

RESEARCH ARTICLE

Clinical psychological correlates of colorectal cancer screening intention: Implications for personalized health promotion intervention

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Abstract

Background: This study investigates clinical psychological factors associated with colorectal cancer (CRC) screening participation, with a specific focus on intention–behavior configurations within the intention–behavior gap framework.**Objective:** From a mind–body perspective, we examine how emotion regulation, health anxiety, body awareness, and narcissistic traits are associated with screening decisions and may inform future personalized strategies to support participation.**Methods:** A cross-sectional study was conducted with 224 adults (aged 50–81) completing an online survey assessing screening intention, behavior, and key psychological variables. Action-control profiles were created based on intention–behavior patterns, and differences were analyzed using Fisher’s exact tests and Kruskal–Wallis tests.**Results:** Most participants (58%) were classified as non-intenders (low intention, no screening). Successful intenders (high intention, yes behavior) showed higher cognitive reappraisal than all other profiles, with small-to-moderate effect sizes ($r = 0.25\text{--}0.53$). Unsuccessful intenders (high intention, no behavior) exhibited higher disease phobia ($r = 0.28$), suggesting anxiety-related barriers to behavioral translation. Non-intenders who nonetheless engaged in screening (low intention, yes behavior) showed higher hypochondriacal beliefs and narcissistic vulnerability ($r = 0.51$), possibly reflecting screening behavior driven by concerns about illness or bodily cues.**Conclusion:** Despite the cross-sectional design and convenience sampling that limit generalizability and prevent causal or temporal inferences, clinical psychological dimensions appear to be associated with CRC screening intention and participation. Our study attests to the importance of an integrative clinical approach that considers psychosomatic aspects, emotion regulation, health anxiety, and personality vulnerabilities to better understand ambivalence in screening behaviors. Preventive programs should address specific psychological barriers (e.g., health literacy) and foster self-care engagement. Future research should explore whether psychological factors, such as emotion regulation, health anxiety, and personality vulnerabilities, can guide the development of approaches aimed at reducing discrepancies between intention and self-reported screening behavior.

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Citation: Martino ML, Lemmo D, Fabbriatore R, *et al.* Clinical psychological correlates of colorectal cancer screening intention: Implications for personalized health promotion intervention. *Health Psychol Res.* 2026;14(2):0435.
doi: 10.36922/hpr.0435

Received: December 14, 2025**Revised:** February 2, 2026**Accepted:** February 13, 2026**Published online:** May 5, 2026

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Keywords: Colorectal cancer screening; Intention-behavior; Emotion regulation; Health anxiety; Personality traits

1. Introduction

Colorectal cancer (CRC) is the third most common cancer in men, and the second in women,¹⁻³ yet early detection through screening significantly improves survival rates. Despite the availability of free screening programs, participation remains suboptimal, particularly in Southern Europe, where only 30% of the target population participates. This discrepancy highlights a gap between the proven medical benefits of screening, its accessibility, and individual healthcare decisions.

Health behavior models, such as the Theory of Planned Behavior, assume a linear relationship between intention and behavior.⁴⁻⁶ However, research has identified an “intention-behavior gap” in CRC screening adherence, where individuals who express intent to screen often fail to follow through due to procrastination, forgetfulness, or disengagement.⁷ The action control model categorizes individuals into four groups: two concordant profiles—non-intenders who subsequently do not adopt the behavior and successful intenders who subsequently adopt the behavior; and two discordant profiles—unsuccessful intenders who failed to enact their intentions and non-intenders who subsequently adopt the behavior.

This classification underscores the complexity of health-related behaviors, which are influenced by emotional, personality, and somatosensory factors.^{8,9} The intention-behavior gap is conventionally examined for prospective behavior, where future behavior is tracked after the formation of an intention. Cross-sectional studies can still provide meaningful insight into discordant patterns between current intention and previously enacted screening behavior. In line with the action-control approach implemented in CRC screening by Le Bonniec *et al.*,⁸ individuals can be categorized into profiles reflecting co-occurring levels of intention and self-reported screening uptake. Unlike longitudinal designs, this framework does not imply temporal prediction or causal direction but offers a clinically relevant characterization of ambivalence and adherence patterns within the target population.

The present study explores the relationships among mental, emotional, and personality-related factors and CRC screening behavior. Specifically, it examines how emotion regulation, health anxiety, body awareness, and perceptions of vulnerability or invulnerability are associated with different intention-behavior patterns. In the present cross-sectional study, the intention-behavior

framework is not used to model intention-behavior translation over time, but to describe co-occurring configurations of current intention and self-reported past behavior. These configurations should be understood as descriptive psychological profiles rather than stages, trajectories, or predictive pathways.

