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Processes of Change for Colonoscopy: Limited Support for Use Among Navigated Latinos

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Abstract

This study assessed the role of the Processes of Change (POC), a construct of the Transtheoretical Model, in colorectal cancer (CRC) screening among Latinos. Latinos participate in CRC screening less often and are diagnosed with CRC at a later stage than whites. POC items were administered to 344 English- and Spanish-speaking Latinos at average risk for CRC who had not had a colonoscopy in the past five years and received a colonoscopy referral. POC were measured at three timepoints: following informed consent (T1) at time of referral; 2 weeks prior to scheduled colonoscopy (T2); and 1 month after scheduled colonoscopy (T3). Participants received patient navigation as part of a randomized controlled trial to promote screening colonoscopy. POC scores were examined for changes during the course of the intervention, and logistic regression models assessed the relationship between POC scores and CRC screening adherence. Total POC scores decreased between T1 and T2 ($p = 0.03$), but were unchanged between T1 and T3. CRC screening adherence was not significantly associated with POC scores or change in POC scores over time. The POC instrument was not found useful for predicting colonoscopy adherence among Latinos in conjunction with patient navigation. Total POC scores did not increase during a patient navigation intervention despite high colonoscopy completion rates.

Keywords

Colorectal cancer; Processes of change; Transtheoretical model; Colonoscopy; Latinos

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Informed consent: Informed consent was obtained from all individual participants included in the study.

Colorectal cancer (CRC) is the third most commonly diagnosed cancer and cause of cancer death in the United States (US) in both men and women [1]. CRC is one of the most detectable and survivable cancers due to the wide variety of screening options available. Latinos are not screened for CRC as frequently as non-Latino whites, with just a 49.9% screening rate versus 65.4% for their white counterparts [2] and are more likely to be diagnosed with CRC at a later stage than whites [2–4]. Increased rates of CRC screening are crucial for decreasing CRC mortality among Latinos; the five-year survival rate for CRC in Latinos is 91% following a localized-stage diagnosis [2]. Regional and distant stage diagnoses further reduce five-year survival rates to 71% and 17%, respectively. Whites have similar five-year survival rates of 90%, 71% and 14% for local, regional, and distant stage diagnoses, respectively [2]. Additionally, polyp detection during the 5-10 year pre-malignant phase has been shown to reduce the incidence of CRC by up to 90% [5]. The American Cancer Society (ACS) guidelines for CRC screening issued in 2017 provide a variety of screening options with differing recommended frequencies for individuals at average risk above age 50, including: colonoscopy every 10 years; flexible sigmoidoscopy, double-contrast barium enema, or CT colonography every 5 years; stool DNA test every 3 years; or Guaiac-based fecal occult blood test/fecal immunochemical test (gFOBT/FIT) every year [2]. The American College of Gastroenterology has identified colonoscopy as the preferred CRC screening method as it is preventative in that polyps, a precursor to CRC, can be removed during screening [5,6].

CRC is the second most commonly diagnosed cancer and the third leading cause of cancer death among Latino men and women in the US [3]. Latino men and women have a lower CRC incidence rate than whites by 6% and 15%, respectively. This lower overall incidence rate among Latinos may be attributable to lower CRC rates in their countries of origin. However, US-born Latino men in California and Texas have a 30% higher CRC mortality rate than whites, emphasizing the urgent need to reduce racial disparities in CRC screening despite lower overall incidence rates, especially in the aforementioned states [7]. Current mainstream interventions for increasing CRC screening are not effective for all ethnic/racial groups, as evidenced by the differing rates of screening among whites, African Americans, and Latinos [2–4]. One-size-fits-all interventions that are not sensitive to the unique needs of different racial/ethnic groups may not address culturally-specific barriers such as limited English proficiency leading to reduced health care access, fear of the colonoscopy procedure, lack of CRC knowledge, and fatalistic beliefs regarding cancer [8–10]. The racial disparities in CRC stage at diagnosis, mortality rates, and screening rates call for interventions targeting Latino populations.

