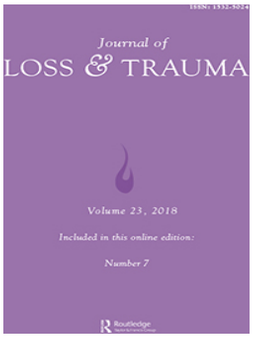

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Moderating Effect of Agreeableness on Coping Among Cancer Survivors: A Longitudinal Analysis

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ABSTRACT

The current study examined interactions among Agreeableness, problem-focused coping (PFC), and emotional expression in predicting purpose in life and self-acceptance. The sample included 345 cancer survivors, who participated in the National Survey of Midlife Development in the United States (MIDUS) studies II and III. We found three-way interactions after statistically controlling for sex, age, level of educational attainment, years since cancer diagnosis, previous levels of purpose in life and self-acceptance, and the Big Five personality traits. Results indicate that, depending on the levels of Agreeableness, the effect of utilizing PFC and emotional expression after a cancer may vary.

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Cancer survivors; agreeableness; emotional expression; problem-focused coping; MIDUS

Cancer is known to be a chronic illness, which can become a prolonged threat, involving uncertainty and ambiguity of survival (Deshields, Heiland, Kracen, & Dua, 2016). As a result, the recovery process after a cancer can be devastating, increasing the importance of examining the effect of utilizing certain coping strategies. In examining coping strategies, researchers have frequently focused on problem-focused coping (PFC) using an objective and analytical process, and emotion-focused coping using approaches that include emotional expression, humor, and positive comparison (Lazarus & Folkman, 1984). However, the effect of implementing these coping strategies has been inconsistent, finding both effective (e.g., Arathuzik, 1991; Lam & McBride-Chang, 2007) and ineffective results (e.g., Gossop, Green, Phillips, & Bradley, 1990). To examine the contradictory effects of utilizing various types of coping strategies, the model of resilience in adult cancer survivors suggests that personality traits are known to influence coping (Deshields et al., 2016). In this study, we examined the moderating effect of Agreeableness on using coping strategies: Agreeableness is one of the Big Five personality traits, known to be related to trust, empathy, and cooperation, and negatively related to interpersonal problems (Costa & McCrae, 1992).

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The theory on interpersonal relationships and cancer highlights the importance of creating supportive social environments of cancer patients and survivors. In these environments, patients and survivors would be able to express fears and uncertainties associated with cancer (Wortman & Dunkel-Schetter, 1979). Multiple studies have supported this theory and its benefits of interpersonal relationships and social support after cancer diagnosis, which was significantly associated with lower distress (e.g., Kamen et al., 2015; Queenan, Feldman-Stewart, Brundage, & Groome, 2010). Among the Big Five personality traits, Agreeableness is found to be most related to positive interpersonal behaviors (Jensen-Campbell, Gleason, Adams, & Malcolm, 2003). Thus, the effect of Agreeableness in coping after a cancer diagnosis was examined in this study.

People with high Agreeableness are able to maintain positive attitudes toward emotional expression even after experiencing a stressful event (Nightingale & Williams, 2000). Emotional expression can be beneficial, considering it involves sharing and discussing feelings with others, and may facilitate developing social support networks. The benefits of social support among cancer survivors have been found in multiple studies (e.g., Kamen et al., 2015; Queenan et al., 2010; Wortman & Dunkel-Schetter, 1979), and agreeable individuals may be better able to utilize emotional expression compared to those with lower Agreeableness, leading to greater social support and better adjustment after a cancer diagnosis. As past studies have shown that Agreeableness is positively related to both emotion- and problem-focused coping (Watson & Hubbard, 1996) and coping was found to be more effective when successfully processing one's emotions (Baker & Berenbaum, 2007), people with high Agreeableness may be able to maximize the effect of various coping strategies such as seeking support and genuinely expressing emotions. In other words, a three-way interaction among PFC, emotional expression, and Agreeableness in predicating well-being may be present.

