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Worried but Not Intending: When Expressive Suppression Dampens the Motivational Role of Health Worry in Colorectal Cancer Screening Among Older Adults

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ABSTRACT

Objectives: Health worry may promote engagement in preventive behaviors, but when poorly regulated it can also foster avoidance. This study examined the relationship between health worry and intention to participate in colorectal cancer screening, investigating the moderating role of emotion regulation strategies and age-related differences.

Methods: Within the MIRIADE project, a cross-sectional survey was conducted with 1,451 adults aged 50–74 years, divided into middle-aged (50–60 years) and older adult (61–74 years) groups. Participants completed measures of health worry, cognitive reappraisal, expressive suppression, and screening intention. Moderation analyses were performed separately by age group using PROCESS.

Results: Health worry was positively associated with screening intention in both age groups. Cognitive reappraisal predicted higher intention but did not moderate this relationship. Expressive suppression significantly moderated this association only among older adults: health worry predicted higher screening intention at low and moderate levels of suppression, whereas this effect disappeared at high levels of suppression.

Conclusions: Emotion regulation strategies, particularly expressive suppression, influence how health worry translates into screening intentions in later adulthood.

Clinical implications: Interventions aimed at increasing cancer screening behaviors in older adults should consider not only health worry, but also the ways individuals regulate emotional experiences associated with health threats.

KEYWORDS

Cancer screening intention; clinical psychology; emotional regulation; health worry; older adults

Introduction

Cancer screening programs constitute fundamental public health tools, contributing substantially to the reduction of cancer incidence, mortality, and disease severity through early diagnosis and timely treatment of precancerous lesions (AIRTUM Working Group [AIRTUM], 2022; World Health Organization [WHO], 2022). Within this framework, colorectal cancer (CRC) screening stands out as one of the most effective preventive measures. Extensive evidence demonstrates that the early detection of advanced adenomas and early-stage neoplasms reduces mortality by 30–40% in the target population (Brenner et al., 2014; Lin et al., 2021).

Colorectal cancer ranks among the leading causes of cancer-related mortality both in Europe and in Italy, exerting a significant burden on older populations (AIRTUM, 2022). The efficacy of screening – particularly through fecal occult blood testing (FOBT/FIT) – is well documented. Characterized by simplicity, replicability, and non-invasiveness, this procedure facilitates the detection of anomalies at preclinical stages, thereby significantly increasing survival rates (Schreuders et al., 2015; Zorzi et al., 2015).

In Italy, cancer screening programs are incorporated into the Essential Levels of Care (LEA), guaranteeing free access for the eligible population. For colorectal cancer screening, men and women aged

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50 to 74 years are invited biennially to undergo the fecal occult blood test (FOBT/FIT) (Ministry of Health, 2022). In the Italian organized screening pathway, FOBT/FIT represents the first-level screening test, whereas colonoscopy is generally offered as a second-level diagnostic procedure following a positive test result. Nevertheless, despite its documented efficacy, participation remains sub-optimal: only approximately 30% of the eligible population regularly adheres to organized screening programs (WHO, 2022). Similar patterns emerge from the *Cancer Screening in the European Union Report* (European Commission, 2017), which highlights low or uneven participation rates across several other European countries.

Extensive literature has identified a wide range of individual, cognitive, emotional, and relational factors that shape both intention to participate in screening and subsequent adherence (Bertaut et al., 2018; Fernandez et al., 2016; O'donovan et al., 2021; Vallone et al., 2022). Although intention does not necessarily translate into actual screening behavior, it represents one of the strongest and most consistent proximal predictors of preventive health behaviors according to socio-cognitive models such as the Theory of Planned Behavior (Ajzen, 1991). Understanding the psychological factors associated with screening intention therefore represents an important step toward promoting subsequent screening uptake. Among these, health worry assumes a critical, albeit dual, role: while moderate levels can function as a motivational driver for preventive behaviors, excessive worry may precipitate anxiety, avoidance, and procrastination, particularly in the absence of adequate emotional regulation (McQueen et al., 2008; Salkovskis & Warwick, 2001). In this sense, emotions extend beyond mere situational barriers – such as embarrassment, fear, disgust, or discomfort, which are frequently documented in CRC screening contexts (Eberth et al., 2018; Orom & Allard, 2025). Rather, they constitute profound psychological processes that modulate how individuals interpret risk and formulate preventive decisions.