1.1. Emotion regulation, health anxiety, body awareness, and perceptions of in/vulnerability in behavioral intentions

Research on intention and behavior has largely focused on emotions rather than broader psychological functioning. Emotions can motivate intention formation and may influence the transformation of motivational content into action.¹⁰ For example, in sports participation,¹¹ emotions mediate the link between intention and behavior. However, studies rarely consider emotion regulation strategies as determinants of health behavior.

Emotion regulation strategies,^{12,13} particularly cognitive reappraisal, play a crucial role in shaping health behaviors.¹¹ Unlike expressive suppression, cognitive reappraisal—reinterpreting negative situations to reduce their emotional impact—has been associated with healthier choices and better psychological outcomes.^{12,14,15} In the context of preventive health behaviors, individuals who effectively regulate their emotions are more likely to adhere to screening recommendations.

Health anxiety is another key factor influencing screening behavior. Defined as excessive worry about health, it exists on a continuum, with hypochondriasis representing its extreme manifestation.¹⁶ Individuals with high health anxiety display attentional biases toward potential illness, misinterpret bodily sensations as symptoms of serious disease, and exhibit cognitive distortions that amplify perceived threats.^{17,18} They tend to seek frequent medical consultations,¹⁹ undergo extensive diagnostic testing,²⁰ and experience heightened emotional distress when faced with ambiguous test results.²¹ These tendencies may lead to both increased screening participation as a means of reducing anxiety and avoidance due to fear of potential diagnoses.²²

Closely related to health anxiety is body awareness, also known as interoception—the ability to perceive internal bodily sensations. While heightened body awareness can support emotion regulation and self-care, it is also associated with increased anxiety, hypochondriasis, and somatization. In the context of CRC screening, individuals

with heightened body awareness may either be hyper-vigilant in monitoring symptoms or avoid screening due to distress over potential findings.

Personality traits, particularly narcissism, influence health-related decision-making.²³ Contrary to its traditional pathological interpretation, narcissism exists on a continuum and includes traits related to self-esteem, grandiosity, and vulnerability.^{24,25} It affects how individuals respond to health threats, with grandiose narcissists displaying cognitive biases that create an illusion of invincibility, reducing their perceived susceptibility to health risks.^{26,27} These individuals tend to exhibit an optimism bias, believing negative events (e.g., developing cancer) are unlikely to affect them while expecting positive outcomes for themselves.²⁸

Grandiose narcissism is linked to an increased tendency toward risk-taking behaviors,^{29,30} such as excessive alcohol consumption and reckless driving. However, it also correlates positively with health-promoting behaviors like regular exercise and healthy eating, driven by a focus on physical appearance and self-enhancement.^{31,32} These contrasting behaviors highlight the role of narcissism in shaping both preventive and risky health decisions. Research suggests that narcissistic individuals prioritize immediate self-benefit, which may influence their likelihood of participating in screening programs.

A common thread among the constructs discussed—emotion regulation, health anxiety, body awareness, and narcissism—is their impact on cognitive and attentional biases that shape perceptions of vulnerability and risk. Emotional responses to health-related decisions, coupled with personality traits, influence whether individuals perceive screening as necessary or avoid it due to fear, denial, or a misplaced sense of invulnerability.

The variables were selected based on theoretical perspectives that emphasize the role of emotional, somatosensory, and personality-related processes in preventive health decisions. Emotion regulation and health anxiety influence how individuals manage the threat of illness, while body awareness shapes perceptions of internal signals that may trigger either preventive actions or avoidance. Vulnerable narcissistic traits, reflecting hypersensitivity to perceived vulnerability and self-evaluative concerns, may further shape responses to health-related cues. These constructs offer a clinically grounded framework for characterizing diverse psychological pathways underlying participation in CRC screening, whereas socio-demographic and clinical variables (such as sex or family history of cancer) were considered as control variables rather than primary determinants of screening decisions.

Our study, part of a broader research-intervention project, MIRIADE (Innovative Research–Intervention Model for the Analysis of Cancer Screening Adherence Profiles), aims to:

- (i) Classify participants based on intention–behavior patterns in CRC screening.
- (ii) Determine psychological factors—such as emotion regulation, illness attitude, body awareness, and personality traits—that influence screening decisions.

By integrating psychological and behavioral insights, this study seeks to provide insight into psychological configurations that may support future refinements to prevention strategies. Understanding the complex interplay of these factors will provide a foundation for personalized health promotion strategies, ultimately improving adherence to preventive health behaviors.

2. Materials and methods

2.1. Ethical considerations

The present research received ethical approval from the Ethics Committee for Psychological Research of the Blinded (protocol code: 4/2024, Department of Humanities of Federico II University; approval date: February 29, 2024), complied with the European Union General Data Protection Regulation, and adhered to the Declaration of Helsinki. Informed written consent was obtained before participation, and all questions were mandatory, though participants could withdraw at any time.