Current study

Therefore, the purpose of this study is to assess the moderating effect of Agreeableness in using coping strategies (i.e., PFC, emotional expression) among cancer survivors using a large national longitudinal data set. As recent studies have begun to focus more on thriving among people diagnosed with cancer, two components of well-being (i.e., purpose in life and self-acceptance) were predicted in this study to be consistent with past studies (e.g., Costa & Pakenham, 2012). Specifically, we hypothesized that among people with high Agreeableness, engaging in PFC and emotional expression will be associated with higher well-being. Considering that sex,

age, levels of education, years since the cancer diagnosis, Big Five personality traits, and previous levels of purpose in life and self-acceptance are found to be associated with coping and future levels of well-being (e.g., Carver & Connor-Smith, 2010; Deshields et al., 2016), these variables were statistically controlled to reflect the actual effect of Agreeableness, PFC, and emotional expression on well-being.

Method

Participants

Data were drawn from the National Survey of Midlife Development in the United States (MIDUS), studies II and III. MIDUS II (M-II; Ryff et al., 2004–2006) was conducted from 2004 to 2006 and MIDUS III (M-III; Ryff et al., 2013–2014) was conducted from 2013 to 2014. Participants were 345 cancer survivors, who reported being diagnosed with cancer when M-III was conducted. Participants who only selected "skin cancer/melanoma" were excluded from this study ($n = 185$). It was not possible to distinguish between melanoma skin cancer, which is associated with a high death rate, and nonmelanoma skin cancer, which has an excellent survival rate (American Cancer Society, 2018). We did not want to treat nonmelanoma skin cancer in the same manner with other types of cancer with higher death rates. Furthermore, participants who did not complete all responses used in the analysis were also excluded from the further analyses.

Participants' ages in M-III ranged from 43 to 92 ($M = 69.62$, $SD = 10.13$) and comprised 58.2% women and 41.8% men. A majority of the sample were Caucasian (87.0%), followed by "Other" (6.8%), African American (3.2%), multiracial (2.1%), Native American (0.6%), and Native Hawaiian or Pacific Islander (0.3%). The mean year since the diagnosis of cancer was 14.4 years ($SD = 12.4$) in M-III. Types of cancer included breast (28.5%), prostate (21.5%), lymphoma or leukemia (6.5%), uterine (6.5%), colon (5.6%), cervical (3.8%), lung (3.5%), ovarian (1.5%), and "Other" (33.2%). We were not able to identify the specific type of cancer in the "Other" category because there was no follow-up question asked.

Measures

Purpose in life and self-acceptance (M-II and M-III)

The Purpose in Life and Self-Acceptance were measured using Ryff's Psychological Well-Being Scale in M-II and M-III (Ryff & Keyes, 1995). Both Purpose in Life (e.g., "I have a sense of direction and purpose in life") and Self-Acceptance (e.g., "When I look at the story of my life, I am pleased with how things have turned out") subscales consist of 7 items,

with response choices ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The overall scores for each domain were calculated by adding the item scores. Cronbach's alphas for the current study for M-II and M-III, respectively, were .67 and .71 for Purpose in Life, and .85 and .81 for Self-Acceptance.

Personality (M-II)

The Big Five personality traits were measured in M-II, using the five-factor inventory (Zimprich, Allemand, & Lachman, 2012). Participants were asked to rate how each of the adjectives described them, using a scale from 1 (*Not at all*) to 4 (*A lot*). Neuroticism consists of 4 items (e.g., "moody"), Extraversion consists of 5 items (e.g., "outgoing"), Openness to Experience consist of 7 items (e.g., "creative"), Conscientiousness consists of 5 items (e.g., "organized"), and Agreeableness consists of 5 items (e.g., "helpful"). The overall scores for five personality traits were calculated by averaging the item scores for each personality trait. Cronbach alphas for the current study were .74 for Neuroticism, .76 for Extraversion, .76 for Openness to Experience, .70 for Conscientiousness, and .80 for Agreeableness.

Coping (M-II)

Problem-focused coping and emotional expression were measured using the COPE scale (Carver, Scheier, & Weintraub, 1989). PFC consists of items from three subscales: Positive Reinterpretation and Growth (e.g., "I try to grow as a person as a result of the experience"), Active Coping (e.g., "I concentrate my efforts on doing something about it"), and Planning (e.g., "I make a plan of action"). Emotional expression was measured using the Focus on and Venting on Emotion subscale (e.g., "I get upset and let my emotions out"). Each subscale consists of 4 items, with response choices ranging from 1 (*Not at all*) to 5 (*A lot*). Cronbach's alphas for the current study were .91 for PFC and .85 for Emotional Expression.