While dominant theoretical models addressing screening participation have heavily prioritized cognitive constructs, such as attitudes and perceived behavioral control (e.g., within the Theory of Planned Behavior; Ajzen, 1991), scant attention

has been directed toward the role of emotion regulation strategies, conceptualized as relatively stable traits that influence how individuals manage complex emotions related to health risk and illness (Gross, 1998; Gross & John, 2003).

The intention to participate in colorectal cancer screening: the role of trait health anxiety and emotion regulation strategies

A growing body of literature highlights the central role of emotional processes in modulating preventive health behaviors, particularly in the domain of cancer screening. Empirical evidence consistently demonstrates that health worry and cancer worry are intrinsically linked to preventive actions, including participation in cancer screening programs. Specifically, research suggests that both the frequency and intensity of worry may function as facilitators or deterrents of colorectal cancer screening uptake (Murphy et al., 2018; Vrinten et al., 2015), whereas higher levels of health anxiety have been correlated with increased distress surrounding colonoscopy procedures (Miles & Wardle, 2006). Similarly, perceived risk and worry have been identified as robust predictors of screening practices – ranging from mammography to sigmoidoscopy – and worry-related constructs consistently emerge as critical variables in population-based studies examining knowledge, attitudes, and barriers to colorectal cancer screening (Gabel et al., 2019; Moser et al., 2007).

Although a substantial body of research on cancer prevention has traditionally relied on the construct of *cancer worry* to operationalize emotional concerns related to cancer risk, this dimension can be conceptually traced back to broader and more dispositional forms of health anxiety and illness-related attitudes. From this theoretical standpoint, the *Illness Attitude Scale* (IAS; Kellner, 1987) captures a stable configuration of fears, beliefs, and concerns surrounding illness, functioning as a superordinate construct relative to disease-specific worry, such that associated with cancer. Importantly, such dispositional illness attitudes are liable to be situationally activated within cancer-related contexts, including the decision-making processes underlying screening adherence (Kellner,

1987; McQueen et al., 2008; Salkovskis & Warwick, 2001; Sirri et al., 2008).

Empirical evidence posits a curvilinear relationship between psychological distress and CRC screening behavior, whereby moderate levels of distress predict a higher likelihood of screening uptake, whereas both minimal and excessive levels are associated with lower participation rates (e.g., Goodwin et al., 2023; O'donovan et al., 2021). Furthermore, discrete emotions such as fear, embarrassment, disgust, and anticipated discomfort have been shown to independently predict colorectal screening avoidance. Notably, these effects persist even after controlling for medical and socio-demographic covariates, highlighting the insufficiency of purely cognitive models in explaining health behavior (Reynolds et al., 2018). In older adults, this emotional dimension assumes heightened salience: evidence from primary care settings indicates that symptoms of anxiety and depression substantially influence perceptions of risk, as well as the appraisal of benefits and barriers associated with CRC screening (Anderson et al., 2023; Beydoun et al., 2014; Wardle et al., 2000).

On a broader level, classic work by Wardle and colleagues demonstrated that interest in cancer screening among older adults is predominantly driven by perceived vulnerability and cancer-related worry, suggesting that health worry serves as a pivotal motivational driver in later life (Wardle et al., 2000). Beyond the oncological domain, research on aging and prevention consistently shows that worry and risk perception can promote preventive behaviors – such as medical checkups, adherence to surveillance protocols, and protective actions – especially when coupled with a sense of control, clear information, and adequate health literacy (McQueen et al., 2008). Educational interventions targeting adults aged 50–70 years have demonstrated efficacy in increasing colorectal cancer screening uptake by reducing perceived and emotional barriers rooted in fear and worry, suggesting that health-related concerns, when effectively managed, may facilitate preventive action rather than avoidance (Rakhshani et al., 2024).

