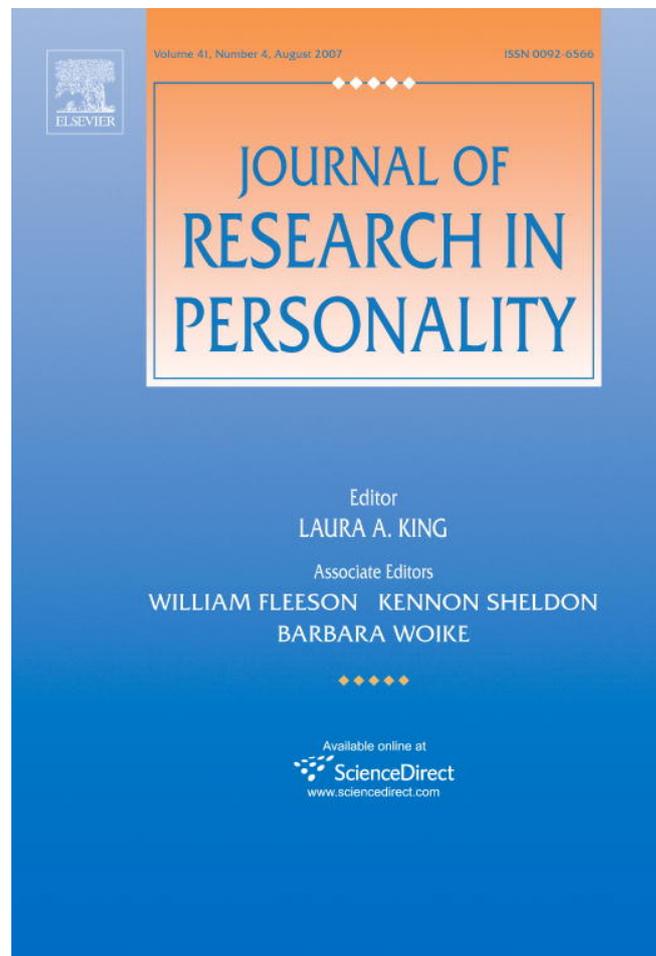


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Sensitivity to disgust, stigma, and adjustment to life with a colostomy [☆]

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Abstract

We examined whether trait disgust sensitivity predicts well-being in colostomy patients, and whether disgust predicts stigmatizing attitudes about colostomy in non-patients. 195 patients with a colostomy returned a mailed survey including measures of disgust sensitivity, life satisfaction, mood, and feelings of being stigmatized. We also conducted an internet-survey of a non-patient sample ($n = 523$). In the patient sample, we observed negative correlations between a bowel-specific measure of disgust sensitivity and life satisfaction ($r = -.34, p < .01$), and colostomy adjustment ($r = -.42, p < .01$), and a positive correlation with feeling stigmatized because of the colostomy ($r = .54, p < .01$). Correlations between a general trait disgust measure and these outcomes were more modest. A structural equation model indicated that colostomy patients who had high disgust sensitivity felt more stigmatized, and this was in turn strongly related to lower life satisfaction. Concordantly, in the non-patient sample we observed that disgust sensitivity was a significant, positive predictor of wanting less contact with colostomy patients ($r = .22, p < .01$).

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1. Introduction

People have an amazing ability to adapt to difficult circumstances. Surveys of people with seemingly severe disabilities, such as paraplegia and Parkinson's disease, find that people report levels of emotional well-being that are often higher than one might expect given their condition (Albrecht & Devlieger, 1999; Ubel, Loewenstein, & Jepson, 2003). In one study, researchers provided palm pilots to a group of end-stage renal disease patients receiving dialysis treatment, and to a group of matched, but healthy controls. The palm pilots were programmed to administer short surveys of well-being several times a day over a period of one week. Results of the study indicated that the average mood of the ESRD patients was positive, almost as positive, in fact, as those of healthy controls, and patients' moods were considerably higher than the predictions of healthy participants (Riis et al., 2005).

Nonetheless, individual responses to negative events vary considerably. In a study of grief and depression after bereavement, Bonanno and colleagues found evidence for several distinct "trajectories" of well-being after spousal loss. While some widows did well, and recovered quickly, others showed low well-being that continued to decline one year after the loss (Bonanno et al., 2002). As another example, while the study described in the previous paragraph suggests that ESRD patients adapt well on average, other studies have shown that some patients are susceptible to depression (Kimmel, Thamer, Richard, & Ray, 1998).

In investigating individual difference in reactions to adversity, researchers have examined whether factors such as an active coping style, the availability of social support, and the resources associated with higher socioeconomic status can help people retain or more quickly recover well-being after the onset of some adversity (e.g., Cohen & Wills, 1985; Schulz & Decker, 1985). For example, results from a nationally representative survey indicated that after the onset of a significant physical disability, people below the median in income experienced a subsequent drop in well-being that was substantially greater than that experienced by people above the median (Smith, Langa, Kabeto, & Ubel, 2005).