Data analysis

All analyses were performed by R version 3.3.2 (R Development Core Team, 2016). Hierarchical multiple regression analyses were conducted to examine interactions among agreeableness, PFC, and Emotional Expression (all measured in M-II) in predicting Purpose in Life and Self-Acceptance (measured in M-III) controlling for sex (1 = women, 0 = men), age, level of educational attainment (ranging from 1 = no school/some grade to 12 = graduate or professional degree), years since cancer diagnosis, previous levels of Purpose in Life and Self-Acceptance, and Big Five personality

Table 1. Correlations, means, and standard deviations for overall sample ($n = 345$).

Variables	PurLife (M-II)	Accept (M-II)	PurLife (M-III)	Accept (M-III)	Neuro (M-II)	Extra (M-II)	Open (M-II)	Consc (M-II)	Agree (M-II)	ProbCope (M-II)	EmoExp (M-II)
PurLife (M-II)											
Accept (M-II)	.69***										
PurLife (M-III)	.62***	.47***									
Accept (M-III)	.54***	.71***	.67***								
Neuro (M-II)	−.36***	−.51***	−.30***	−.42***							
Extra (M-II)	.28***	.43***	.13*	.32***	−.14*						
Open (M-II)	.39***	.45***	.32***	.38***	−.24***	.50***					
Consc (M-II)	.32***	.33***	.29***	.30***	−.17**	.21***	.34***				
Agree (M-II)	.18***	.19***	.08	.10	−.01	.54***	.29***	.20***			
ProbCope (M-II)	.46***	.44***	.36***	.38***	−.23***	.30***	.50***	.39***	.24***		
EmoExp (M-II)	−.21***	−.32***	−.16**	−.28***	.59***	.01	−.12*	−.07	.08	−.07	
M	39.31	38.54	38.05	38.46	2.02	3.16	2.91	3.42	3.49	37.95	9.37
SD	6.58	8.38	6.99	7.64	0.62	0.56	0.50	0.45	0.48	6.15	2.97

Note. PurLife: Purpose in Life; Accept: Self-Acceptance; Neuro: Neuroticism; Extra: Extraversion; Open: Openness to Experience; Consc: Conscientiousness; Agree: Agreeableness; ProbCope: Problem-Focused Coping; EmoExp: Emotional Expression; M-II: MIDUS II; M-III: MIDUS III.
*$p < .05$, **$p < .01$, ***$p < .001$.

traits measured in M-II. All continuous predictor variables were mean-centered before entering in the model. Regression lines were plotted when interaction terms were found statistically significant. Specifically, regression lines were plotted using one standard deviation above and below the mean of each predictor. As recommended by Hayes (2013), unstandardized regression coefficients were reported, as they are preferred when examining moderation.

Results

Descriptive statistics

Means, standard deviations, and bivariate correlations for all variables are reported in Table 1. In both M-II and M-III, Purpose in Life and Self-Acceptance were correlated with the Big Five personality traits in expected directions, although Purpose in Life and Self-Acceptance measured in M-III were not significantly associated with Agreeableness measured in M-II. They were also positively correlated with PFC and negatively with emotional expression. All significant correlation coefficients ranged from .12 to .71.

Hierarchical multiple regression analyses

Regression analyses were conducted to examine interaction effects of Agreeableness, emotional expression, and PFC in predicting Purpose in Life and Self-Acceptance in M-III. For each analysis conducted, sex, age, level of education, time since diagnosis, previous levels of Purpose in Life and Self-Acceptance, and Big Five personality traits measured in M-II were

Table 2. Summary of hierarchical multiple regression analyses predicting Purpose in Life and Self-Acceptance controlling for demographic variables, previous levels of Purpose in Life and Self-Acceptance, and Personality Traits ($n = 345$).