Analogous trends are evident in non-oncological contexts, including infectious disease prevention, where higher levels of worry among older adults correlate with greater engagement in protective

behaviors, provided that preventive options are perceived as realistic and actionable (Baig et al., 2025; Bish & Michie, 2010). Qualitative studies further corroborate these findings, indicating that concerns related to safety, physical decline, and loss of autonomy in older age can translate into tangible preventive measures when anxiety is constructively processed and integrated rather than avoided (Consedine et al., 2004). Together, this literature suggests that health worry in older adults should not be conceptualized solely as a risk factor, but also as a motivational resource that may drive prevention, contingent upon how it is regulated.

Within this framework, emotion regulation strategies emerge as a critical moderating mechanism. Cognitive reappraisal, an adaptive strategy involving the reinterpretation of emotionally salient situations, has been consistently associated with greater psychological resilience, better health outcomes, and adaptive decision-making in preventive contexts (Gross & John, 2003; Ochsner et al., 2012; Silvers et al., 2013). Conversely, expressive suppression – entailing the inhibition of emotional expression without altering the underlying emotional experience – has been correlated with adverse psychological outcomes, increased physiological arousal, avoidance tendencies, and reduced engagement in health-promoting behaviors (Aldao et al., 2010; Gross, 2002). Within oncological settings, evidence indicates that adaptive emotion regulation strategies facilitate screening uptake by buffering against fear, anxiety, and discomfort. In contrast, maladaptive strategies such as rigid suppression or avoidance significantly predict the postponement or complete avoidance of screening protocols (Consedine et al., 2004).

Given that colorectal cancer screening primarily targets individuals aged 50 years and older, understanding how age-related emotional and regulatory processes influence preventive decision-making becomes particularly relevant for improving screening adherence in aging populations.

Despite these converging lines of evidence, relatively few studies have examined emotion regulation as a stable, dispositional moderator of screening intentions, particularly within the CRC context. Age constitutes a critical variable in this dynamic. According to Socioemotional Selectivity Theory, emotional goals and regulatory processes undergo systematic changes in later life, thereby heightening

older adults' sensitivity to the affective components of health-related decision-making (Carstensen et al., 1999). Empirical data indicate that older adults not only demonstrate preserved efficacy in cognitive reappraisal strategies – such as detached and positive reappraisal – but may also utilize expressive suppression more frequently than their younger counterparts, often without incurring the physiological or psychological costs typically observed in younger cohorts (Brummer et al., 2014; King Johnson et al., 2023; Liang et al., 2017; Shiota & Levenson, 2009; Urry & Gross, 2010). This suggests that, in older age, suppression may function as part of a relatively stable regulatory style contingent upon context rather than constituting a uniformly maladaptive strategy. Lifespan reviews and meta-analyses further substantiate that advancing age is characterized by an increased focus on emotional well-being, a preference for strategies that preserve affective balance, and a context-dependent impact of specific regulatory efforts (Brady et al., 2018; Livingstone & Isaacowitz, 2015). Recent research emphasizes that age-related differences are less apparent in the selection of strategies and more pronounced in the contextual and motivational determinants that trigger emotion regulation (Isaacowitz, 2022; Isaacowitz & English, 2024). From this perspective, emotion regulation is better conceptualized as a dynamic process determining when and how emotional responses – such as health-related worry – are translated into action or avoidance, rather than as a uniformly adaptive or maladaptive set of strategies.

Moreover, evidence from decision-making research highlights that health-related choices in older age increasingly reflect an interplay between cognitive risk evaluation and emotional regulation, particularly under conditions of uncertainty and delayed benefits – features intrinsic to cancer screening (Özdeş, 2020). Within this conceptual framework, emotion regulation functions as a key mechanism translating abstract health worry into concrete preventive intentions. Accordingly, theoretical models suggest that older adults rely more heavily on stable regulatory styles, implying that the same emotional state – namely health worry – may act either as a driver or an obstacle to prevention contingent upon how it is regulated (Aldao et al., 2010; Mauritzson

et al., 2023; Nakagawa et al., 2017; Sardella et al., 2023; Scheibe & Carstensen, 2010).

Drawing upon the theoretical premises outlined above, the present study examines the relationship between health worry and intention to participate in colorectal cancer screening, investigating the moderating role of emotion regulation strategies (cognitive reappraisal and expressive suppression). To elucidate age-related differences, the study compares two age groups—50–60 years and 61–74 years – to assess whether the role of emotion regulation assumes particular salience among older adults.