Non-adherence to CRC screening guidelines can be due to a variety of factors, including a lack of CRC knowledge, limited access to health care, and psychological/attitudinal barriers [8]. Since the underlying causes of non-adherence may vary between individuals, interventions tailored to target one's individualized needs are considered more effective [11–13]. The Transtheoretical Model (TTM), a theory of health promotion, proposes that an individual's perceptions of a particular health behavior, and his or her skills relating to behavior change, are determinants of health decisions and behaviors [14]. The TTM model explains an individual's health behavior modification process as a progression through stages of increased readiness ("stages of change") to undergo a positive behavior. The TTM

posits that individuals move through five stages of change: precontemplation (no change has been made, and a change is not under consideration), contemplation (no change, but considering one), preparation (beginning first steps of a change), action (health behavior has been changed for a specific period of time), and maintenance (long-term commitment to the change) [14].

The TTM also proposes that an individual's stage is determined by: 1) his or her perceptions of the health behavior under consideration in terms of "pros" and "cons" and 2) skills relating to behavior change referred to as "Processes of Change" (POC) [14]. Positive changes in these pros/cons perceptions and the POC are thought to move an individual through the stages of change and toward enacting a particular health behavior [14]. The TTM suggests that an intervention tailored to an individual's stage of change—taking into consideration his or her POC skills and strategies—would be most successful in eliciting a move to a subsequent stage, thus bringing an individual closer to enacting a particular health behavior.

The POC are the "cognitive and behavioral strategies by which change is actually accomplished," and are necessary to enact a change to health behavior [14]. The POC that have been found to be applicable to CRC include the following skills and strategies: (1) "commitment to screening," which represents an interest in regular CRC screening; (2) "information sharing and communication," representing a tendency to discuss CRC screening with others and to seek out information about screening tests; (3) "thinking beyond oneself," placing CRC screening in a context broader than one's own direct experience, such as benefit to family; and (4) "avoids contact with health care" [14,15]. The TTM has been applied to a number of health behaviors, including mammography use, physical activity, sun avoidance, and Pap testing [14–20].

A number of studies have examined components of the TTM as applied to CRC screening [12,15,21–24]. Manne and colleagues [15] adapted Rakowski and colleagues' measures for mammography [14] to CRC-specific subscales. They found that individuals adherent to CRC screening guidelines, whose siblings were diagnosed with early onset CRC, had higher commitment to screening and less avoidance of health care [15]. DuHamel and colleagues [12] demonstrated factor validity and predictive validity of POC test score interpretations among African Americans and found that individuals in the preparation/contemplation stages for screening colonoscopy had elevated thinking beyond oneself and lower avoidance of health care compared to those in the precontemplation stage.

To date, several studies have applied the POC to Latino populations. Surís and colleagues analyzed POC items administered to Mexican American women enrolled in a weight loss program and found POC scores to be related to stage of change and consistent with prior TTM research [25]. Fernández and colleagues found that Latinas who participated in an intervention promoting mammography and Pap testing had increased POC scores compared to controls [26]. Similarly, Pekmezi and colleagues examined POC among Latinas in a randomized clinical trial (RCT) targeting physical activity behavior change, and found that POC increased following a culturally-targeted intervention [27]. Oliveira and colleagues studied POC for fruit and vegetable consumption among male college students, including a

group of international Latinos [28]. They found that POC scores were generally higher in action/maintenance stages as compared to precontemplation/contemplation stages.

Multiple studies have examined the TTM as it relates to CRC screening; others have analyzed the POC among Latinos. This is the first study to combine these areas of prior research and explore the POC from the TTM in the context of CRC screening among Latinos. The present study aims to apply an existing POC measure for screening colonoscopy [15] to a Latino study group, and to address how this existing measure changes longitudinally during an intervention promoting screening colonoscopy and predicts screening colonoscopy completion.

The first hypothesis of the present study is that total and subscale POC scores will increase over time for study participants receiving a patient navigation intervention. Patient navigation has been found to increase screening colonoscopy adherence [29,30] and, as per the TTM, this change may be associated with strengthened POC. The second hypothesis is that total and subscale POC scores will be significantly higher for participants who were adherent to screening colonoscopy versus those who were not adherent. Inclusion of this racial/ethnic group is of great importance due to the low rates of CRC screening for Latinos' and the urgent need to develop interventions targeting this racial disparity.