2.2. Participants and procedures

A web-based cross-sectional survey was conducted among individuals aged 50–81 with no prior cancer diagnosis. Participants completed an online self-report questionnaire via Google Forms, and recruitment followed a snowball sampling procedure.

2.3. Measures

Behavior was measured with one item on fecal occult blood testing in accordance with Ajzen.³³ Participants responded on a 4-point Likert scale (0 = Never, 1 = Rather irregularly, 2 = Quite regularly, or 3 = Regularly every 2 years).

Intention was assessed with three items on colorectal screening intention,³³ and participants responded on a 5-point Likert scale (1 = Completely disagree to 5 = Completely agree). Past behavior was measured using the following item: “Have you ever undergone colorectal screening?” with response options “yes” or “no.” Self-reported screening behavior reflects prior or ongoing participation, therefore serving as a proxy of action rather than a forward-looking behavioral outcome. Accordingly,

the derived profiles do not reflect intention–behavior change or behavioral enactment processes, but represent cross-sectional co-occurring psychological configurations of intentional and behavioral self-reports within the same time frame, reflecting patterns of self-reported engagement with screening.

Habitual use of emotion regulation strategies was measured using the Emotion Regulation Questionnaire.³⁴ It is composed of two subscales: cognitive reappraisal and expressive suppression. It consists of 10 items with a Likert scale from 1 to 7.

Fears, beliefs, and attitudes associated with abnormal health behaviors and hypochondriac features were measured using the Illness Attitude Scale.^{35,36} It comprises 27 items with a Likert scale from 0 to 4. It consists of nine subscales: worry about illness, concerns about pain, health habits, hypochondriacal beliefs, thanatophobia, disease phobia, bodily concerns, effects of symptoms, and effects of treatment. This last subscale was not included in the questionnaire because it was not relevant to the present study's aims.

Traits of grandiose narcissism were measured using the Narcissistic Personality Inventory-16.³⁷ It consists of 16 pairs of statements that are assigned a score of 0 or 1.

Traits of vulnerable narcissism were measured using the Hypersensitivity Narcissism Scale.^{38,39} It consists of 10 items on a Likert scale from 1 to 5.

Body awareness and bodily dissociation were measured using the Scale of Body Connection.^{40,41} Item response options were based on a 5-point Likert scale ranging from 1 to 5.

2.4. Data analyses

Firstly, the score for each dimension of the considered psychometric scale was computed along with descriptive statistics. Secondly, the action-control profiles were created based on the intention and behavior variables according to the strategy proposed by Le Bonniec *et al.*⁸ Regarding intention, participants scoring below 4 were categorized as low-intenders, while those scoring 4 or above were classified as high-intenders. Screening behavior was dichotomized as either “no screening” for participants selecting categories 0 (never) or 1 (rather irregularly), or “yes screening” for those choosing categories 2 (rather regularly) or 3 (regularly every two years). Consequently, participants were grouped into one of four profiles: (i) non-intenders (low intentions, no screening), (ii) non-intenders who performed behavior (low intentions, yes screening), (iii) unsuccessful intenders (high intentions, no screening), and (iv) successful intenders (high intentions,

yes screening). Thirdly, the association between intention–behavior profiles and participants' socio-demographic characteristics (e.g., sex, family history of colon cancer) was examined. Since several contingency table cells contained fewer than five observations, Fisher's exact test was selected, as it is appropriate even for small sample sizes. Finally, given the non-normal distribution of the psychological variable scores, a series of Kruskal–Wallis tests were conducted to explore differences in emotion regulation, illness attitude, grandiose/vulnerable traits, and body connection across the four profiles. When the Kruskal–Wallis test was significant ($p \leq 0.05$), pairwise post-hoc comparisons were conducted using Dunn's test with Bonferroni-adjusted p -values. For post-hoc comparisons, an alpha level $\alpha = 0.10$ was adopted to reduce the risk of Type II error and to identify potentially meaningful patterns for hypothesis generation in an exploratory setting. Results approaching this threshold are often referred to as marginally significant and are interpreted as indicative trends requiring future confirmatory validation. The effect sizes were computed through the correlation coefficient $r = Z / \sqrt{N}$. Absolute values of r of 0.10, 0.30, and 0.50 were interpreted as small, medium, and large effects, respectively.

3. Results

A total of 224 adults from the target population for colorectal screening, aged 50–81 years, participated in this cross-sectional study (mean = 58.53; standard deviation = 6.29; 54% women). The majority of participants reported being married or cohabiting (74%) and judged their socioeconomic status to be “medium” (77%). Just under half had a secondary school diploma (42%) and worked as an employee (47%). The majority of participants reported not being familiar with CRC (61%), while 68% reported being familiar with other types of cancer. Detailed participant demographics are presented in [Table 1](#). Descriptive statistics and score distribution for each considered variable are reported in [Figure 1](#).