	Purpose in Life (M-III)					Self-Acceptance (M-III)				
Predictor	*B*	*SE*	*t*	*P*	ΔR^2	*B*	*SE*	*t*	*p*	ΔR^2
Step 1					0.54***					0.54***
Sex	−0.15	0.67	−0.23	0.82		−0.45	0.67	−0.67	0.50	
Age	−0.67	0.32	−2.12	<.05		−0.18	0.32	−0.55	0.58	
Education	0.34	0.12	2.87	<.01		0.19	0.12	1.64	0.10	
YearSinceCancer	−0.01	0.30	−0.04	0.97		0.11	0.30	0.35	0.73	
PurLife (M-II)	0.55	0.05	10.11	<.001		–	–	–		
Accept (M-II)	–	–	–	–		0.55	0.05	11.49	<.001	
Neuro (M-II)	−0.69	0.39	−1.79	0.07		−0.35	0.40	−0.88	0.38	
Extra (M-II)	−0.49	0.38	−1.27	0.21		0.39	0.40	0.99	0.33	
Open (M-II)	0.39	0.39	0.99	0.32		0.02	0.39	0.06	0.95	
Consc (M-II)	0.30	0.33	0.90	0.37		0.34	0.33	1.03	0.30	
Agree (M-II)	0.23	0.37	0.63	0.53		−0.18	0.37	−0.49	0.63	
EmoExp (M-II)	−0.03	0.38	−0.09	0.93		−0.38	0.38	−1.02	0.31	
ProbCop (M-II)	0.25	0.37	0.66	0.51		0.38	0.36	1.04	0.30	
Step 2					0.01					0.01
AgreeXEmoExp	−0.28	0.28	−0.99	0.32		−0.23	0.28	−0.81	0.42	
AgreeXProbCop	0.41	0.30	1.38	0.17		0.38	0.30	1.27	0.21	
ProbCopXEmoExp	−0.27	0.28	−0.96	0.34		0.06	0.28	0.23	0.82	
Step 3					0.01					0.01
AgreeXEmoExpXProbCop	0.57	0.27	2.14	<.05		0.63	0.27	2.36	<.05	

Note. PurLife: Purpose in Life; Accept: Self-Acceptance; Neuro: Neuroticism; Extra: Extraversion; Open: Openness to Experience; Consc: Conscientiousness; Agree: Agreeableness; ProbCope: Problem-focused Coping; EmoExp: Emotional Expression; M-II: MIDUS II; M-III: MIDUS III.

statistically controlled. All unstandardized regression coefficients are shown in Table 2.

In predicting Purpose in Life, the previous level of Purpose in Life, age, and education were statistically significant ($p < .05$). Also, there was a significant three-way interaction among Agreeableness, emotional expression, and PFC ($B = .57$, $SE = .27$, $p < .05$). The predictors included in the current model explained approximately 42% of the variance in Purpose in Life. When plotting the three-way interaction (see Figure 1), individuals with low PFC and high EFC tended to experience less Purpose in Life as their levels of Agreeableness increased. Also, individuals with scores both high on emotional expression and PFC tended to experience higher Purpose in Life as their levels of Agreeableness increased. However, when assessing simple slopes, none of them reached statistical significance ($p > .05$).

In predicting Self-Acceptance, the previous level of Self-Acceptance was statistically significant ($p < .001$). There was also a significant three-way interaction among Agreeableness, emotional expression, and PFC ($B = .63$, $SE = .27$, $p < .05$). The predictors included in the current model explained approximately 52% of the variance in Self-Acceptance. When plotting the three-way interaction (see Figure 2), individuals with low PFC and high EFC experienced less Self-Acceptance as their levels of Agreeableness increased ($B = -1.41$, $SE = .60$, $p < .05$). Also, although individuals with high Emotional Expression and PFC tended to experience higher Purpose