Factors like social support and coping style are generalized constructs, in that they reflect individual differences in how people adjust to a broad range of adverse circumstances—and indeed, they have been studied in many contexts beyond any specific physical disability, and beyond disability generally, in areas such as bereavement and unemployment (Bonanno et al., 2002; Vinokur & Price, 1989). But if we take a more idiosyncratic approach, we may find that many additional personality factors are relevant to understanding how people adjust to specific disabilities. Particular disabilities create unique challenges that could interact with relevant personality traits to affect how well people respond to those challenges. Consider the case of colostomy. People with this condition are confronted with distinctive issues that may have a negative effect on their well-being—and may pose special challenges for people high in some personality traits. Specifically, in this investigation, we will explore whether a personality trait that has not previously been examined as a predictor of general coping—disgust sensitivity—plays a role in how people respond to a medical condition—colostomy.

1.1. Disgust sensitivity

Rozin, Haidt, and McCauley (1993) have proposed that disgust sensitivity (range and intensity of negative response to “offensive” events) likely originated as an aversion to eating spoiled or otherwise dangerous foods. In modern times, disgust sensitivity has been subsumed under a more generalized aversion to a wide range of stimuli or events that are considered “offensive” within any particular context. They noted that disgust elicitors are usually so powerful that they elicit two types of rejection. First, even brief contact with a disgust elicitor renders an otherwise acceptable object unacceptable (contamination, illustrating the law of contagion). Second, harmless replicas or images of disgust elicitors may themselves elicit disgust (the law of similarity). Based on an analysis of disgust elicitors in the USA, Japan, and India, they identified seven domains in which disgust is elicited. These were: foods, animals (especially those associated with spoiled foods, such as cockroaches), body products (e.g., waste), hygiene (e.g., body odor), sex, body envelope violations (including deformities of the body), and death (Haidt, McCauley, & Rozin, 1994; Rozin, Haidt, & McCauley, 2000). Haidt et al. (1994) developed a scale (the DScale) that assesses sensitivity to disgust reactions in each of these seven domains. They validated their disgust sensitivity scale in behavioral tests of reactions to actual or potential contact with a wide range of disgust elicitors (Rozin, Haidt, McCauley, Dunlop, & Ashmore, 1999). They report positive correlations between disgust sensitivity (the DScale) and fear of death and neuroticism, and negative correlations with experience seeking (Haidt et al., 1994).

To date, research on disgust sensitivity has focused on its relationships with other psychological factors and pathologies, such as eating disorders, anxiety, obsessive compulsive disorder, and religious obsessions (Haidt et al., 1994; Olatunji, Tolin, Huppert, & Lohr, 2005; Rozin et al., 1999, 2000; Thorpe, Patel, & Simonds, 2003). In this investigation, we wanted to see if disgust sensitivity would help to predict the extent to which individuals adapt to a potentially disgust-inducing physical disability—in this case, colostomy.

1.2. Challenges of living with a colostomy, including concerns with stigma

In colostomy and ileostomy surgeries, normal bowel function is interrupted, and waste is passed through the abdominal wall through an opening called a stoma, to an appliance which must be emptied periodically. Reasons for this surgery are varied, but the most common causes are colon cancer and inflammatory bowel syndrome. Overall physical functioning with a colostomy can be nearly unimpaired. Most patients learn to empty and clean their appliance, and maintain care of their stoma, etc. The appliance itself is typically easily hidden under clothing, and physical activity is generally not severely hampered, although there may be restrictions on lifting heavy weights.

Nonetheless, adapting to life with a colostomy presents challenges. Occasionally, patients may experience odors and noises caused by gas and waste passing through the stoma. There is also the chance that the colostomy bag may leak if it is allowed to fill past capacity. Fundamental to our purpose, even a well-functioning colostomy appliance requires closer contact with fecal matter than is required with normal bowel functioning. As human feces prompt universal and strong disgust responses (Haidt et al., 1994), colostomy patients may experience disgust reactions. There are four aspects of

colostomy that could enhance disgust: (1) the exit of feces from the body in an unusual location, (2) the lack of control of the time of exit; (3) the complexities of emptying and replacing the appliance (more complex and more in the visual domain than the usual anal cleansing process); and (4) the enhanced risk of noise and leakage.

Of course, given repeated experiences over time, this disgust response might be expected to fade—indeed, this may be a key factor in successful adaptation to this particular disability. But, it seems likely that people with a greater disposition toward disgust sensitivity would take longer, and perhaps be less prone, to adapt to this disability.¹

In addition, people with colostomies may experience, or at least imagine, disgust reactions from other people. Previous research has shown that a disgust reaction plays a role in stigmatization of outgroups (Cottrell & Neuberg, 2005), and at least one study has demonstrated that trait disgust sensitivity is positively associated with stigmatization of disabled individuals (Park, Faulkner, & Schaller, 2003).

It could be that the potentially stigmatizing reactions of others could present another difficulty in adapting to life with a colostomy. And patients who themselves are more easily disgusted may be more likely to anticipate that others will react to their condition with disgust; thus, again, concern about stigma might be especially problematic for patients who have higher trait disgust sensitivity.

