

Embarrassment and Disgust as Predictors of Early-Onset Colorectal Cancer Screening Intentions Among Young Adults

Part of the visions for the “good life” is the idea of living free of disease. However, colorectal cancer (CRC) is a prevalent and hazardous form of cancer (Sung et al., 2021; Xi & Xu, 2021), which severely threatens this notion. Early detection of CRC is crucial but screening uptake has remained low (Klabunde et al., 2015). There is also a growing prevalence of *early-onset* CRC, which affects individuals under 50 years of age (Akimoto et al., 2021; Kanth & Inadomi, 2021; Zaborowski, et al., 2021). Young patients are often diagnosed with CRC at an advanced stage which reduces the options for therapy (Campos, 2017; Siegel et al., 2020). Hence, screening is particularly important in this age group.

Various factors influence CRC screening behavior (Chapple et al., 2008; Dressler et al., 2021; Honein-AbouHaidar et al., 2016; Lau et al. 2020; Vallone et al., 2022; Wardle et al. 2004). The respective psychological models have been dominated by rational choice approaches and cognitive predictors (Cooke & French, 2008) although their explanatory power is limited (Consedine et al., 2018; Williams et al., 2019). Awareness is also widely regarded as important predictor of CRC screening (Pantel et al., 2021). In contrast, affective factors have been largely neglected by scholars despite their undisputed relevance (Clarke et al., 2021; Consedine & Moskowitz, 2007; Vrinten et al., 2017; Williams et al., 2018). In particular, the role of embarrassment and disgust is underresearched (Chambers et al., 2016; Clarke et al. 2021; Consedine et al., 2018; Davis et al., 2017; Klasko-Foster et al., 2020, Reynolds et al., 2013, 2018; Scaglioni et al., 2021). However, there is indication that these affective factors may be especially influential among younger adults (Klasko-Foster et al., 2020).

Therefore, this study aims to investigate the role of disgust and embarrassment as predictors of CRC screening intentions among young adults, thereby filling the current gap in research on this topic. By identifying and addressing these affective predictors, we may improve screening rates and ultimately save lives.

Methods

As we aimed at investigating early-onset CRC, we defined younger adults of age 18-49 years as our target population. To reach this population, we conducted an online survey among the students of a large German university with approximately 25 000 students. The questionnaire was sent out through the university’s official student mailing list in March 2023. A sample of $N = 958$ people completed the survey. We conducted three hierarchical regression models (OLS) with behavioral outcomes (faecal test intention, colonoscopy intention, family conversation intention) as dependent variables.

Findings

Sociodemographic factors significantly contributed only to the family conversation model (see Table). *Awareness factors* contributed to all three models (4-8%), with early-onset awareness positively predicting colonoscopy intention ($\beta = .10^*$) and family heredity awareness predicting faecal test intention ($\beta = .12^*$) and family conversation intention ($\beta = .10^*$). *Risk and efficacy perceptions* also affected all three behavioral outcomes (6-8%). Among them, susceptibility perception positively predicted colonoscopy intention ($\beta =$

.15***) and family conversation intention ($\beta = .20***$), while response-efficacy positively predicted faecal test intention ($\beta = .09^*$) and family conversation intention ($\beta = .08^*$). In terms of fatalism and optimism, cancer fatalism predicted only colonoscopy intention ($\beta = -.06^*$) and comparative optimism did not significantly contribute to any of the models.

By far the strongest predictors of screening behaviors were *affective factors*. Fear of CRC had a significant positive influence on faecal test intention ($\beta = .13***$) and colonoscopy intention ($\beta = .16***$). However, the negative effects of embarrassment and disgust were much larger, in particular the effect of faecal test embarrassment on faecal test intention ($\beta = -.39***$) and the effects of both colonoscopy embarrassment ($\beta = -.28***$) and colonoscopy disgust ($\beta = -.25***$) on colonoscopy intention.

Table: Regression models explaining behavioral intentions related to CRC screening

	Faecal test intention			Colonoscopy intention			Family conversation intention		
	B	β	ΔR^2	B	β	ΔR^2	B	β	ΔR^2
Constant	3.14			1.55			-.89		
<i>Sociodemographics</i>			.02***			.04***			.17***
Age	.01	.04		.01	.05		.02	.07*	
Gender (male)	-.03	-.02		.05	.02		-.38***	-.13***	
CRC patient contact (yes)	-.04	-.02		-.07	-.03		.61***	.21***	
<i>Awareness</i>			.03***			.07***			.04***
Early-onset CRC awareness	-.01	-.02		.11*	.10*		.10	.07	
Family heredity awareness	.09*	.12*		.08	.07		.14**	.10**	
<i>Risks and Efficacy</i>			.03***			.08***			.06***
Susceptibility (CRC)	.07	.08		.18***	.15***		.29***	.20***	
Severity (CRC)	.14	.06		.19	.05		.15	.03	
Response-Efficacy (screening)	.12*	.09*		.20***	.11***		.17	.08*	
Self-Efficacy	-.00	-.00		-.05	-.02		.10	.03	
Comparative optimism	-.01	-.02		-.03	-.03		-.01	-.01	
Cancer fatalism	.01	.01		-.16	-.06*		-.15	-.05	
<i>Affects</i>			.23***			.22***			.03***
Fear (CRC)	.08***	.13***		.15***	.16***		.14***	.13***	
Embarrassment (faecal test)	-.25***	-.39***					-.17*	-.14*	
Embarrassment (colonoscopy)				-.24***	-.28***		.04	.04	
Disgust (faecal test)	-.08**	-.12**					.05	.04	
Disgust (colonoscopy)				-.22***	-.25***		-.11*	-.11*	
N	684			673			653		
R ²			.32***			.40***			.31***

Discussion

The negative influence of embarrassment and disgust on CRC screening intention is consistent with prior research (Chambers et al., 2016; Consedine et al., 2011a; Davis et al., 2017). Klasko-Foster and colleagues (2020), who surveyed younger adults ($M = 35$ years), as we did in our study, reported a negative influence of colonoscopy disgust on colonoscopy intention ($\beta = -.21***$) that is remarkably comparable to the one found here ($\beta = -.25**$).

However, it is a strength of our study that it allows to multivariately compare the affective influences to a broad range of other predictors from various areas. In this way, we could show that the effects of embarrassment and disgust are roughly three times larger than the ones of awareness or of risk and efficacy perceptions. This contributes to debunking the common myth that awareness is the most important key to changing cancer screening behavior.

Fear is also a significant predictor of screening intention. However, given the relatively low magnitude of its influence and the known side effects of fear appeals (Hastings et al., 2004),

communication practitioners should be careful to exploit this affect in order to increase screening uptake. It is remarkable that embarrassment and disgust toward screening procedures not only predict screening intention but also the willingness to have a conversation about CRC in the family.

Our sample was biased toward female participants, and participants with higher awareness, involvement, and threat perceptions.

Our study has empirically demonstrated that the main reason why younger adults are reluctant toward CRC screening procedures is because they are embarrassed and disgusted by them. The influence of these affective factors is roughly three times stronger than the one of awareness or risk and efficacy perceptions. We conclude that future CRC screening research should consider affective factors even more seriously. Communication campaigns that aim at increasing CRC screening uptake should focus not only on raising awareness and improving knowledge but also on mitigating the negative effects of embarrassment and disgust, in particular if they target younger adults in the case of early-onset CRC.