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Original Research

Adult attachment and emotion regulation: better predictors of subjective or objective health?

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Abstract

Background: Although patterns of relating – attachments – appear useful in predicting health outcomes, studies are yet to evaluate whether attachment characteristics predict *both* objective and subjective outcomes equally. Further, although prior work has identified trait emotionality as a contributing factor, the possibility that attachment related differences in emotion *regulation* are associated with health outcomes has not been investigated.
Methods: Between 2002 and 2004, 616 older men and women completed measures of attachment along with demographics, health reports, and measures of emotion regulation.
Results: Analysis (conducted in 2012) revealed that both security and fearful avoidance predicted better subjective health, while preoccupied attachment predicted worse subjective *and* objective health outcomes.
Conclusions: Attachment dimensions predicted health even when controlling for demographic factors, but were a better predictor of subjective than objective health outcomes. The inclusion of regulatory factors weakened some links between attachment and health, suggesting that patterns of emotion regulation may play a role in attachment – health links. Directions for future research and implications are discussed.

INTRODUCTION

A growing body of work indicates that interpersonal factors are associated with health outcomes [1, 2]. Although demographics, such as income and ethnicity [e.g. 3], are also associated with health, such factors are less amenable to intervention, and psychosocial factors may be more suitable targets for interventions aimed at improving health outcomes. Prior work indicates that attachment, a dispositional style of relating to others, predicts health [4]. Understanding how interpersonal factors predict health should improve the effectiveness with which healthcare is provided, while findings that attachment may be both fluid [5] and modifiable [6], indicate that frameworks based in attachment theory may be useful in assessing risk and guiding the development of interventions aimed at improving outcomes.

Attachment theory posits that early interactions with caregivers influence subsequent patterns of relating to others [7, 8]. If early needs are consistently met, individuals are thought to develop a secure attachment style. However, if caregiving is harsh, inconsistent or non-responsive then compensatory, insecure styles develop [9, 10]. Prior work has identified three [11], or four [8] dominant *styles* of attachment, although dimensional measurements are statistically more robust. Therefore, the current study assessed links between attachment dimensions and health using the terms "secure", "dismissive", and "preoccupied" as in early studies of adults [11], and "fearful-avoidant" as used by others [8].

Attachment has been associated with numerous health outcomes including pain [12, 13], symptom reports [4], and mortality [14]. Additionally, there are established links between attachment styles and health behaviours, such as self-care and medication adherence among diabetics [15], and cancer screening [16-18]. Security is typically associated with better, while insecure attachment predicts worse outcomes [4, 13, 19, 20], including increased vulnerability to physical diseases [14, 21-24]. In line with this, data indicate that preoccupation and fearful avoidance predict greater symptom reporting [4, 25], while fearful avoidance has been linked to greater activity limitations [26]. Diabetic patients classified as having an independent (dismissive and fearful avoidant) style had a greater risk of mortality at five year follow up than those classified as interactive (secure and preoccupied) [14]. Finally, there are established links between attachment and pain [12, 20, 27], with attachment insecurity thought to contribute to the development of, and/or poor adjustment to chronic pain [28-30].

Despite these links, several areas remain to be investigated. First, the possibility that attachment characteristics may differentially predict subjective versus objective health outcomes requires consideration. Although there is evidence of attachment related differences in objective health outcomes [20], it is possible that links between attachment and health may be stronger at the subjective level. In extending current work, this report investigated links between attachment and both current disease diagnosis – a more objective health measure – and perceived global health – a subjective assessment.

Second, the mechanisms by which attachment predict health warrant further investigation. Prior work indicates that emotional factors are likely candidates, and trait affect may underlie some attachment-health links [19] [25] [31] [32]. For example, factors such as catastrophizing appear to influence links between attachment and pain [12, 13], and attachment has been linked to stress, depression, and HIV-related stigma [33], along with physical health quality of life scores among HIV+ patients [34]. Basic research demonstrates that different attachment profiles are associated with distinct patterns of emotion and emotion regulation [35]. Security and dismissiveness are typically associated with less negative affect (NA) [36] and greater positive affect (PA) [31], while fearful and preoccupied styles predict greater NA [37]. In turn, NA is a robust predictor of greater symptom reporting, while PA also predicts health outcomes, even when controlling for NA [32].