To summarize, there are several reasons to expect that disgust sensitivity could be relevant to how patients adapt to colostomy, and to how colostomy patients are perceived by non-patients. To begin to test these ideas, we gave a trait disgust inventory (Haidt et al., 1994), and some additional items modified to specifically include items related to bowel-related disgust responses, to three groups: a sample of current colostomy patients, a sample of former colostomy patients, and a sample of the general public. We tested the following hypotheses:

1. In colostomy patients, trait disgust—especially disgust that is specific to bowel function—will negatively predict life satisfaction and overall adjustment to life with a colostomy, and will positively predict negative experiences with their colostomies, and feelings of stigmatization.
2. Because we argue that disgust sensitivity should be problematic for colostomy patients as a result of the disgust arousing features of their condition, we predict that the negative association with life satisfaction will be strongest among current patients who are currently experiencing negative colostomy-related symptoms (such as unwanted odors and leakage from their appliance), and weak or non-existent in a non-patient sample.
3. Using path and structural equation modeling, we will test whether the overall relationship between disgust and adjustment is mediated by concerns about stigmatization, negative experiences with colostomy symptoms, or both.

¹ Feces normally exit the body through the anus, which has to be cleaned after each act of defecation. Few people seem to be upset by this process, presumably as a result of adaptation. Now imagine that the normal exit of feces from the body came from the lower front torso, where the colostomy stoma is usually located. Under these conditions, disease necessitated surgery that caused the normal frontal exit to move to the location of the anus might well produce a corresponding disgust response.

2. Methods

2.1. Participants: Former and current colostomy patients

Using a database derived from hospital billing records, we identified 330 individuals who had undergone colostomy or ileostomy surgery at the University of Michigan in the last 5 years. To be eligible, participants must have been 18 or older at the survey time. Of the eligible 330 individuals, 195 completed and returned the survey, giving us a 59.1% response rate. We paid participants \$25 per completed survey.²

2.2. Measures for both current and former patients

The survey consisted of questions about participants' type of colostomy, reason for undergoing the surgery, disgust (both general and colostomy-related), attitudes toward colostomy-related events, experience adjusting to the colostomy, stigma related to colostomy patients, and overall quality of life. The survey took approximately 45 min to complete. The survey also contained a skip pattern, such that general measures of well-being and disgust sensitivity (both general and bowel-specific) were asked of all patients, but only current patients responded to items that asked specifically about a current colostomy (e.g., questions about efficacy in dealing with the appliance).

2.2.1. Trait disgust

The standard disgust scale (Haidt et al., 1994) consists of 32 items, and takes too long to complete in the context of this study. Instead, we used a shortened 8 item version (version 2, short form: (Haidt, McCauley, & Rozin, 2002)). The items on this form were selected because of their range of coverage of types of disgust and high correlation with the total score. This D8Scale correlates about .90 with the full disgust scale. It includes four statements about how respondents might react in certain potentially disgusting or disturbing situations, such as "It would bother me tremendously to touch a dead body." Respondents indicated how much they agreed with the statements on a scale from 1 ("Strongly disagree") to 4 ("Strongly agree"). The second set of items consists of four situations, including "You accidentally touch the ashes of a person who has been cremated." Respondents rated how disgusting each situation would be to them, from "Not disgusting at all (1)," to "Very disgusting (4)." See [Appendix B](#) for all eight items.

2.2.2. Colostomy-specific disgust

We developed two items on the survey to measure perceptions of disgust specifically related to colostomies, based on similar items in the full Disgust Scale. Participants were asked: "I am bothered by the odor caused by passing gas" and "The smell of other persons' bowel movements disgusts me" on a 1–7 scale ranging from "Strongly disagree (1)" to "Strongly agree (7)."

² Other results from this data collection have been accepted for publication elsewhere (Smith, Sherriff, Damschroder, Loewenstein, & Ubel, in press). The previous manuscript focuses on comparisons of utility valuations for colostomy provided by patients, former patients, and non-patients.

2.1.3. Life satisfaction

Overall life satisfaction was measured using the satisfaction with life scale (Diener, Emmons, Larsen, & Griffin, 1985). This instrument comprises five statements about respondents' general feelings and attitudes concerning their life, such as "In most ways my life is close to my ideal" and "So far I have gotten the important things I want in life." Respondents indicated how much they agreed or disagreed with these statements on a 1–7 scale ranging from "Strongly disagree (1)" to "Strongly agree (7)." We did not include data from one item of the Life Satisfaction Scale in our composite ("If I could live my life over, I would change nothing"), as we were concerned that it would have a different connotation for currently colostomy patients than for the other groups.

2.1.4. Quality of life

An overall quality of life question asked participants to choose a number between 0 and 100 that best represents their current quality of life, where 0 represents the worst imaginable quality of life, and 100 represents the best imaginable quality of life.

