusion

Our studies suggest that dispositional mindfulness is an important explanatory mechanism for understanding age differences in health and safety risk behaviors. Sustained attention to what is happening in the "here and now" may be a key factor for why older adults avoid health and safety risk behaviors, which adds to the literature that has found connections between age, mindfulness, and emotional well-being (Raes et al. 2013; Shook et al. 2017). Future research should continue to explore why dispositional mindfulness differs with age and whether dispositional mindfulness is associated with age differences in other health and safety behaviors.

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Compliance with Ethical Standards

Data Policy All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Informed Consent Informed consent was obtained from all individual participants included in the studies.

Appendix

Health and Safety Risk Taking Measures

Domain Specific Risk Taking Scale, Health and Safety Sub-Scale (Weber et al. 2002)

For each of the following statements, please indicate your likelihood of engaging in each activity or behavior. Provide a rating from 1 to 5, using the following scale:

1 (very unlikely)
2 (unlikely)
3 (not sure)
4 (likely)
5 (very likely)

1. Buying an illegal drug for your own use.
2. Consuming five or more servings of alcohol in a single evening.
3. Engaging in unprotected sex.
4. Not wearing a seatbelt when being a passenger in the front seat.
5. Not wearing a helmet when riding a motorcycle
6. Exposing yourself to the sun without using sunscreen.
7. Walking home alone at night in a somewhat unsafe area of town.
8. Regularly eating high cholesterol foods.

Revised Domain Specific Risk Taking Scale, Health and Safety Sub-Scale (Blais and Weber 2006)

For each of the following statements, please indicate the likelihood that you would engage in the described activity or behavior if you were to find yourself in that situation. Provide a rating from Extremely Unlikely to Extremely Likely, using the following scale:

1 (Extremely Unlikely)
2 (Moderately Unlikely)
3 (Somewhat Unlikely)
4 (Not Sure)
5 (Somewhat Likely)
6 (Moderately Likely)
7 (Extremely Likely)

1. Drinking heavily at a social function.
2. Engaging in unprotected sex.
3. Driving a car without wearing a seat belt.
4. Riding a motorcycle without a helmet.
5. Sunbathing without sunscreen.
6. Walking home alone at night in an unsafe area of town.

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