However, while PA and NA may partially account for links between attachment and health, emotion regulation – the processes by which we monitor, evaluate, and modify the experience or expression of emotion [38] – has also been linked to health outcomes [39], but has yet to be considered. Typically, inhibition predicts poorer health outcomes [40], while expressivity has been associated with better health [see 41 for a review]. In turn, patterns of more and less expressive emotion regulation are robustly associated with attachment [35, 42, 43]. Insecure attachment tends to predict poorer emotion regulation [42, 43] and more restricted regulatory styles [35]. Given recent data that implicate emotion regulation in the links between attachment and physiological responding [44], the current report tested links between attachment, patterns of emotion regulation, and health outcomes.

In sum, the present report sought to evaluate whether attachment characteristics equally predicted subjective and objective health, and whether attachment related differences in dispositional emotion inhibition and expression were implicated. Based on the above literature, we hypothesised that; security would predict better, but insecure styles worse health outcomes. Second, we expected that attachment-health links would be more strongly evident in the more subjective, perceived health model, than in the more objective, diagnosis count model. Finally, we expected that emotional regulation would play a role in the links between attachment and health outcomes.

METHODS

Participants

Participants were 616 men and women who met the study inclusion criteria of living in New York and being aged 50-70 years. Participants from several immigrant and non-immigrant ethnic subpopulations were recruited for a study of "Emotion and Health." For the current report, ethnic subpopulations were collapsed into three major ethnic groups of White, Black, and Hispanic. Participants were excluded if they did not live in New York, were older/younger than the study focus, or did not self-identify as belonging to one of the designated ethnic groups. The average age of the sample was 59.14 years, participants reported an average household income of approximately $34,000, and an average of 12.4 years of education (slightly greater than high school). Ethics permission was granted by the Long Island University Institutional Review Board and all participants signed informed consent and were treated in accordance with American Psychological Association (APA) ethical guidelines.

Procedures

Participants were recruited through local newspapers, community postings/flyers, health fairs and senior centres. Data were collected between 2002 – 2004 at

senior centres, health fairs, and clinics. Instruments were translated from English into Spanish, French Creole or Russian, and, consistent with standard ethnographic practice, were then back-translated by independent translators to ensure comparability. Interviews were then conducted in the participant's language of choice, by trained bilingual research personnel who were fluent in English together with the participants' native language. Measures were administered in a standard order for all respondents and took approximately 45-60 minutes to complete. Participants were paid $20(US) for their involvement.

Measures

Background Questionnaire. Demographic information was collected regarding age, sex, marital status, income and race. In the present study, age was measured in years, race was operationalized as Black, White or Hispanic, and income was measured in dollars, but was rescaled for purposes of the regressions, and measured in thousands of dollars. Finally, marital status was dichotomized as 0 (single, divorced, separated or widowed) and 1 (married, living with a partner).

Attachment. The Relationship Scales Questionnaire (RSQ) [45] is a 30-item scale based on phrases drawn from the paragraph descriptors in Hazan and Shaver's (1987) attachment measure, Bartholomew and Horowitz's (1991) Relationship Questionnaire, and Collins and Read's (1990) Adult Attachment Scale. Respondents rate how well each item describes their characteristic style in close relationships using 5-point scales (not at all like me = 1, very much like me = 5). The measure has been extensively used in studies of diverse older adults [26, 31, 46-48] and shows theoretically predictable patterns of association with emotion regulation [46].

As in earlier work [49], internal consistency for the *a priori* subscales was low. Therefore, we conducted a principal components analysis with varimax rotation to examine the underlying structure and loadings. This analysis revealed a four-component solution, whereby the first component (items 3, 4, 8, 14, and 30), appeared to index attachment security and the second component (items 1, 2, 19 and 26), dismissiveness. The third component (items 6, 7, 13, 17, 20, 22, 27R, and 29) appeared to access fearful avoidance and the final component (items 9, 11, 16, 18, 21, 23, 25, and 28), preoccupation. The item RSQ20, "I get nervous when others get too close" loaded on both preoccupied and fearful factors, and so was loaded on the fearful component on the basis of theory. The final alphas for the subscales were .85 (preoccupation), .65 (secure), .72 (fearful), and .66 (dismissive). The secure and dismissive scales (with the exception of RSQ10) map on to structures seen in earlier studies of older groups [31]. Following the procedure and rationale outlined by Mickelson and colleagues [50], we also generated a categorical score or assignment for each respondent. On this basis, approximately 13% were classified as secure, 72% as dismissive, 9% as preoccupied, and 7% as fearful avoidant.