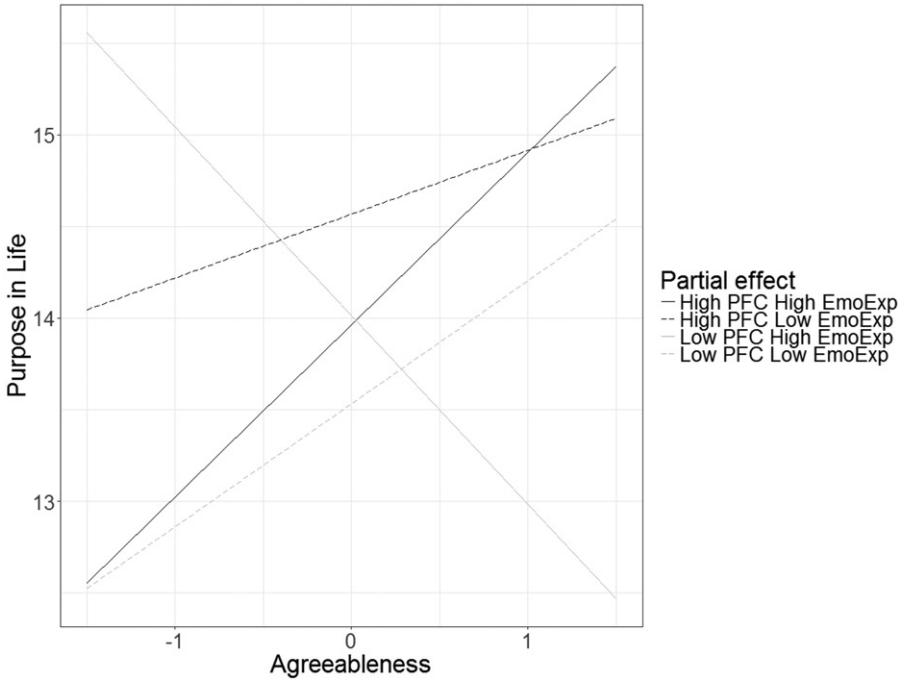

Figure 1. Three-way interaction plot of Agreeableness, problem-focused coping, and Emotional Expression predicting purpose in life ($n = 345$). PFC: Problem-focused coping; EmoExp: Emotional Expression.

in Life as their levels of Agreeableness increased, the simple slope did not reach statistical significance ($p > .05$).

Discussion

The purpose of this study was to examine the moderating effect of Agreeableness in using coping strategies (i.e., PFC and emotional expression) to predict Purpose in Life and Self-Acceptance among cancer survivors using a large national longitudinal dataset. Although approximately 10 years had passed between the M-II and M-III studies, the levels of Purpose in Life and Self-Acceptance were strongly associated across time, indicating those with higher well-being were more likely to experience higher well-being even after 10 years among cancer survivors. Also, Neuroticism was negatively associated with Purpose in Life and Self-Acceptance measured in both M-II and M-III. The other four Big Five personality traits were positively associated with Purpose in Life and Self-Acceptance in M-II and M-III; although, no significant associations were found between Agreeableness and both Purpose in Life and Self-Acceptance in M-III. This suggests that high Agreeableness alone is not associated with future Purpose in Life and Self-Acceptance.

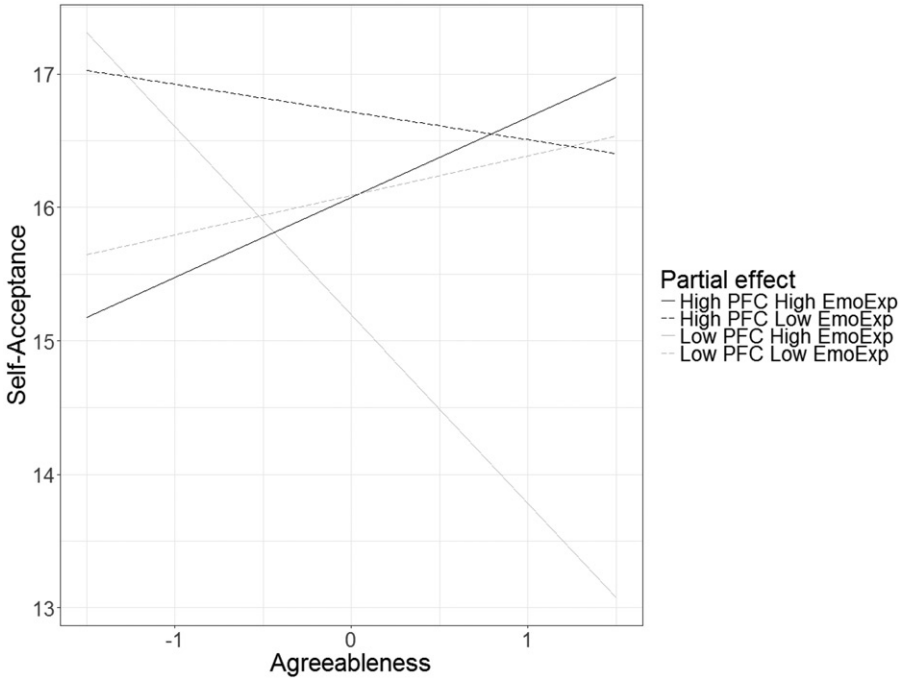

Figure 2. Three-way interaction plot of Agreeableness, problem-focused coping, and Emotional Expression predicting self-acceptance ($n = 345$). PFC: Problem-focused coping; EmoExp: Emotional Expression.