Comparing the theoretical range of the adopted psychometric scales and the observed scores provides a general overview of the sample's characteristics. The score distributions of hypochondriacal beliefs and effects of symptoms variables are extremely left-skewed, indicating a weak presence of these beliefs and a low occurrence of negative effects due to perceived symptoms. Moreover, scores on narcissism measures were generally low, especially for grandiose narcissism, which scored lower than the vulnerable trait. Participants also showed low levels of disease phobia, bodily preoccupations, and body dissatisfaction, as can be seen from score distributions and sample means of these variables. Instead, medium levels are reported for characteristics related to expressive

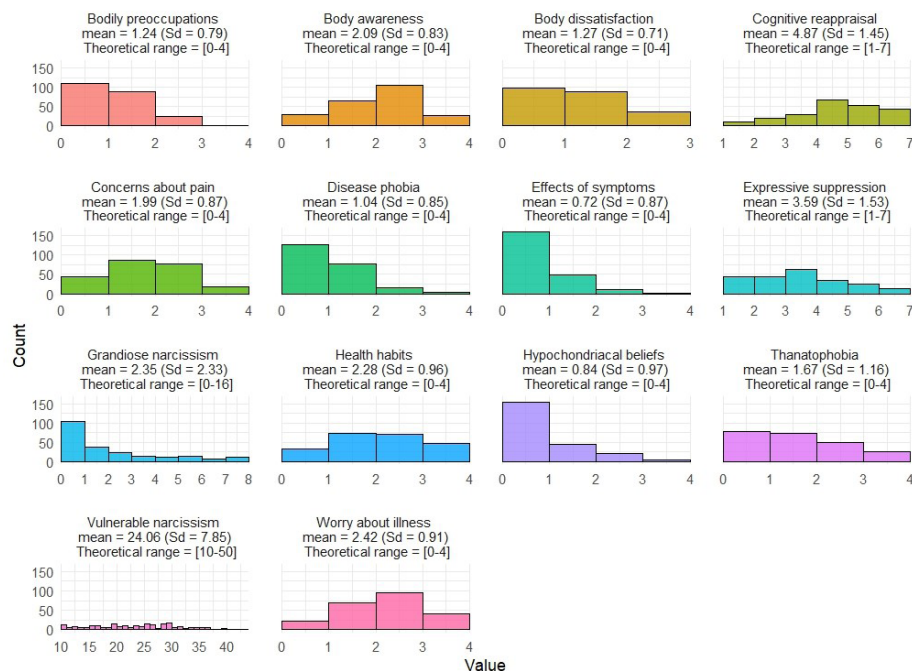


Figure 1. Descriptive statistics and score distribution for the considered clinical psychological variables
Abbreviation: SD: Standard deviation.

Table 1. Socio-demographic characteristics of the sample

Variable	Category	n	Percentage
Gender	Female	121	54%
	Male	97	43%
	Prefer not to specify	6	3%
Marital status	Single	14	6%
	Married/cohabiting	165	74%
	In a relationship (not cohabiting)	12	5%
	Separated/divorced	16	7%
	Widowed	17	8%
Occupational status	Employed	106	47%
	Self-employed	34	15%
	Homemaker	44	20%
	Unemployed	8	4%
	Retired	32	14%
Education	Primary school	16	7%
	Middle school	44	20%
	High school diploma	95	42%
	University degree	60	27%
	Post-graduate education	9	4%
Socioeconomic status	Low	38	17%
	Medium	172	77%
	High	14	6%

suppression, concerns about pain, health habits, thanatophobia, and body awareness. Finally, cognitive reappraisal and worry about illness were the variables that characterized the sample, reporting medium-high scores.

Regarding intention and behavior variables, their scores were used to create the four action-control profiles, which yielded the following distribution: non-intenders ($n = 130$; 58%), non-intenders who performed behavior ($n = 9$; 4%), unsuccessful intenders ($n = 69$; 31%), and successful intenders ($n = 16$; 7%).

Among participants' characteristics, only past behavior (i.e., prior participation in CRC screening) and knowledge of screening programs were significantly linked to the action-control profiles ($p < 0.01$). Figure 2 depicts the corresponding bar plots. Results indicated that most successful intenders had previously participated in CRC screening, whereas the opposite was found for non-intenders. Regarding participants' knowledge of screening programs, almost all successful intenders and about half of unsuccessful intenders reported knowledge. Balanced frequencies were reported instead for non-intenders and non-intenders who performed the behavior. Instead, no significant differences were detected for sex ($p = 0.99$), family history of colon cancer ($p = 0.08$), and familiarity with other types of cancer ($p = 0.51$). The results of the Kruskal–Wallis tests exploring differences in emotion regulation, illness attitude, and levels of grandiose/vulnerable traits across the four action-control profiles are reported in Table 2.