Based on this rationale, the following hypotheses were formulated:

H1. Health worry will be positively associated with intention to participate in colorectal cancer screening.

H2. Greater use of cognitive reappraisal is expected to attenuate (i.e., moderate) the negative impact of health worry, promoting higher screening intention.

H3. Greater use of expressive suppression is expected to amplify the anxiety-related components of health worry, thereby reducing screening intention.

H4. Consistent with Socioemotional Selectivity Theory, we hypothesize that the moderating role of emotion regulation (specifically expressive suppression) will be specific to the older age group (61–74). In this group, suppression is expected to modulate the relationship between health worry and screening intention, whereas no significant moderating effect is expected in the younger group (50–60).

The present study was carried out as part of the [Blinded for Review] initiative. Funded by the Italian Ministry of Health under the framework of the Regional Prevention Plan of Campania (PRP 2020–2025), the primary objective of the project is to enhance adherence to cancer screening across the region through the implementation of targeted psychological interventions.

Methods

Participants and procedure

An a priori power analysis was performed using G*Power (version 3.1.9.7) to estimate the minimum sample size required for the planned multiple regression analyses. The parameters were set to detect a small effect size ($f^2 = .02$) with a standard significance level of $\alpha = .05$ and a statistical power of .80. The specified model included five predictors: health worry, cognitive reappraisal, expressive suppression, and the two respective interaction terms. The analysis indicated that a minimum sample of 647 participants was necessary to achieve adequate statistical power. Data collection was managed by a professional survey agency, which employed a quota sampling strategy to ensure the sample was representative of the population eligible for colorectal cancer screening in the Campania region (Italy) in terms of age, gender, and geographical distribution. Prior to participation, all individuals were fully informed about the anonymous nature of the study and provided digital informed consent.

Through this sampling procedure, a total of 1451 participants were recruited. The sample was divided into two distinct age cohorts based on the median age of the distribution ($Md = 61$): a middle-aged group ($n = 736$, 50.7%; Age mean = 54.6, $SD = 3.2$, range: 50–60 years) and an older adult group ($n = 715$, 49.3%; Age mean = 67, $SD = 4$, range: 61–74 years).

Regarding socio-demographic characteristics, the overall sample consisted of 51.6% females, with a mean age of 60.7 years ($SD = 7.2$). Moreover, the majority of participants (76.2%) were married or in a committed relationship. In terms of socioeconomic status, 63.3% perceived their economic resources as adequate or excellent. Occupational data indicated that the majority of the sample was currently active in the workforce (57%, comprising 38.9% employees and 18.1% self-employed). The remaining participants were retired (18.3%), homemakers (17.9%), or unemployed (6.4%). The sample was predominantly Catholic (88.1%), with 37.1% identifying as practicing believers.

As for their relationship with cancer and screening, results revealed a complex picture. While 66.5% of participants were aware of the colorectal

cancer screening program, a substantial proportion (63.5%) reported never having received an official invitation. General familiarity with cancer was reported by 57.8% of the sample, and 35.6% had vicarious experience with the disease. Crucially, regarding past adherence to screening guidelines, the majority (59.1%) reported never having undergone screening. The remaining participants reported adhering rather irregularly (16%), fairly regularly (12%), or regularly (13%).

The study was conducted in accordance with the Declaration of Helsinki and received formal approval from the Ethics Committee for Psychological Research at [Blinded for Review] (Protocol No. XXX).

Measures

Demographic and health-related background

Participants provided sociodemographic information, including age, gender identity, educational level, self-perceived socioeconomic status, marital status, occupation, and religious orientation. Additionally, specific health-related variables were assessed: participants indicated their awareness of the colorectal cancer screening program, whether they had ever received an official invitation, their general familiarity with cancer, and any vicarious experience with the disease (e.g., knowing someone affected by colorectal cancer). Past screening behavior was assessed with a single item asking participants to categorize their adherence to the recommended schedule (*never, rather irregularly, fairly regularly, or regularly*).