Methods

Study sample and recruitment.

Three-hundred and eighty-six individuals were approached between May 2012 and December 2013 to participate in an IRB-approved RCT (NCI R01 CA140737-01A2, "Improving CRC Screening for Diverse Hispanics in an Urban Primary Care Setting"). This RCT examined screening colonoscopy adherence for Latino patients consented to the study and randomized across three arms: best clinical practices patient navigation, best clinical practices patient navigation with standard CDC print materials, and best clinical practices patient navigation with culturally-specific print materials.

This NCI-funded study included investigators from Memorial Sloan Kettering Cancer Center and the Icahn School of Medicine at Mount Sinai (ISMMS), and study recruitment took place at the ISMMS primary care clinic. Participants were approached after receiving a referral for screening colonoscopy from their primary care physician (PCP). Of the 386 individuals approached, 344 eligible individuals were consented following an eligibility assessment. Participants were provided the IRB-approved informed consent form in English or Spanish, depending on their choice, and had the opportunity to read, understand, and have their questions answered prior to signing the consent. Eligibility criteria included: 1) self-identified Latino; 2) ages 50-85; 3) no personal cancer history or immediate first-order family history of CRC before age 60; 4) no history of gastrointestinal disorder; 5) no colonoscopy procedure in the last five years; 6) referral for screening colonoscopy by PCP; 7) English or Spanish-speaking and; 8) having a telephone or cell phone service. Participants were administered the baseline (T1) face-to-face interview by a trained bilingual research assistant. Forty participants were not reached after T1, did not receive the intended patient

navigation and, thus, were excluded from the study. Four individuals were excluded from the analysis due to a lack of health insurance which might have biased their access.

Immediately following the consent and completion of the baseline interview, the project coordinator used a random numbers-generating program to randomize the participants into their assigned study arms. Enrollment numbers were matched to a randomly generated list of “1” (best clinical practices patient navigation), “2” (best clinical practice patient navigation plus standard materials) or “3” (best clinical practices patient navigation and culturally targeted materials). Twenty percent, 40%, and 40% of participants were assigned to no print materials, standard CDC print materials and culturally-specific print materials to promote CRC screening, respectively. The randomization schedule was changed from a ratio of 1:1:1 to 1:2:2 during the course of the study to increase the ability to detect group differences. The project coordinator then noted, in a sealed envelope, the participant’s group assignment. The research assistant was, therefore, blind to study group assignment until after the baseline assessment took place; he or she was made aware of group assignment only by opening the sealed envelope and providing print materials to the participant. Health care providers were also blind to study group assignment.

The second interview (T2) occurred at 2 weeks before the scheduled screening colonoscopy, generally 3 months after baseline; T2 occurred immediately after bowel preparation instructions were provided. The final interview (T3) took place 6 to 12 months after baseline or 1 month after the scheduled screening colonoscopy date. Respondents received \$20 (cash or a gift card) for their participation in each interview. IRB approval was gained for this study and it was registered with clinical trials ([ClinicalTrials.gov](https://clinicaltrials.gov) identifier: NCT01569620). Recruitment concluded when the desired sample size was achieved. Target sample size was determined in order to generate sufficient statistical power (estimated power=0.95 at alpha=0.05) for the RCT based on previous studies examining interventions to increase screening colonoscopy adherence through targeted educational materials and patient navigation [31–38].

Sixty-two (20.4%) of the 304 individuals who received patient navigation did not have complete POC scores at all three timepoints.

There was no significant difference in screening colonoscopy adherence across the three arms of the RCT. Additionally, the groups did not differ significantly on baseline POC total or subscales. As a result, the data for the three groups have been combined in the present study.

Analytic strategy.

Statistical analyses were executed using the SAS 9.2.3 and R 3.2.3 software packages. For 13 cases with missing income information, income was imputed via regression mean imputation based on education, age, and indicators of insurance type and employment.