2.3. Measures for current patients only

2.3.1. Colostomy adjustment

Several items were derived from the Cancer Self-Efficacy Scale (Lewis, 1996). These items focused on how well current colostomy patients were dealing with circumstances and challenges produced by having a colostomy. They include statements such as "I am able to deal with the physical changes caused by the colostomy" and "I can lead a productive and fulfilling life despite my colostomy." Participants indicated how much they agreed or disagreed with the statements on a scale from 1 to 7. See Appendix B.

2.3.2. Colostomy-related symptoms

After consulting clinical staff who treat colostomy patients, we created a measure of how frequently certain commonly experienced symptoms occurred. We also asked how much these symptoms bothered participants, when they occurred. These included events such as stoma bag leakage and the occurrence of irritation around the stoma. Respondents indicated how many days in the past week that they experienced these symptoms. Separately, respondents indicated how much these problems bothered them on a scale ranging from 1 ("Not at all") to 7 ("Very Much"). See Appendix B.

2.3.3. Stigma

Six items assessed how much participants felt stigmatized by having a colostomy, including assessments of whether they think others are disgusted by colostomy. See Appendix B.

2.4. Procedures for current and former patients

We sent each patient a survey, a payment form (mentioning that they would receive \$25 for completing the study) and two self-addressed, stamped envelopes: one for the survey and one for the payment form. Respondents returned the surveys and payment forms separately to further ensure the confidentiality of their responses. No information identifying

respondents was printed or written on the surveys; all contact and personal information was maintained in a password-protected file.

If we did not receive a patient's payment form within two weeks, we made a series of reminder calls over the next several days and then called once in the evening. We left a message during the evening call if we were still unable to reach the patient. If patients did not respond to the message or return the survey within two weeks, we sent a reminder letter and another copy of the survey.

2.5. Participants—the non-patient sample

For the non-patient sample, participants were drawn from a panel of Internet users who voluntarily agreed to participate in research surveys. This panel is administered by Survey Sample International (SSI) and includes over 1 million unique member households recruited through random digit dialing, banner ads, and other "permission-based" techniques. (For more information, see <http://www.surveysampling.com>). Individuals completing our web-based survey were entered into a drawing to win a cash prize of up to \$1000. Email invitations were sent to a sample of panel members stratified to mirror the US census population based on gender, education level, and income. Respondents over the age of 50 were oversampled.

A total of 7240 people received email messages inviting them to participate in an online survey, and 606 clicked the embedded link to begin the survey (an 8.4% response rate). Of these, 567 completed at least one measure, and 523 completed the full survey instrument, a completion rate of 86%.

2.6. Measures—the non-patient sample

The non-patient sample provided demographic information, and read a brief description of colostomy (provided in [Appendix A](#)), and answered questions regarding their perception of quality of life with a colostomy. Relevant to the current investigation, they completed the bowel-specific disgust measure and indicated the extent to which they felt discomfort with the idea of close contact with a person with a colostomy (see [Appendix B](#)).

3. Results

3.1. Sample characteristics and reliability

Demographics for each of our three samples are reported in [Table 1](#). Means, standard deviations, and Cronbach's α coefficients for our composite variables are presented in [Table 2](#). All of our composite variables demonstrated acceptable levels of internal reliability. As stated above, we did not include data from one item of the Life Satisfaction Scale in our composite "If I could live my life over, I would change nothing." Reliability of this scale did not drop as a result of eliminating this item (α with 5 items = .918, with 4 items = .922). Therefore, the following analyses include only the four item version of the scale.

In addition, across the two patient samples, the general disgust measure was significantly and positively related to our modified specific disgust measure, as we expected ($r = .36, p < .01$).

Table 1
Sample demographics

	Current patients (<i>n</i> = 95)	Former patients (<i>n</i> = 100)	Community members (<i>n</i> = 567)
Mean age (standard deviation)	55.44 (15.01)	50.09 (17.34)	54.15 (16.03)
Gender			
% Female	50%	47%	64%
Race			
% Non White	12%	5%	28%
Mean number of months since colostomy (standard deviation)	50.49 (67.68)	31.08 (17.32)	n/a
Median annual income (1–7)	3	3	4
1 = <\$10K			
2 = \$10K–\$25K			
3 = \$25K–\$40K			
4 = \$40K–60K			
5 = \$60K–\$80K			
6 = \$80K–\$100K			
7 = >\$100k			
Cause of colostomy/ileostomy			n/a
Inflammatory bowel disease	29	42	
Familial adenomatous polyposis	3	4	
Cancer	41	11	
Trauma/accident	1	5	
Spinal cord injury	1	0	
Other cause ^a	13	26	
More than one reason listed	5	11	

Less than 6% of respondents had missing data on any item except for annual income (9%).

^a The most commonly cited reasons in this category involved various types of infections and surgical complications.