Intention to participate in colorectal cancer screening was measured using a two-item scale drawn from previous research (Bianchi et al., 2024, 2025). Prior to answering, participants were provided with a brief informative section outlining the organized colorectal cancer screening program in the Campania region. This section explicitly defined the screening procedure as the fecal occult blood test, detailing its essential characteristics and the recommended screening intervals. Participants rated statements (e.g., “I intend to undergo colorectal cancer screening”) on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale demonstrated excellent internal consistency ($\alpha = .96$).

Health worry was assessed using a subscale of the Illness Attitude Scale (IAS; Kellner, 1987; Sirri et al., 2008). This instrument evaluates stable fears, beliefs, and concerns associated with the possibility of suffering from a serious illness. The subscale used in the present study assesses general worry about having or developing a serious illness or disease. Participants responded to the items using a 5-point frequency scale ranging from *No* to *Most of the time*. In the present study, the scale showed good internal reliability ($\alpha = .82$).

Emotion regulation strategies were assessed using items adapted from the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003). Specifically, two items were used to measure Cognitive Reappraisal (e.g., “When I want to feel more positive emotion, I change the way I’m thinking about the situation”) and two items measured Expressive Suppression (e.g., “I keep my emotions to myself”). Participants rated their agreement on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Both dimensions demonstrated acceptable internal consistency (Cognitive Reappraisal: $\alpha = .74$; Expressive Suppression: $\alpha = .76$).

Statistical analysis

As a first step, descriptive statistical procedures were employed to assess potential baseline disparities between the two age cohorts (50–60 years vs. 61–74 years). Specifically, independent samples *t*-tests were calculated to evaluate mean differences in the key psychological constructs, namely screening intention, health worry, cognitive reappraisal, and expressive suppression. Concurrently, Chi-square tests were utilized to examine differences in categorical variables related to screening history and cancer awareness, including program knowledge, receipt of official invitations, familiarity with the disease, vicarious experience, and past adherence behaviors. This preliminary screening was essential to contextualize the subsequent findings within the specific demographic profiles of the two groups. In addition, one-way ANOVAs with Bonferroni post-hoc comparisons were conducted on the full sample to examine differences in screening intention as a function of invitation receipt and past screening behavior.

To test the study’s core hypotheses, two distinct moderation models were computed—one for the middle-aged group and one for the older adult group – using the PROCESS macro for SPSS (Model 2; Hayes, 2012). In this analytical framework, health worry served as the independent variable, while screening intention was entered as the dependent variable. Cognitive reappraisal and expressive suppression were included as simultaneous moderators to determine their interactive effects on the relationship between worry and intention. To mitigate potential multicollinearity and facilitate interpretation, all continuous predictors were mean-centered prior to analysis. Where significant interactions emerged, the nature of the moderation was further explored via simple slope analysis (Dawson, 2014). This procedure examined the conditional effect of health worry on screening intention at low (–1 SD), mean, and high (+1 SD) levels of the significant moderator.

Results

Descriptive analyses

First, preliminary analyses were conducted to compare the two age cohorts (50–60 years vs. 61–74 years) on key screening-related variables and psychological factors.

Results highlighted significant age-related disparities regarding the institutional aspects of the screening process. Specifically, a significant difference emerged in program awareness, $\chi^2_{(1)} = 4.23$, $p = .040$. Examination of the frequencies indicates that older adults were slightly more likely to be aware of the colorectal cancer screening program compared to the younger cohort. Similarly, a highly significant difference was found regarding the receipt of an official invitation, $\chi^2_{(1)} = 12.44$, $p < .001$. As expected, the older group reported having received an official invitation significantly more frequently than the younger group. In contrast, no significant differences were found regarding participants’ broader, personal history with cancer. The two age groups did not differ significantly in terms of general cancer familiarity, $\chi^2_{(1)} = 1.28$, $p = .258$, nor in terms of vicarious experience with colorectal cancer, $\chi^2_{(1)} = 0.38$, $p = .538$. These findings suggest that while institutional exposure to screening

increases with age, the personal burden of cancer experience is distributed relatively evenly across the sample.

Subsequent independent samples *t*-tests were conducted to determine whether the two age cohorts differed in the mean levels of the investigated psychological variables. Descriptive statistics and test results are presented in the left panel of Table 1. Results indicated no significant differences between the middle-aged (50–60 years) and older adult (61–74 years) groups on any of the continuous variables (all *ps* > .05). These findings suggest that while the age groups differ in their institutional exposure to screening, they share a similar psychological profile regarding health anxiety, regulatory styles, and preventive intent.