Trait emotion regulation: inhibition and expressivity. The tendency to inhibit and express emotions was assessed with the Present Personality Questionnaire (PPQ), a 24-item measure assessing trait expressive and inhibitory tendencies for four emotions – anger, sadness, fear, and shame [see 40]. The scale includes four express and four inhibit items for each emotion and includes items such as "I try not to let my anxieties show," "When I feel sad I keep to myself," and "When I get angry I really blow off steam". For this report the 24 items assessing the tendency to inhibit and express feelings of fear, anger, shame and sadness were aggregated into two, 12-item general inhibition (overall α = .82 and individual group α's = .75 - .86) and expressivity (overall α = .86 and individual group α's = .80 - .87) scales.

Prior work among several large, ethnically diverse samples of older adults has generated alphas of α = .74 -.84 for inhibition, and α = .84 -.85 for expression [46]. Additionally, in another independent sample (N = 288, mean age = 27 years, SD = 10.0, 75% female), scores on the PPQ inhibition were compared to scores on a child analogue – the Emotions as a Child Questionnaire [49, 51, 52], a 48-item inventory that measures emotion regulation in childhood. The PPQ inhibition score was correlated with the inhibition subscale from the Emotions as a Child Questionnaire at r = .58, p < .0001, indicating good convergent validity [40].

Objective health: Objective health was assessed using an 18 item measure of physical diagnoses. Current formal diagnoses of chronic conditions were measured using a yes–no format. Items were made up of physical conditions including; diabetes, asthma, kidney disease and cancer. Participants also listed any additional formal diagnoses they had, that were not included in the measure. Condition counts were aggregated.

Subjective health: Participants rated their health as "Poor, Fair, Good, Very Good or Excellent" in response to the single item; "In general, how is your health?" Such items are a widely used means of assessing subjective health, and have been shown to capture physical, functional, coping and wellbeing aspects of perceived health [53]. In turn, subjective health predicts mortality; with poorer self-assessed health predicting greater mortality risk, even when controlling for more objective indicators of health status [54].

Analytic Strategy

Descriptive analyses were used to characterize the sample and examine zero-order (univariate) links between attachment and known predictors. Next we tested whether attachment predicted health by running two linear regressions on subjective (perceived) health and objective health (diagnosis counts). Models were run in three steps, with the four attachment dimensions entered first, followed by background variables, then inhibition and expression.

RESULTS

Table 1 presents descriptive statistics broken down by *categorical* attachment classifications. Analysis of variance (ANOVA) and chi-square tests revealed attachment-related differences in being married/living with a partner, being Black, being Hispanic, inhibition, expression, perceived health and diagnosis counts. Games-Howell post hoc tests revealed that preoccupied persons reported greater inhibition than all others, and greater expression than dismissive and fearful avoidant types. Security also predicted greater expression than dismissives. Secure and dismissive persons reported better perceived health than those with preoccupied attachment (see Table 1).

Zero order correlations indicated that security was associated with greater income, being White and reporting greater emotional expressiveness. Dismissiveness was positively associated with being Black, but negatively associated with being Hispanic. Fearful avoidance was lower among males, those who were married/living with a partner, and among Blacks, but was positively linked to inhibition, expression, and diagnosis counts. Finally, preoccupation was positively associated with being Hispanic, inhibition, expression and diagnosis counts, and was negatively associated with income, being Black, and perceived health (see Table 2).

Table 1. Means and standard deviations of demographics by attachment classification and results of ANOVA or chi-square