Longitudinal change in subscale measures from baseline to T2 and T3.—

Multivariate ANOVA (MANOVA) was used to assess the overall effects of time on the subscale measures, at both T2 and T3. Paired t-tests were then conducted to assess the

change in each POC subscale measure between T1 and T2, and T1 and T3. Pearson's correlation was also calculated to assess the stability of this relationship. Available-case analysis was used to maximize the sample size for each pairwise analysis.

Associations with screening colonoscopy.—Logistic regression models were used to assess unadjusted and adjusted associations of POC subscales with receipt of screening colonoscopy. Adjusted models included effects of nativity (i.e., categorization of individuals to either: born in the US, born in Puerto Rico, or born in another country) and income (i.e., household annual income categorized to either above or below \$10,000), as determined by univariate associations of demographics. Adjusted models also included the effect of baseline (T1) value of the Life Orientation Test – Revised (LOT-R, a psychometric measure of optimism [39]), based on results reported by Efuni and colleagues [40] on demographic and psychometric variable associations with screening colonoscopy. Models were assessed for POC subscales at baseline (T1), T2, and for the change from baseline to T2.

Measures.

Socio-demographic data (age, gender, income level, education, marital status, employment status, country of origin, years lived in the US, and language in which the interview was conducted), POC items and other psychometric variables including LOT-R were collected. Spanish language versions of the instruments were used in a previous study of 400 Latinos [8].

POC were assessed using 13 items adapted by Manne and colleagues, which corresponded to three subscales assessing participants' implementation of strategies for behavior change [14,15]. Responses were recorded using a 5-point Likert scale (1 – “strongly disagree” to 5 – “strongly agree”). Items specifically addressed CRC and mapped to the following three POC subscales: commitment to screening (four items, T1, T2, T3, e.g., “I make plans so that I have enough time for a colonoscopy”); information sharing and communication (five items, T1, T2, T3, e.g., “I talk about a colonoscopy with my friends”); thinking beyond oneself (four items, T1, T2, T3, e.g., “I sometimes think of ways that could get more people to have a colonoscopy”). Health care system avoidance was not assessed in this study as participants were recruited at a primary care facility, thus did not seem to be avoiding health care. Additionally, the POC items were slightly modified from the items DuHamel and colleagues [12] used for CRC screening; “colorectal cancer test” was changed to “colonoscopy” because the present study promoted screening colonoscopy adherence. Four items were removed across the three subscales because unpublished data (examined by the second and fourth authors of this manuscript) showed those items to have low internal consistency and/or not be associated with CRC screening.

Screening colonoscopy adherence was verified through medical chart review 12 months following the baseline interview (T1).

Results

Demographics.

Patients in the study had an average age of 60 years, 54% of patients had less than a high school education, 57% of patients lived in household with annual income under \$10,000, and 90% were receiving public insurance (i.e., Medicaid or Medicare). Just over half (52%) of patients reported that they spoke only Spanish or spoke Spanish better than English, 19% indicated they spoke both languages equally well, and 30% spoke only English or English better than Spanish. Full demographics results are shown in Table 1.

Longitudinal change in subscale measures from baseline to T2 and T3.

Patients' baseline mean POC subscale measures were 4.34, 4.39, and 3.70 for subscales 1 (commitment to screening), 2 (information sharing and communication), and 3 (thinking beyond oneself), respectively. For 270 patients with T2 POC measures, MANOVA results indicated an overall time effect on POC subscale measures (Wilks' $\Lambda = 0.89$; $p < 0.0001$) and subscales 1 and 2 both showed significant decreases between T1 and T2; commitment to screening decreased 0.09 points ($p = 0.005$) and information sharing and communication decreased 0.14 points ($p < 0.0001$). Thinking beyond oneself did not decrease and the observed T2 average in our sample was actually higher than the baseline value, though not significantly (mean change of 0.07; $p = 0.093$). Overall POC scores declined significantly between T1 and T2 (mean change of 0.06; $p = 0.033$).