At the full-sample level, given the substantial proportion of participants who had never undergone screening or received an official invitation, additional analyses examined whether screening intention varied with these variables. A one-way ANOVA indicated that intention was significantly higher among participants who had received an official invitation ($M = 3.88$, $SD = 1.10$) than among those who had not ($M = 3.18$, $SD = 1.22$), $F(1, 1449) = 118.05$, $p < .001$. Intention also differed across levels of past screening adherence, $F(3, 1447) = 99.44$, $p < .001$, increasing progressively from participants who had never undergone screening ($M = 3.03$, $SD = 1.21$) to those reporting irregular ($M = 3.80$, $SD = 1.03$), fairly regular ($M = 4.09$, $SD = 0.91$), and regular adherence ($M = 4.25$, $SD = 0.91$). Bonferroni post-hoc comparisons showed that participants who had never been screened reported lower intention than all other groups (*ps* < .001), and that irregular adherers reported lower intention than both fairly regular ($p = .048$) and regular adherers ($p < .001$), whereas the latter two groups did not differ. Notably, even among never-screened participants, mean intention was at the scale midpoint, indicating that

preventive intentions were not at floor in this subgroup.

Bivariate correlations are reported in the right columns of Table 1. As hypothesized, health worry showed a significant positive correlation with screening intention. Similarly, cognitive reappraisal was positively associated with intention, whereas expressive suppression was not. Regarding the predictors, correlations were generally low to moderate (ranging from $r = -.03$ to $r = .27$), indicating no issues with multicollinearity.

Moderation analyses

Middle-aged group (50–60 years)

The first moderation model was tested on the middle-aged cohort ($n = 736$). The overall model was statistically significant, $F(5, 730) = 8.71$, $p < .001$, accounting for approximately 5.6% of the variance in screening intention ($R^2 = .056$).

Analysis of the individual predictors revealed a significant positive main effect of health worry on screening intention ($b = .16$, $SE = .05$, $t = 3.17$, $p = .002$). Similarly, cognitive reappraisal emerged as a significant positive predictor ($b = .19$, $SE = .04$, $t = 5.44$, $p < .001$). The main effect of expressive suppression, however, was not significant ($b = -.01$, $SE = .03$, $t = -.28$, $p = .776$).

Regarding the moderation hypotheses, results indicated no significant interaction effects. Specifically, neither the interaction between health worry and cognitive reappraisal ($b = -.03$, $p = .458$) nor the interaction between health worry and expressive suppression ($b = .03$, $p = .280$) reached statistical significance. These findings suggest that for adults aged 50–60, while health worry and cognitive reappraisal independently promote screening intention, regulatory strategies do not moderate the motivational impact of worry.

Table 1. Descriptive statistics and bivariate correlations among study variables.

Variable	Full Sample ($N = 1451$)	50–60 ($n = 736$)	61–74 ($n = 715$)	Correlations		
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	1	2	3
1. Screening Intention	3.44 (1.22)	3.45 (1.22)	3.43 (1.22)	–		
2. Health Worry	1.69 (0.85)	1.71 (0.86)	1.68 (0.85)	.14**	–	
3. Cognitive Reappraisal	5.19 (1.27)	5.24 (1.28)	5.13 (1.25)	.19**	–.03	–
4. Expressive Suppression	4.31 (1.56)	4.31 (1.58)	4.32 (1.54)	.04	.07**	.27**

Note: *M* = Mean; *SD* = Standard Deviation. ** $p < .01$.

Older adult group (61–74 years)

The second moderation model was tested on the older adult cohort ($n = 715$). The overall model was statistically significant, $F(5, 709) = 11.23$, $p < .001$, accounting for approximately 7.3% of the variance in screening intention ($R^2 = .073$).

Similarly to the younger group, health worry showed a strong positive main effect on screening intention ($b = .26$, $SE = .05$, $t = 4.96$, $p < .001$). Cognitive reappraisal also remained a significant positive predictor ($b = .22$, $SE = .04$, $t = 5.74$, $p < .001$). The main effect of expressive suppression was not significant ($b = -.04$, $SE = .03$, $t = -1.33$, $p = .184$).