Significant overall differences are observed for cognitive reappraisal ($\chi^2 = 10.90$; $p = 0.01$), health habits ($\chi^2 = 9.10$; $p = 0.03$), hypochondriacal beliefs ($\chi^2 = 9.29$; $p = 0.03$), disease phobia ($\chi^2 = 8.67$; $p = 0.03$), bodily preoccupations ($\chi^2 = 7.98$; $p = 0.05$), and vulnerable narcissism ($\chi^2 = 7.80$; $p = 0.05$). Conversely, no significant differences emerged across the four action-control profiles for the variables expressive suppression, worry about illness, concerns about pain, thanatophobia, effects of symptoms, grandiose narcissism, body awareness, and body dissatisfaction.

Dunn's post-hoc testing for the variables with significant omnibus effects revealed no pairwise differences between the action-control profiles for health habits and bodily preoccupations. Conversely, results showed that successful intenders are characterized by higher cognitive reappraisal compared with all the other profiles, with small-to-large effect sizes across comparisons ($Z = 3.07$, $p = 0.01$, $r = 0.25$ vs. non-intenders; $Z = 2.66$, $p < 0.05$, $r = 0.53$ vs. non-intenders who performed behavior; $Z = -2.45$, $p < 0.10$, $r = -0.26$ vs. unsuccessful intenders). Moreover, successful intenders reported lower levels of disease phobia ($Z = 2.61$, $p < 0.10$, $r = 0.28$) compared to unsuccessful

intenders, suggesting that anxiety-related processes may interfere with intention–behavior translation. Finally, non-intenders who performed behavior showed higher levels of hypochondriacal beliefs ($Z = -2.57$, $p < 0.10$, $r = 0.51$) and vulnerable narcissism ($Z = -2.56$, $p < 0.10$, $r = 0.51$) than successful intenders, possibly reflecting screening behavior driven by concerns about illness or bodily cues. All results are summarized in Table 3, and Figure 3 shows the score distribution according to the action-control profiles for variables reporting at least one significant difference in the post hoc tests.

4. Discussion

Given the cross-sectional nature of the study, the present findings should be interpreted as descriptive rather than process-oriented. The four profiles do not imply stages, trajectories, or mechanisms of intention–behavior translation. Instead, they represent co-occurring psychological configurations, reflecting how intention and self-reported screening behavior are simultaneously articulated within the same assessment window.

Our findings suggest potential avenues for developing personalized psychological approaches to enhance CRC screening participation.

The identification of four distinct action-control profiles—successful intenders, unsuccessful intenders, non-intenders, and non-intenders who performed screening—suggests different psychological pathways underlying screening decisions.

Among the target population for CRC screening, 58% were non-intenders, confirming the low participation rates that characterize CRC screening in Southern Europe. Future studies could explore whether approaches such as motivational interviewing or health literacy strategies may support individuals with low intention to engage in screening. For successful intenders, knowledge of screening programs was strongly associated with both intention and behavior, alongside past behavior, in which prior screening experience increased future adherence.^{42,43} These participants also exhibited higher cognitive reappraisal skills, suggesting that emotion regulation co-occurs with profiles characterized by screening adherence.⁴⁴ These results generate hypotheses for future interventional research, such as examining whether strengthening cognitive reappraisal strategies could support individuals who already express intentions to engage in screening.

Unsuccessful intenders showed higher levels of disease phobia, suggesting emotional ambivalence: fear may increase motivation to screen but also contribute to avoidance when screening is perceived as threatening. The