Table 2
Descriptive statistics and reliability among key composites

	Mean (<i>SD</i>)	Observed range	Cronbach's α
<i>All patients (n = 195)</i>			
Life satisfaction (4; 1–7) ^a	4.46 (1.62)	1.00–7	.92
Quality of life (1; 0–100)	69.47 (22.28)	0–100	n/a
General disgust (8; 1–4)	2.52 (.65)	1.38–3.88	.75
Bowel-specific disgust (2; 1–7)	4.65 (1.38)	1.00–7	.71
<i>Current patients (n = 95)</i>			
Colostomy adjustment (1–7)	5.54 (1.30)	1.60–7	.90
Bothered by symptoms (1–7)	4.23 (1.99)	1.00–7	.87
Stigma (1–7)	3.39 (1.54)	1.00–6.83	.90

^a The numbers in parentheses indicate the number of items, and scale range.

3.2. Correlations between specific disgust, general disgust, and well-being in current colostomy patients

Correlations among our primary variables of interest are presented in Table 3. Both specific and general disgust were negatively related to colostomy adjustment, and were

Table 3
Correlations in current patient sample ($n = 95$)

	Specific disgust	General disgust	Life sat.	QOL	Bother symps.	Colost. adjust	Stigma
Spec. disgust	—						
General Disgust	.26*	—					
Life sat.	-.34**	-.12	—				
QOL	-.33*	-.10	.76**	—			
Bother symps.	.49**	.01	-.22*	-.21*	—		
Colost. adjust	-.42**	-.21*	.62**	.65**	-.32**	—	
Stigma	.54**	.20*	-.51**	-.52**	.57**	-.55**	—

* $p < .05$.

** $p < .01$.

positively related to feelings of stigmatization. Specific disgust was also negatively related to life satisfaction, and to quality of life.

We also observed strong, negative associations between perceptions of stigma and colostomy adjustment, and life satisfaction. Reporting being bothered by symptoms was also a significant negative predictor of overall colostomy adjustment, life satisfaction, and quality of life. The relation between bowel-specific disgust and the other variables was always greater than the relation of general disgust to these same variables.

3.3. Comparisons with other samples

We predicted that the negative association with life satisfaction would be strongest among current patients who are currently experiencing symptoms, and weak or non-existent in a non-patient sample. As shown in Table 4, we observed no correlation between these two variables in the non-patient sample. To test whether the difference in correlations was significant, we performed a regression analyses in which we examined the effect of patient status (coded 1 for current patients, and 0 for non-patients), specific disgust, and the interaction of these two variables in predicting life satisfaction. In this model, the interaction term was significant ($n = 655$, $t = -3.31$, $p < .01$), indicating a significantly stronger relationship between disgust and life satisfaction for current patients than for non-patients. A similar interaction was significant for the quality of life variable ($n = 652$, $t = -3.66$, $p < .001$).

Next, we tested whether the effects were stronger in current patients than in former patients. As shown in Table 4, the correlations between disgust and life satisfaction, and between disgust and quality of life, were lower in former patients. However, regression analyses did not reveal a significant interaction for either outcome variable ($n = 192$, $ps > .2$).

Table 4
Correlations between bowel-specific disgust and well-being, by group

	Current patients with symptoms	Current patients w/no symptoms	Non patients	Former patients
Life satisfaction	-.38***	-.16	-.01	-.18*
Quality of Life	-.42***	-.03	.03	-.24**

* $p < .10$.

** $p < .05$.

*** $p < .01$.

We also tested whether, among current patients, the effects of disgust on well-being would be especially strong for patients who reported experiencing some colostomy-related complicating symptoms over the past week. We conducted a regression analysis, with number of symptoms experienced and specific disgust, and the interaction of these two variables (both treated as continuous) predicting life satisfaction. This analysis confirmed a significant interaction, indicating a stronger relationship between disgust and life satisfaction for patients who reported more symptoms ($n = 93$, $t = -2.22$, $p < .05$). A separate regression model examining quality of life as the dependent variable also showed a significant interaction ($n = 93$, $t = -3.26$, $p < .01$). As shown in Table 4, for the subset of current patients who experienced at least 1 colostomy-related symptom in the last week, correlations between specific disgust and the well-being outcomes were the largest of any subgroup. Of note, general trait disgust, which was not a significant predictor of life satisfaction in the overall sample of current patients, was negatively related to life satisfaction in this subsample ($r = -.29$, $p < .05$).

3.4. Links between disgust, negative colostomy experiences, stigma, and well-being

Next, we considered two routes whereby disgust could influence adjustment to colostomy, and overall well-being for current patients. Specifically, we hypothesized that disgust sensitivity might: (a) increase the extent to which patients feel bothered by symptoms such as leakage, or odors, and/or (b) increase the extent to which patients feel that others would likely be disgusted by their colostomies, leading to feelings of stigmatization. Either or both of these factors should, in turn, negatively influence adjustment to the colostomy.