Crucially, regarding the moderation hypotheses, the analysis revealed a significant interaction effect between health worry and expressive suppression ($b = -.11$, $SE = .04$, $t = -3.01$, $p = .003$). The interaction between health worry and cognitive reappraisal, however, was not statistically significant ($b = .07$, $p = .078$).

To interpret the significant interaction, a simple slope analysis was conducted to examine the relationship between health worry and screening intention at different levels of expressive suppression (-1 SD, Mean, $+1$ SD).

Results indicated that for individuals with low levels of suppression (-1 SD), health worry was a strong positive predictor of screening intention ($b = .43$, $SE = .08$, $p < .001$). At mean levels of suppression, the relationship remained positive and significant ($b = .26$, $SE = .05$, $p < .001$). However, for individuals with high levels of suppression ($+1$ SD), the relationship between health worry and screening intention became non-significant ($b = .10$, $SE = .07$, $p = .178$).

This finding suggests a dampening effect: while health worry typically acts as a motivational trigger for screening in older adults, this adaptive function is inhibited in individuals who habitually suppress their emotional expression.

Discussion

The present study examined the role of health worry and emotion regulation strategies in the intention to adhere to colorectal cancer screening, with particular attention to age-related differences. Overall, the findings provide a significant contribution to the cancer prevention literature,

highlighting how emotional – and not just cognitive – processes are central to shaping preventive decisions, especially in late adulthood (Ferrer et al., 2015; Mikels & Taullahu, 2023).

In line with the first hypothesis, health worry was positively associated with the intention to undergo screening in both age groups.

This finding suggests that moderate levels of health worry may play an adaptive motivational role in preventive decision-making, while remaining conceptually distinct from clinically significant health anxiety (Vrinten et al., 2015). This finding is consistent with curvilinear models of the relationship between distress and prevention and with studies indicating that risk perception and health worry can increase vigilance and preventive intentionality, especially when the required action is perceived as accessible and useful (Moser et al., 2007; Reynolds et al., 2018). Although the perceived benefits of colorectal cancer screening were not assessed in the present study, our findings suggest that health worry is more likely to foster preventive intentions when screening is perceived as a useful and effective means of reducing disease risk. From this perspective, adaptive emotion regulation may facilitate not only the management of health-related emotions but also the recognition of screening as a viable preventive option, thereby supporting preventive decision-making.

It should also be noted that the majority of participants had never undergone screening and had never received an official invitation, and that intention was accordingly higher among invited participants and past adherers. Intentions were thus largely expressed by a population naïve to the behavior, and may partly reflect anticipated rather than experienced barriers. This context may enhance the relevance of dispositional emotional factors, such as health worry and regulatory style, in shaping preventive intentions before direct experience with the procedure becomes available.

Contrary to what was hypothesized, cognitive reappraisal did not show a moderating effect on the relationship between health worry and screening intention, neither in the 50–60 nor in the 61–74 age group. However, it emerged as a direct and robust predictor of screening intention in both age groups. This result suggests that the ability to cognitively reframe emotionally salient situations

can support prevention orientation in general, regardless of the intensity of worry. In other words, reappraisal appears to act as a stable resource that promotes the adoption of healthy behaviors, rather than as a mechanism that specifically transforms the motivational impact of worry (Gross & John, 2003; Ochsner et al., 2012). The most significant finding of the study, however, concerns the role of expressive suppression in the group of older people (61–74 years). Consistent with the fourth hypothesis, suppression significantly moderated the relationship between health worry and screening intention exclusively in this age group. Specifically, in subjects with low or medium levels of suppression, worry retained its motivational value, while in subjects with high suppression, this relationship disappeared. This “dampening” effect suggests that, in older adults, the habitual tendency to inhibit emotional expression may interfere with the transformation of worry into preventive action. This finding is particularly interesting when read in light of Socioemotional Selectivity Theory and the lifespan literature on emotion regulation. Although suppression in older adults is not always associated with the negative outcomes observed in young adults, our data indicate that it can become dysfunctional in decision-making contexts that require contact with and processing of emotions related to bodily vulnerability, risk, and mortality (Brummer et al., 2014; Carstensen et al., 1999; Urry & Gross, 2010). In this sense, suppression does not amplify worry, but rather neutralizes its adaptive function, favoring a form of emotional avoidance that hinders preventive intention (Brady et al., 2018; Livingstone & Isaacowitz, 2015). It is important to emphasize that the differences observed between age groups are not attributable to different levels of psychological variables, which are comparable between the two groups. This reinforces the interpretation that the critical factor is not “how much” individuals worry or regulate their emotions, but how and when these strategies come into play in health-related decision-making in old age. This finding is also consistent with lifespan perspectives suggesting that age differences in emotion regulation are less related to the strategies themselves than to the motivational contexts in which they are deployed (Isaacowitz, 2022). One possible