When inspecting interaction effects among Agreeableness, Emotional Expression, and PFC, a significant three-way interaction was found even after statistically controlling for confounding variables (i.e., sex, age, education, years since cancer diagnosis, personality traits, and previous levels of well-being). Specifically, cancer survivors with high Agreeableness tended to experience higher levels of well-being when they engaged in both PFC and Emotional Expression. This suggests that, although the ability to engage in various coping strategies was associated with better adjustment after a stressor (Carver & Connor-Smith, 2010; Cheng, Lau, & Chan, 2014), in the current study, this pattern was only observed among cancer survivors with high Agreeableness, especially as the two-way interaction between PFC and Emotional Expression was not statistically significant.

However, although individuals with high Agreeableness are more likely to experience higher well-being when utilizing both PFC and emotional expression, research also indicates that they are less likely to engage in health care decision making, such as selecting treatment choices (Flynn & Smith, 2007). Considering that PFC involves making decisions about the problem and those with high problem-solving skills are more likely to believe in their own decisions (Deniz, 2006), some individuals with high Agreeableness may be hesitant to engage in certain PFC, as high Agreeableness is also related to

feelings of submissiveness and being overly considerate of others (Toegel & Barsoux, 2012). This highlights that, among people with high Agreeableness, in addition to emphasizing the benefits of interpersonal relationships and social support after cancer diagnosis (Kamen et al., 2015; Queenan et al., 2010; Wortman & Dunkel-Schetter, 1979), encouragement to engage in health-related behaviors (e.g., eating healthier diets and engaging in exercise) may be critical to survivors' well-being.

Next, individuals who engaged in low PFC and high emotional expression experienced significantly lower Self-Acceptance when they reported higher Agreeableness; a similar pattern was found in predicting Purpose in Life. However, researchers suggested a positive effect of Emotional Expression among people with high Agreeableness (Nightingale & Williams, 2000; Tobin, Graziano, Vanman, & Tassinary, 2000). Considering that Emotional Expression in the current study was negatively associated with both Purpose in Life and Self-Acceptance ($r = -.16$ to $-.32$), future studies should distinguish the positive and negative effects of emotional expression and its association with Agreeableness.

There are some limitations to this study. First, researchers have suggested the importance of measuring emotional coping by including how individuals identify, process, and express emotions when facing stressful events (Stanton, Sullivan, & Austenfeld, 2011). Considering that the current study focused solely on emotional expression, further examining the process of emotional expression might distinguish the adaptive nature of emotions in relation to Agreeableness. Second, although engaging in both Emotional Expression and PFC was found to be beneficial among cancer survivors who are agreeable, it was unclear what types of emotions were associated with adjustment. For instance, depending on the levels of valence (how pleasant or unpleasant) and arousal (intensity of physical response) of emotions, expressing certain emotions may not lead to adjustment after a cancer. Research has shown that expressing certain negative emotions, such as anger, was more beneficial compared to expressing fear and anxiety (Lieberman & Goldstein, 2006). Third, although time since cancer diagnosis was statistically controlled in the regression models; there was a wide variability of the years passed since the diagnosis ($SD = 12.4$). In other words, cancer survivors who received the diagnosis 10 years ago may cope differently compared to those who recently received the diagnosis. Lastly, differences among cancer types were not examined because of the low number of cases for certain types of cancer, and the majority of the current sample identified as Caucasian. Thus, the generalizability of the current results across cancer patients may be limited.

Nevertheless, regardless of these limitations, the current study highlights the moderating effect of Agreeableness on Emotional Expression and PFC

in predicting well-being after a cancer. Results indicate that, depending on the levels of Agreeableness, the effect of utilizing various coping strategies and their adjustment after a cancer may vary. These results may provide an alternative explanation of inconsistent results on the effect of utilizing various coping strategies.

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