Of course, given the cross sectional design, we cannot directly assess such causal hypotheses. Therefore, we sought only to see if the patterns of associations between our variables supported either or both of these hypothesized routes. To do so, we employed path and structural equation modeling. The basic path model we tested is depicted in Fig. 1. As can be seen in the figure, specific disgust sensitivity was positively associated with both feelings of stigmatization, and (somewhat more weakly) with reports of being

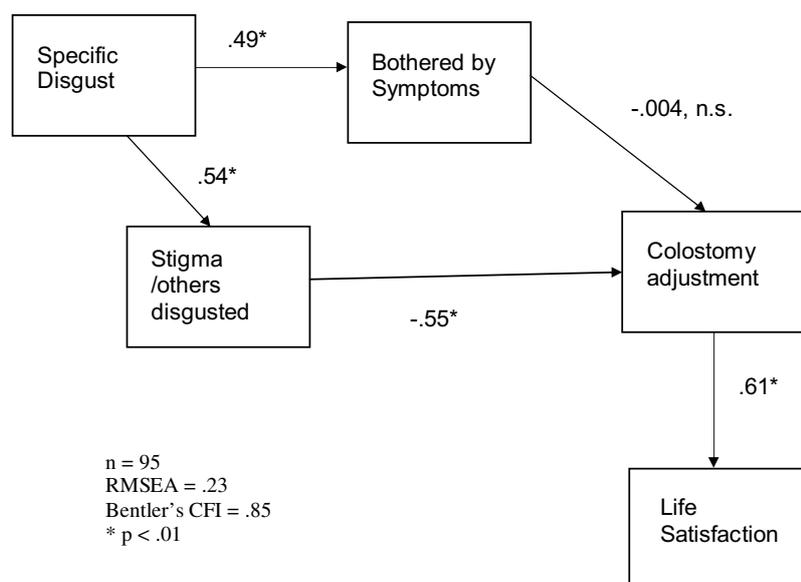


Fig. 1. A path model showing relations between trait disgust, stigma, negative colostomy experiences, colostomy adjustment, and overall QOL.

bothered by negative colostomy symptoms. However, experiences with symptoms did not significantly predict colostomy adjustment in this model, and overall fit was not adequate (RMSEA = .23, Bentler's CFI = .85). Thus, we adjusted the model by dropping the negative symptoms variable. Doing so reduced the number of estimated paths. Given our sample size, we decided that this smaller model could be tested using a structural equation model, without falling below 10 observations per estimated path. To compute the model, we used SAS PROC CALIS (v.8) in lineqs mode, and maximum likelihood estimation. In this model stigma, colostomy adjustment, and life satisfaction were treated as latent variables (because the specific disgust composite had only two items, we did not treat it as latent). Overall well-being was indicated by our three composites (Life satisfaction, positive mood, and negative mood), each treated as a separate indicator (the path between positive mood and the latent factor was constrained to equal 1.0). Colostomy adjustment was indicated by one variable that was actually a composite comprised of the three efficacy items; the other two variables in the five-item composite were each treated as separate indicators (the path to the efficacy composite was constrained to 1.0). For stigma, we divided our six-item composite randomly into three 2 item composites, each one treated as a separate indicator, and the path from one constrained to equal 1.0. To summarize, this model estimated 6 indicator paths and 3 structural paths (from disgust to stigma, from stigma to colostomy adjustment, and from colostomy adjustment to well-being), for a total of 9 (See Fig. 2).

Results indicate that all estimated indicator paths were highly significant (all $ps < .001$), and the six standardized path coefficients ranged from .70 to .91. The structural paths were also highly significant (all 3 $ps < .001$); the standardized path from specific disgust to stigma = .58, from stigma to colostomy adjustment = $-.64$, and from colostomy adjustment to overall well-being = .81. This is a highly parsimonious model, with direct links from disgust to colostomy adjustment, and to well-being constrained to zero, as is the direct link from stigma to well-being. No errors among indicators were free to covary. Nonetheless, this model fit the data (RMSEA $< .07$, Bentler's CFI = .98), suggesting that there is no need to add additional paths. A specific examination of LaGrange multipliers revealed that none of the potential paths from specific disgust to any other variable in the model would have improved fit by a significant amount (all $ps > .15$).

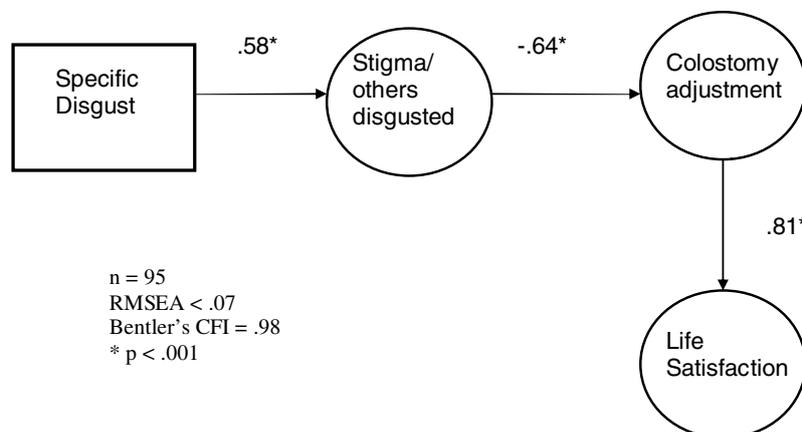


Fig. 2. Final structural equation model.