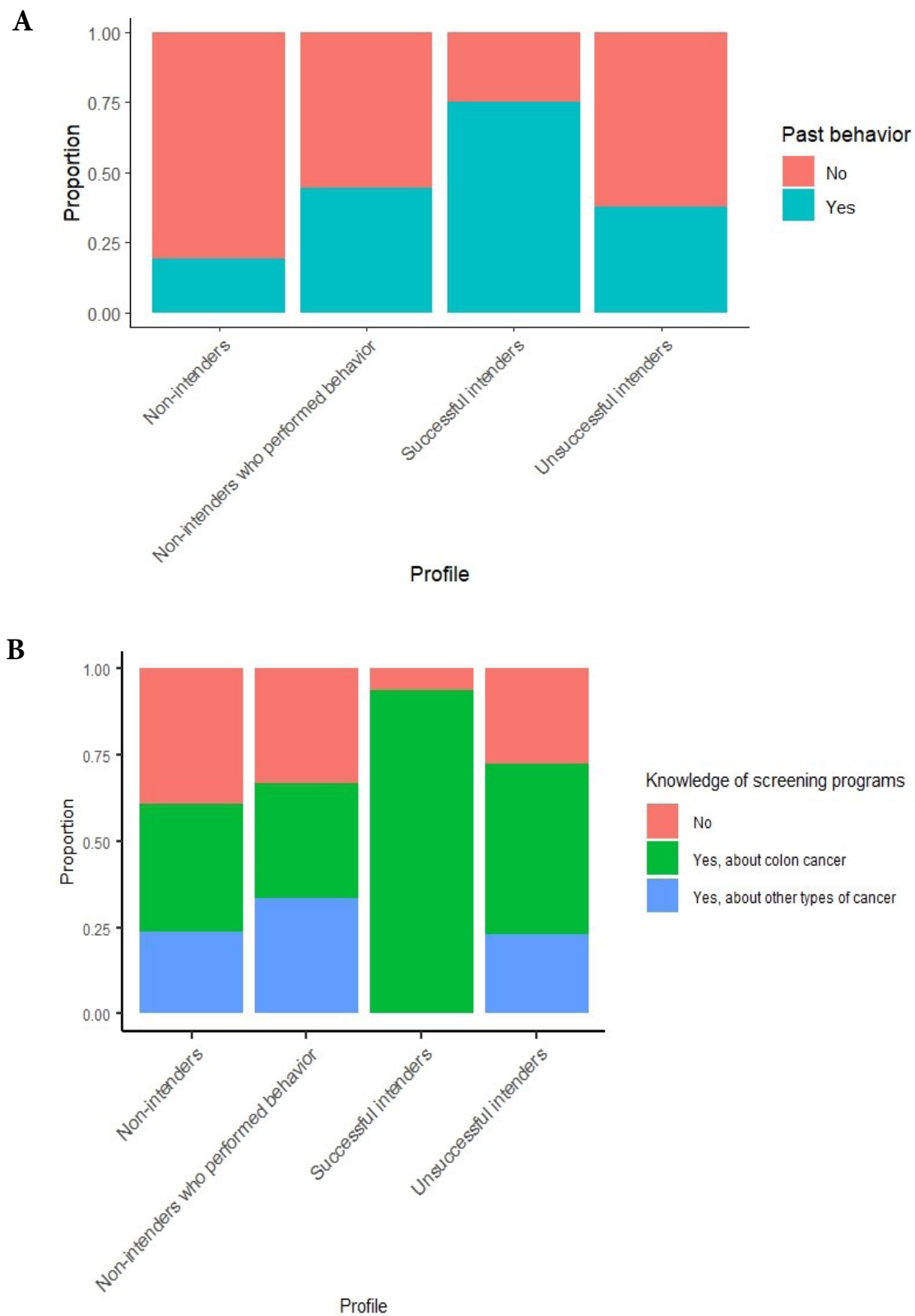


Figure 2. Intention–behavior profiles and participants’ socio-demographic characteristics: bar plots for variables showing significant associations. (A) Past behavior. (B) Knowledge of screening programs.

Table 2. Overall psychological differences across action-control profiles: Kruskal–Wallis test results reporting χ^2 statistic, degrees of freedom (df), and p -value for each considered variable

Variable	Kruskal–Wallis χ^2	df	p -value
Cognitive reappraisal	10.90	3	0.01**
Expressive suppression	1.08	3	0.78
Worry about illness	2.62	3	0.45
Concerns about pain	2.28	3	0.52
Health habits	9.10	3	0.03**
Hypochondriacal beliefs	9.29	3	0.03**
Thanatophobia	1.19	3	0.75
Disease phobia	8.67	3	0.03**
Bodily preoccupations	7.98	3	0.05**
Effects of symptoms	2.81	3	0.42
Vulnerable narcissism	7.80	3	0.05**
Grandiose narcissism	4.32	3	0.23
Body awareness	1.28	3	0.73
Body dissatisfaction	5.15	3	0.16