Variable	Categorical Attachment Classification				ANOVA or Chi Square	Post Hoc Howell Games
	Secure (N = 79)	Dismissive (N = 444)	Preoccupied (N = 53)	Fearful Avoidant (N = 40)		
Age	59.41 (5.88)	58.96 (6.11)	60.06 (6.46)	59.40 (5.86)	0.60	-
% Male	50.60	48.40	52.80	62.50	3.12	-
% Married/lw partner	55.70	51.10	32.10	50.00	45.86**	
Income ($K)	20.87(22.12)	23.36(24.97)	16.67(20.25)	15.81(18.49)	2.20^{t}	
% Black (N = 261)	31.60	47.70	18.90	32.50	22.58**	
% Hispanic (N = 173)	40.50	20.80	54.70	50.00	45.86**	
% White (N =182)	27.80	31.30	26.40	17.50	3.81	
Inhibition	31.87 (8.31)	32.70 (8.93)	36.47 (8.14)	31.29 (8.60)	3.80*	P > S, D, & FA
Expression	34.23 (8.69)	30.96 (7.68)	36.08 (8.89)	31.83 (8.61)	9.10*	P > D & FA. S > D.
Perceived health	2.95 (1.20)	2.80 (1.07)	2.43 (0.77)	2.58 (1.01)	3.08*	S, D > P
Current diagnoses	1.72(1.80)	1.54(1.50)	2.13 (2.17)	1.33 (1.42)	2.67*	

*Note: *p* < .05, ** *p* < .01; Per cent reported is the proportion of each variable found in each attachment category

Table 2. Correlations between dimensional attachment, control variables, and screening outcomes

Variables	Attachment Dimension			
	Secure	Dismiss	Fearful Avoidant	Preoccupied
Age	-.01	-.06	-.04	.02
Male[a]	-.06	.03	-.13**	-.03
Married[a]	.07[t]	.01	-.12**	-.07[t]
Income	.08*	.07	.02	-.11**
Black[a]	-.06	.20**	-.11*	-.26**
Hispanic[a]	-.04	-.26**	.08[t]	.25**
White[a]	.10*	.04	.05	.05
Inhibition	-.02	.07[t]	.38**	.37**
Expression	.20**	-.04	.17**	.46**
Perceived health	.05	-.01	.06	-.13**
Current Diagnoses	.03	-.04	.09*	.20**

Note: [t] $p<.10$, *$p < .05$, ** $p < .01$; [a] Spearmans rho; binary variables code such as 1 = male, married, Black, Hispanic and White.

Multivariate predictors of perceived health

The initial model examining the predictors of perceived health was significant, F (4, 611) = 8.72, $p <.01$, and explained 5% variance (see Table 3). Better perceived health was predicted by greater security (β = .19) and fearful avoidance (β = .32), but lower preoccupation (β = -.32). Adding demographics in Step 2 also produced a significant model, F (10, 605) = 12.91, $p <.01$, explaining a further 11% variance. Again, security (β = .12) and fearful avoidance (β = .24) predicted better, while preoccupation (β = -.22) predicted worse perceived health. Age was negatively, and income positively linked with perceived health.

Finally, including expression and inhibition in Step 3, (F (12, 603) = 12.18, $p <.01$) explained a further 2% variance in ratings, with inhibition predicting worse perceived health. Again, while controlling for emotion regulation, preoccupation (β = -.18) predicted worse, while fearful avoidance (β = .29) predicted better perceived health.

Multivariate predictors of diagnosis counts

The initial model examining the predictors of disease diagnosis counts was significant, F (4, 611) = 6.31, $p <.01$, and explained 4% variance in diagnoses (see Table 4). Higher diagnosis counts were predicted by greater preoccupation (β = .37). Adding demographics in Step 2 also produced a significant model, F (10, 605) = 9.27, $p <.01$, explaining an additional 8% variance. Again preoccupation predicted greater diagnosis counts (β = .23), as did age, while income was negatively associated with diagnosis counts. Finally, the addition of expression and inhibition in Step 3, F (12, 603) = 8.35, $p <.01$ explained a further 1% variance in diagnoses, with inhibition predicting greater diagnosis counts. The inclusion of regulatory factors in Step 3 weakened links between preoccupation and diagnosis counts seen earlier in the model, such that the link was no longer significant.

DISCUSSION

The current study makes three specific contributions to the attachment-health literature. First, attachment characteristics predicted both perceived health and diagnosis counts in a large sample of diverse, community dwelling older adults, even when controlling for demographic factors. As expected, attachment was a better predictor of subjective, perceived health, than it was for more objective, disease diagnosis counts. Finally, our results suggest that links between attachment and *both* subjective and objective health are associated with emotion regulation. Below, we examine these findings in greater depth, integrate results into the attachment-health literature, and suggest some possible interpretations. We conclude by examining the implications that these findings may hold for clinical practice.