3.5. Disgust and stigmatizing attitudes in the non-patient sample

Finally, we tested the hypothesis that non-patients higher in disgust sensitivity would express a greater desire to distance themselves from someone with a colostomy. We tested the association between the specific disgust measure and the two-item social distance composite and found a modest positive association between disgust sensitivity and expressed discomfort with the idea of close contact with a colostomy patient ($r = .22$, $p < .001$).

4. Discussion

We found preliminary evidence to suggest that disgust sensitivity is negatively associated with adjustment to having a colostomy. Specifically, among colostomy patients, we observed positive correlations between disgust sensitivity and feelings of stigmatization as a result of the colostomy and with feeling bothered by colostomy symptoms, such as leakage. When a bowel-specific measure of disgust was considered, we also observed negative correlations with overall life satisfaction, and with perceived quality of life. These latter effects were strongest among colostomy patients currently experiencing negative symptoms, and were essentially zero in a sample of non-patients. This pattern is consistent with the idea that disgust represents a particular problem for colostomy adjustment, as opposed to being a general predictor of lessened well-being.

Among current colostomy patients, those who had higher disgust sensitivity reported higher levels of feeling stigmatized—they appeared to assume that others would be disgusted by their colostomy. This factor was, in turn, a strong negative predictor of colostomy adjustment and well-being. A path and structural equation model suggested that the influence of disgust sensitivity on colostomy adjustment and life satisfaction occurred primarily via feelings of stigmatization, rather than feeling bothered by colostomy symptoms.

Finally, data from the non-patient sample appeared to verify the patients' concerns about stigmatization. Non-patients who themselves reported higher disgust sensitivity reported less comfort with the idea of close contact with a colostomy patient.

We can readily postulate at least two different frameworks for thinking about the negative impact of disgust sensitivity on perceived stigma and colostomy adjustment. First, it could be that having a pre-existing high sensitivity to disgusting stimuli puts you at greater risk, if you experience the onset of a potentially disgust-inducing disability, like colostomy. Alternatively, it could be that the people who adjust successfully to a colostomy do so in part by reducing their sensitivity to certain kinds of disgusting stimuli, resulting in lower levels of reported disgust along with higher levels of well-being. Consistent with this notion, we found that bowel-specific disgust sensitivity is slightly, but significantly, lower in the current patient sample than in the general public sample ($M = 4.57$ vs. $M = 5.09$, $p < .01$).

Given the cross-sectional design, we cannot tease apart these two alternatives. That is, although disgust sensitivity has been conceptualized as a stable personality trait, we cannot say for sure whether disgust sensitivity is a cause of, or effect of, poor adjustment to having a colostomy. Ultimately, longitudinal and perhaps prospective designs will be needed to further understand these relationships.

In addition, we cannot rule out the possibility that our disgust measures are proxies for other, related constructs. As discussed in the introduction, previous work has shown that disgust is related to factors like neuroticism, and obsessive tendencies, and it is possible that these variables are also related to lower colostomy adjustment. We would argue that the stronger associations between disgust and well-being among current patients with symptoms, and the lack of association in the non-patient sample, suggest that disgust is specifically a problem for colostomy, and thus not standing in for a broad personality variable such as neuroticism. But we cannot completely dismiss the possibility of a confounding third variable. Similarly, although we have argued that disgust is important to colostomy adjustment via its association with stigma, and less through its association with negative symptoms, it is possible that this pattern is specific to the measures we used. Perhaps other, unmeasured, aspects of the colostomy experience would also have proved important.

Other limitations include the use of convenience samples for both patients and non-patient samples. In addition, as is often the case with web-based studies, the response rate for our internet sample was low. Both of these factors potentially limit the generalizability of our results, although we do not have a specific reason to think that the associations observed would be different in a more representative sample. (Note: In a separate study using the same internet methods, and similar response rates, sample, etc, we found age-related trends in happiness that mirror those found in more representative samples (Lacey, Smith, & Ubel, 2006).)

Finally, the strongest effects of disgust sensitivity were observed using a previously untested measure that was specific to bowel-related disgust. This measure was reliable, and was positively correlated with the general disgust measure; however, it has only two items, was created as an ad hoc measure for this survey, and thus could probably be improved upon. A better measure might reveal even stronger associations between colostomy adjustment and life satisfaction.

4.1. Implications

The current data—while they must be considered preliminary—add to the literature on how the tendency to respond more or less strongly to noxious stimuli affects other psychological variables. As reviewed in the introduction, high disgust sensitivity has previously been linked with obsessive tendencies, and with neuroticism among other variables. But we think this is the first study to demonstrate that high disgust sensitivity might negatively influence well-being as a whole, under some circumstances. Specifically, our data provide initial evidence that repeated exposure to noxious stimuli – in the form of a potentially disgust inducing disability – is a problem for the well-being of people with higher disgust sensitivity.

There are potential clinical implications of these findings. If trait disgust sensitivity before a colostomy can predict adaptation afterward (something that needs to be verified in prospective studies), then disgust measures could become useful tools to help identify patients who might need more help in adjusting to their condition. Indeed, while global disgust sensitivity may be a fairly fixed trait, bowel specific sensitivity might be modifiable. Interventions could be devised that de-sensitize responses to bowel functioning, reducing bowel disgust sensitivity and aiding in the adaptation process.