explanation is that, during middle adulthood, health threats may be experienced as less personally salient than in later life, reducing the extent to which expressive suppression influences the translation of health worry into preventive intentions. Emotion regulation thus emerges as a mechanism for translating worry into behavior, rather than as a simple risk or protective factor (Scheibe & Carstensen, 2010). Overall, the findings suggest that classic cognitive models of prevention, while useful, are incomplete unless integrated with an affective perspective that considers dispositional emotion regulation strategies, especially in older targets (Ajzen, 1991; Ferrer et al., 2015).

Limitations and future directions

Limitations of the study include the cross-sectional design, which does not allow causal inferences, and the use of self-report measures and an intentional rather than behavioral measure. The study was conducted within a regional screening program in Southern Italy. Although the sample was designed to be representative of the target population in this context, caution should be exercised when generalizing the findings to healthcare systems with different screening policies, cultural contexts, or organizational procedures. Additionally, the present study assessed health worry as a broad, dispositional trait rather than as cancer-specific worry. The intensity and qualitative nature of health worry may vary depending on the specific health threat considered. For example, concerns related to colorectal cancer may differ from worries associated with other chronic conditions or illnesses (e.g., hypertension). These limitations also point to several directions for future research. Future research could directly compare the respective roles of general worry about having a disease and cancer-specific worry in shaping colorectal cancer screening intentions. Furthermore, the present study assessed vicarious experience with colorectal cancer through a broad indicator encompassing family members, friends, and acquaintances. Future research should explicitly differentiate direct family history and caregiving experiences from general familiarity, as these close relational factors may uniquely moderate perceived susceptibility, health anxiety, and subsequent screening intentions. It

would also be valuable to examine whether awareness of colorectal cancer as one of the leading causes of cancer-related mortality contributes to cancer-specific worry and how this, in turn, influences screening intentions and subsequent screening behavior. Overall, future studies could adopt longitudinal or experimental designs, include indicators of actual screening adherence, integrate disease-specific measures of cancer worry, and explore the role of other emotion regulation strategies, as well as the relational and communicative contexts in which preventive decisions are made.

Clinical implications

- Assess not only health worry but also how older adults regulate health-related emotions, as expressive suppression may reduce the motivational impact of concern on colorectal cancer screening intentions.
- Integrate emotional regulation strategies into colorectal cancer screening interventions to help older adults transform health-related concern into preventive action rather than emotional avoidance.
- Screening communication should combine risk information with emotionally responsive approaches that facilitate adaptive emotional processing and support informed preventive decision-making

Author contributions

CRedit: **Daniela Lemmo PhD:** Conceptualization, Data curation, Investigation, Writing – original draft; **Miriam Capasso PhD:** Data curation, Formal analysis, Methodology, Software, Writing – original draft; **Maria Luisa Martino PhD:** Conceptualization, Investigation, Writing – review & editing; **Anna Rosa Donizzetti PhD:** Supervision, Writing – review & editing; **Maria Francesca Freda PhD:** Conceptualization, Supervision, Writing – review & editing; **Daniela Caso PhD:** Investigation, Methodology, Project administration, Resources, Supervision, Writing – review & editing.

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Data availability statement

The data presented in this study are available on request from the corresponding author due to privacy restrictions.

Informed consent statement

Informed consent was obtained from all subjects involved in the study.

Institutional review board statement

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee for Psychological Research at [Blinded for Review] (Protocol No. XXX).

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