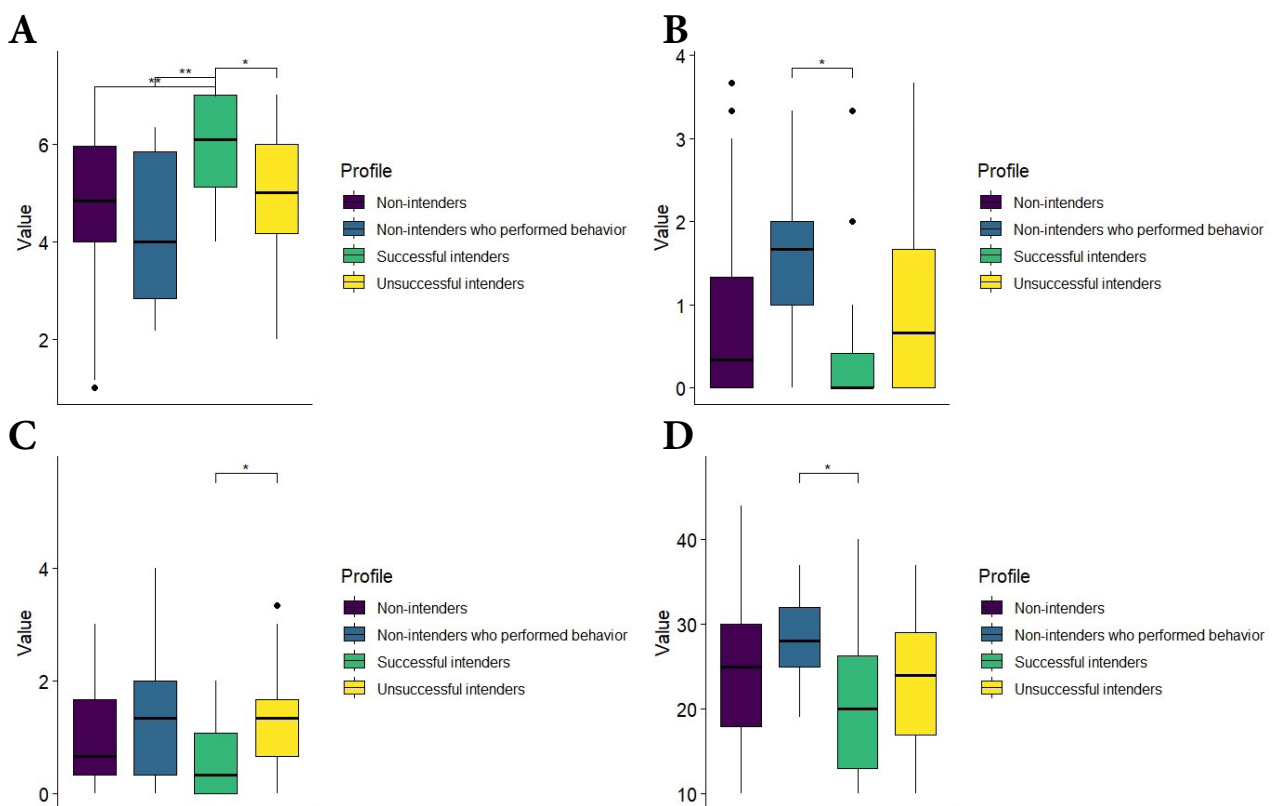
Note: ** $p \leq 0.05$ **Figure 3.** Between-profile psychological differences identified by Dunn's post hoc test. For each variable, the boxplots depict the distribution according to the four action-control profiles, and the lines connect the profiles that differ significantly. (A) Cognitive reappraisal. (B) Hypochondriacal beliefs. (C) Disease phobia. (D) Vulnerable narcissisms.Notes: * $p < 0.10$; ** $p \leq 0.05$.

Table 3. Between-profile psychological differences: Dunn's post hoc test results (Z statistics, Bonferroni-adjusted *p*-values) for variables with significant omnibus effects

Variable	Pairwise comparison	Z	Adjusted <i>p</i> -value
Cognitive reappraisal	NI–NIB	–0.86	1.00
	NI–SI	3.07	0.01**
	NI–UI	0.90	1.00
	NIB–SI	2.66	0.05**
	NIB–UI	1.22	1.00
	SI–UI	–2.45	0.09*
Health habits	NI–NIB	1.16	1.00
	NI–SI	2.18	0.17
	NI–UI	2.34	0.11
	NIB–SI	0.43	1.00
	NIB–UI	–0.14	1.00
	SI–UI	–0.83	1.00
Hypochondriacal beliefs	NI–NIB	2.03	0.26
	NI–SI	–1.41	0.95
	NI–UI	1.60	0.66
	NIB–SI	–2.57	0.06*
	NIB–UI	–1.30	1.00
	SI–UI	2.20	0.16
Disease phobia	NI–NIB	0.62	1.00
	NI–SI	–1.54	0.75
	NI–UI	2.13	0.20
	NIB–SI	–1.49	0.81
	NIB–UI	0.29	1.00
	SI–UI	2.61	0.05**
Bodily preoccupations	NI–NIB	1.37	1.00
	NI–SI	–0.98	1.00
	NI–UI	2.16	0.19
	NIB–SI	–1.75	0.48
	NIB–UI	–0.42	1.00
	SI–UI	2.09	0.22
Vulnerable narcissism	NI–NIB	1.39	0.98
	NI–SI	–2.22	0.16
	NI–UI	–0.81	1.00
	NIB–SI	–2.56	0.06*
	NIB–UI	–1.69	0.54
	SI–UI	1.68	0.55

Notes: **p* < 0.10; ***p* ≤ 0.05.