Attachment – links with perceived health and diagnosis counts

Consistent with prior work [4, 26], and even after controlling for demographic variables, security was associated with better perceived health, while greater preoccupation predicted poorer health reports, and greater diagnosis counts. As expected, attachment characteristics were a better predictor for subjective outcomes than for more objective measures. Security,

fearful avoidance and preoccupation were all associated with perceived health, explaining 5% variance. Furthermore, fearful-avoidance and preoccupation continued to predict perceived health even after entering regulatory variables, whereas only preoccupied attachment predicted diagnosis counts, explaining 4% variance. Links between preoccupation and diagnosis counts attenuated once regulatory factors were included.

Table 3. Linear regression with perceived health regressed on attachment, demographic variables, and regulatory characteristics

Variables	Step 1				Step 2				Step 3			
	B	Std. Error	β	*sr2*	B	Std. Error	β	sr2	B	Std. Error	β	sr2
Attachment Dimension												
Secure	.19	.06	.13**	.01	.12	.06	.08*	.01	.09	.06	.06	.00
Dismissive	-.06	.05	-.05	.00	-.10	.05	.07^{t}	.01	-.08	.05	-.06	.00
Preoccupied	-.32	.06	-.26**	.05	-.22	.06	-.18**	.02	-.18	.06	-.14**	.01
Fearful avoidant	.32	.07	.20**	.03	.24	.07	.15**	.02	.29	.07	.19**	.02
Demographics												
Age					-.02	.01	-.09*	.01	-.02	.01	-.10*	.01
Sex / gender					-.02	.08	-.01*	.00	-.05	.08	-.02	.00
Marital status					.01	.08	.01*	.00	.01	.08	.01	.00
Income					.01	.00	.31*	.09	.01	.00	.31**	.09
Black					-.06	.10	-.03	.00	-.13	.10	-.06	.00
Hispanic					-.18	.11	-.08	.00	-.23	.11	-.10*	.01
Emotion Regulation												
Inhibit									-.02	.01	-.16**	.02
Express									.00	.01	.02	.00
(Constant)	2.41	.30			3.44	.54			3.86	.56		

Note: ^{t} p<.10, *p < .05, ** p < .01; sr^2 = squared part correlation; Step 1; R^2 = .05, Step 2; R^2 = .16, Step 3; R^2 = .18

Table 4. Linear regression with diagnoses regressed on attachment, demographic variables and regulatory characteristics

Variables	Step 1				Step 2				Step 3			
	B	Std. Error	β	*sr2*	B	Std. Error	β	sr2	B	Std. Error	β	sr2
Attachment Dimension												
Secure	-.01	.09	-.01	.00	.06	.09	.03	.00	.07	.09	.03	.00
Dismissive	-.06	.08	-.03	.00	.01	.08	.01	.00	.00	.08	.00	.00
Preoccupied	.37	.09	.20**	.03	.23	.09	.12*	.01	.15	.10	.08	.00
Fearful avoidant	-.02	.11	-.01	.00	.10	.11	.04	.00	.05	.11	.02	.00
Demographics												
Age					.06	.01	.21**	.05	.06	.01	.22**	.05
Sex / gender					.23	.13	.07^{t}	.01	.24	.13	.07^{t}	.01
Marital status					-.01	.13	.00	.00	.00	.13	.00	.00
Income					-.01	.00	-.14**	.02	-.01	.00	-.14**	.02
Black					-.10	.16	-.03	.00	-.03	.16	-.01	.00
Hispanic					.26	.17	.07	.00	.32	.17	.09^{t}	.01
Emotion Regulation												
Inhibit									.02	.01	.10*	.01
Express									.01	.01	.04	.00
(Constant)	.97	.45			-2.76	.83		.00	-3.42	.88		.00

Note: ^{t} p<.10, *p < .05, ** p < .01; sr^2= squared part correlation; Step 1; R^2 = .04, Step 2; R^2 = .12, Step 3; R^2 = .13

Although this work is preliminary, it may be that attachment is linked to health outcomes in multiple ways. Specifically, links between preoccupation and poorer health may reflect hyper-vigilance and a tendency to *report* more somatic symptoms [4]. Reporting more symptomology may also occur in the context of high reassurance seeking and utilisation [4], potentially producing an *over* diagnosis of disease.