In addition, many individuals with inflammatory bowel syndrome have an option of whether to have a colostomy, balancing the negative features of the colostomy against the

symptom relief it would produce. Insofar as bowel-specific disgust sensitivity will predict the degree of adaptation, it could be employed as a factor in determining the advisability of an elective colostomy. Given the extremely high correlation observed between colostomy adjustment and overall life satisfaction, it is important to make the choice of elective colostomy as informed as possible.

Our data also suggest that disgust plays a role in perceived and actual stigmatization of disabled patients. More easily disgusted patients reported higher levels of concern about being stigmatized by others—perhaps anticipating a disgust reaction from others—and these concerns in turn were associated with much lower well-being. These data were mirrored by data from a non-patient sample, which confirmed that disgust plays a role in how people respond to this disability. These findings are consistent with the idea that disgust plays a role in stigma processes, and adds to the small, but growing literature emphasizing the important of specific emotional reactions to specific stigmatizing conditions, as opposed to broader reactions like dislike (Cottrell & Neuberg, 2005; Neuberg, Smith, & Asher, 2000).

Previous investigations on adjustment to disability have focused on general responses to adversity (e.g., social support, coping style, optimism, etc.). What is relatively unique about our approach is the consideration of how the specific challenges posed by a disability would interact with a personality trait specifically relevant to that disability. Although we have focused on colostomy, disgust sensitivity could plausibly be related to other physical health conditions, such as amputation and incontinence. In addition, personality traits other than disgust might make it easier or more difficult to adapt to specific disabilities, as well as life challenges beyond disability and physical health. Thus, while the current findings must be interpreted cautiously, given the modest study design, we think they are both novel and important, and hope they will motivate future studies using more powerful designs.

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Appendix A. Colostomy description provided to community sample

Imagine that you have a colostomy. A colostomy is an operation involving the surgical redirection of your bowels through a hole created in your gut, called a stoma.

Waste passes through your intestines and out the stoma into a bag, which you must empty several times a day. If you wear relatively loose clothing, this bag will not be visible underneath your garments.

Occasionally, you will experience odors and noises caused by gas and waste passing through the stoma. There is also the chance that the colostomy bag may leak if it is allowed to fill past capacity.

Although you will be restricted from lifting very heavy weight, your daily activities will not otherwise be greatly affected.

Appendix B. Measures

General disgust:

The following questions are about how you might react in certain situations. Please indicate how much you agree with each of the following statements, or how true it is about you. Please write a number (1, 2, 3 or 4) to indicate your answer:

- 1 = Strongly disagree (very untrue about me)
 2 = Mildly disagree (somewhat untrue about me)
 3 = Mildly agree (somewhat true about me)
 4 = Strongly agree (very true about me)

- ___ 1. I try to avoid letting any part of my body touch the toilet seat in a public restroom, even when it appears clean
- ___ 2. It would make me uncomfortable to hear a couple making love in the next room of a hotel
- ___ 3. It would bother me tremendously to touch a dead body
- ___ 4. Even if I was hungry, I would not drink a bowl of my favorite soup if it had been stirred by a used but thoroughly washed fly-swatter

How disgusting would you find each of the following experiences? Please write a number (1, 2, 3, or 4) to indicate your answer:

1 = Not disgusting at all, 2 = Slightly disgusting, 3 = Moderately disgusting, 4 = Very disgusting
 (If you think something is bad or unpleasant, but not disgusting, you should write "1".)

- ___ 5. You take a sip of soda and then realize that you picked up the wrong can, which a stranger had been drinking out of
- ___ 6. You hear about a 30 year old man who seeks sexual relationships with 80 year old women
- ___ 7. While you are walking through a tunnel under a railroad track, you smell urine
- ___ 8. You accidentally touch the ashes of a person who has been cremated

Stigma (1 = strongly disagree, 7 = strongly agree):

I think other people find ostomies to be extremely disgusting

I feel embarrassed by my ostomy

I think other people would be uncomfortable around me if they knew about my stoma

I feel rejected by other people because of my ostomy

To what extent does your ostomy make you feel embarrassed or socially uncomfortable?

(1 = not at all, 7 = very much)

To what extent does your ostomy make you feel stigmatized? (1 = not at all, 7 = very much)

Negative experiences with symptoms:

How much does it bother you when you have (1 = not at all, 7 = very much, 99 = never happens (recoded as 1)):

Leakage from your stoma bag?

The smell of stool coming from your stoma bag?

Noise coming from your stoma bag?

Colostomy adjustment (1 = strongly disagree, 7 = strongly agree):

I have the ability to handle the challenges from the ostomy and its treatments.

I am able to deal with the physical changes caused by the ostomy.

I have the ability to take the necessary steps to work through the demands from the ostomy and its treatments

I think I am leading quite a normal life despite my ostomy

I can lead a productive and fulfilling life despite my ostomy

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