Abbreviations: NI: Non-intenders; NIB: Non-intenders who performed behavior; SI: Successful intenders; UI: Unsuccessful intenders.

fear of having cancer was higher in profiles marked by high intention and lack of reported screening, likely due to the phobic avoidance of facing a feared outcome. This aligns with previous research indicating that health-related phobias can impede effective participation in screening.⁴⁵ Health-related anxieties could therefore be a relevant focus for future preventive efforts focused on anxiety management, and exposure-based cognitive restructuring could reduce screening-related distress and promote adherence.

The profile of non-intenders who engaged in screening was characterized by higher levels of hypochondriacal beliefs and vulnerable narcissistic traits. From a health psychology perspective, vulnerable narcissism—characterized by hypersensitivity, self-focus, and affective reactivity—may be more closely aligned with illness-related vigilance than grandiose narcissism, which is typically associated with optimism bias and perceived invulnerability. This distinction may help explain why only vulnerable, and not grandiose, narcissistic traits were associated with this intention–behavior configuration. These associations should not be interpreted as pathological motivations for screening, but rather as indicative of heightened sensitivity to bodily cues and illness-related concerns. Within health anxiety models, such configurations may reflect reassurance-seeking tendencies rather than maladaptive health behavior.⁴⁶

Unlike studies linking grandiose narcissism to risky health behaviors, our results highlight vulnerability as a significant driver of preventive behavior. Investigating how reassurance-seeking behavior interacts with preventive care could help tailor supportive strategies that maintain constructive engagement without increasing anxiety.

Rather than informing immediate personalized interventions, these findings generate hypotheses for future longitudinal and experimental studies. Such research could examine whether different psychological configurations are differentially responsive to tailored communication strategies or supportive approaches in preventive screening contexts.

5. Conclusion

This study offers preliminary insights into the psychological factors associated with CRC screening behavior. Psychological characteristics, such as emotion regulation, health anxiety, body awareness, and personality vulnerabilities, appear to distinguish individuals with different intention–behavior configurations.

Specifically, the findings suggest two key clinical

implications:

- (i) The utility of an integrative clinical approach⁴⁷ that considers psychosomatic aspects, emotion regulation, health anxiety, and personality vulnerabilities to better understand ambivalence in screening behaviors.
- (ii) The need for targeted preventive programs addressing specific psychological barriers, such as improving health literacy, fostering self-care engagement, and designing medical training interventions that enhance individual responsibility for health.

At the same time, several limitations should be considered when interpreting the study results. First, the cross-sectional design prevents any inference of temporal or causal relationships among psychological variables and the four action-control profiles. Second, the created profiles are based on self-reported screening behavior, which may be affected by recall bias or social desirability. The dichotomous operationalization of screening behavior may also have obscured meaningful variability in screening frequency and adherence, potentially limiting measurement precision. Third, the use of a convenience sample introduces potential selection bias, limiting the generalizability of the results. Participants who voluntarily completed the survey may differ systematically from the general population in terms of health literacy, motivation, or psychological characteristics. Fourth, the small sample sizes of certain intention–behavior profiles (e.g., non-intenders who performed behavior) reduce statistical stability and power for between-profile comparisons. Consequently, these analyses should be interpreted cautiously and primarily as exploratory. Future studies should therefore rely on more representative sampling strategies and longitudinal designs to confirm the patterns observed in this study and/or examine more nuanced behavioral categories.

Despite its limitations, the current study contributes to the growing body of research emphasizing the role of psychological factors in preventive healthcare.^{48–50} Clinical implications should therefore be understood as research-oriented directions, aimed at refining theoretical models and informing the design of future intervention studies, rather than as applied recommendations.

Acknowledgments

None.

Funding

This work was supported by the Federico II University of Naples, San Paolo Company Foundation, FRA PROJECT, MEMO-PRO.

Conflict of interest

The authors declare no competing interests.

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Ethics approval and consent to participate

The present research received ethical approval from the Ethics Committee for Psychological Research of the Blinded (protocol code: Blinded), complied with the European Union General Data Protection Regulation, and adhered to the Declaration of Helsinki (under approval number: Napoli 80133). Informed written consent was obtained before participation, and all questions were mandatory, though participants could withdraw at any time.

Consent for publication

Each participant provided written consent before participation in the research study. Participants were informed of the study's aim regarding the construction of original scientific knowledge useful for implementing engagement in colorectal cancer screening. They were informed that the data were presented in aggregate form to ensure anonymity.

Availability of data

The data presented in this study are available on reasonable request from the corresponding author (MLM) to ensure the privacy of research participants.

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