Better perceived health among secure persons may reflect their more effective coping [55], rendering them less vulnerable to daily stressors [56]. This, along with better engagement with the healthcare system [57], may result in less risk of over-diagnosis, and fewer health concerns. Alternatively, it may be that persons with greater attachment security have more resources to help them adjust to the aging process. Attachment security, for example, is associated with larger family networks [48], and social support appears more beneficial to those with greater security [58]. Thus, it is possible that better perceived health among secure persons indicates that these individuals have more resources to cope with daily stressors. More broadly, although our analyses controlled for relationship status and income (two key resources in aging), attachment related variation in unmeasured psychosocial or physical resources may well be responsible.

The finding that fearful avoidance consistently predicted *better* perceived health is somewhat surprising. One prior report found that despite reporting *more* symptoms, fearful avoidant styles had the *lowest* primary care costs and utilization [4], while another found that among singles, fearful avoidance predicted *better* outcomes [59]. Although the current report controlled for marital status, further work investigating the complex links between fearful avoidance and health is needed.

Attachment, affective parameters and health outcomes

Finally, the addition of dispositional tendencies to inhibit and express felt emotion in Step 3 of the models showed that while emotional expression did not predict outcomes, inhibition predicted both worse perceived health, and greater disease diagnosis counts. Although there are exceptions, dispositional inhibition typically predicts poorer health [40]. Inhibition is associated with heightened physiological responding [38], and it may be that the elevated autonomic responding associated with inhibition is responsible for its links to poorer outcomes [60].

Perhaps more importantly in terms of the current report, adding trait regulatory factors to the models attenuated the links between (a) security and better perceived health and (b) preoccupation and greater diagnosis counts. Interpretively, this pattern may imply that attachment-related variations in typical patterns of emotion regulation [35] are partially responsible, although issues with power are also possible. This interpretation is weakened in the case of attachment security by the absence of links between security and regulatory patterns in this sample (Table 2), but remains viable for persons with preoccupied characteristics. Given that preoccupation was associated with greater inhibition and expression, it seems likely that overall patterns of emotionality, or attempts to regulate emotion, may be behind preoccupied persons characteristic high reassurance seeking [61] and more frequent healthcare utilisation [4], possibly resulting in greater diagnosis counts.

Implications

Prior work suggests that attachment is both fluid [5] and amenable to intervention [6]. As such, the finding that attachment predicts *both* subjective, perceived health and more objective, diagnosis counts, has important clinical implications, both in terms of identifying those at risk and in guiding the development of interventions aimed at improving health outcomes.

Preoccupied attachment appears to be a risk factor for both poorer reported health and greater diagnosed disease, and it seems likely that poor perceived health, symptom sensitivity, and high use of healthcare [4] may increase the risk of excessive (and expensive) investigations or over-diagnosis among such persons. Briefly assessing attachment among high-end users of healthcare (or those not responding), would provide insight into the psychological processes of patients. Given that in the current sample preoccupation was more prominent among Hispanics (see Tables 1 and 2), the development of culturally relevant, targeted interventions reducing inhibition may lead to better health outcomes in this group, however, further work is needed to generalize findings beyond the current sample. Second, although preoccupation appeared to be a better predictor of health, it is also notable that a high proportion of our sample classified as dismissive. Dismissives may under-report symptoms and fail to seek medical care when it is needed [36]. Population-based campaigns that position regular or symptom-responsive care-seeking as a means of increasing or maintaining independence may be appealing to this group [62], and thus prove helpful in increasing utilisation.

Limitations

There are several limitations to these data. First, using self-reported health outcomes limits the conclusions that can be drawn, and further work investigating attachment related differences between self-reported perceived health, and more objective, biological and

physiological health measures is needed. Second, the cross-sectional design means that temporal links between attachment and health remain unclear. Changes in attachment as a result of poor health are possible, and prospective work is needed. Finally, this report is also limited by the sample and recruitment contexts. Despite their diverse nature, the sample are a specific cohort and group and those willing to participate may be healthier than average; findings may not generalize to other populations.

In sum, the present study offers insight into the complex relationships between attachment, regulatory factors, and both perceived health and current disease diagnoses among older adults. As many Western societies are confronted with increased longevity and morbidity, future work detailing when and how attachment and emotion regulation predict health outcomes may contribute to critical health agendas.

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