For the 266 patients with a T3 score, this decline in subscales 1 and 2 was sustained (though not exacerbated) at T3. MANOVA results again indicated an overall reduction (Wilks' $\Lambda = 0.87$; $p < 0.0001$). The mean decrease from T1 to T3 was 0.07 ($p = 0.017$) for subscale 1 and 0.09 ($p = 0.001$) for subscale 2. The non-significant increase observed in subscale 3 between baseline and T2 persisted to T3; the statistically significant mean increase from baseline to T3 was 0.16 ($p = 0.001$). Overall POC scores did not significantly change between T1 and T3. These changes are depicted in Table 2. Statistically significant, though moderate, correlations were found between each of the baseline subscales and corresponding values at longitudinal timepoints T2 and T3 (Pearson correlation values ranging from 0.38 to 0.53, all $p < 0.0001$), indicating that the baseline value is significantly associated with the T2 and T3 values, but that there are other sources of variability contributing to these longitudinal measures.

Associations with screening colonoscopy.

Findings from unadjusted and adjusted models were comparable, showing no significant difference in POC subscale values (T1, T2), or longitudinal change (from T1 to T2), based on final screening colonoscopy adherence status (all $p > 0.05$). The POC subscale values at T3 and the longitudinal change from T1 to T3 were not evaluated as predictors of screening colonoscopy as the T3 assessment took place 1 month following scheduled screening colonoscopy. Odds ratios for the T1 POC subscales ranged from 0.84 ($p = 0.61$) to 0.98 ($p = 0.89$); full results appear in Table 3.

Discussion

US Latinos participate in CRC screening at a lower rate than whites, and disease onset occurs at a later stage [2–4]. The TTM promotes health behavior change and proposes that individuals move through sequential stages of change toward the desired behavior, here CRC screening via colonoscopy, which are influenced by POC skills and strategies. To our knowledge, this is the first study to evaluate the use of POC in predicting screening colonoscopy adherence among Latinos. If POC skills and strategies are predictive of colonoscopy adherence among Latinos, then individuals with the lowest POC test scores can be made a priority for skill-boosting interventions tailored to address specific POC skill deficiencies.

The POC are skills and strategies that an individual employs to enact a positive health behavior [14]. According to the TTM, a successful intervention would increase an individual's POC, imbuing in them the skills to progress to the adoption of the desired behavior. Participants that completed the present study received patient navigation across all RCT arms, but varied in the addition of print materials. As there was no difference in screening colonoscopy adherence rates between the different arms, the data across all groups were combined in this study. Overall, 82% of the participants were adherent to screening colonoscopy. Due to the success of the patient navigation intervention and the mechanisms of change described in the TTM for cancer screening [14], total and subscale POC scores were expected to increase among participants that were adherent to screening colonoscopy. However, subscales 1 and 2 (commitment to screening and information sharing and communication) surprisingly decreased between T1 and T2. At T3, both subscales remained below the baseline assessment at T1. Subscale 3 alone (thinking beyond oneself) increased between T1 and T3. Overall, total POC scores decreased between T1 and T2 ($p = 0.03$), but due to a slight rebound were not significantly different between T1 and T3. The longitudinal trends do not support the first hypothesis that POC scores would be higher among those adherent to screening colonoscopy when patient navigation is applied. Study participants that were adherent to screening colonoscopy did not do so because POC skills and strategies were strengthened through the patient navigation intervention.

Timing of the assessment batteries may have influenced POC scores. There was moderate correlation between each participant's POC scores at T1, T2 and T3, implying a source of variability between scores. For most participants, assessment at T2 took place immediately following a detailed explanation of bowel preparation instructions. Patients may require more support to avoid becoming overwhelmed with information.

There is no support for the second hypothesis, as total and subscale POC scores at T1 or T2 were not found to be associated with screening colonoscopy adherence. This is in contrast to prior studies in non-navigated groups of patients that found POC scores predictive of progression through stages of change relating to cancer screening [12,14,15,41]. Additionally, changes in total and subscale POC scores were not found to be associated with screening colonoscopy adherence. The results of the present study do not support the development of interventions to increase POC scores among Latinos in order to improve

screening colonoscopy adherence when patient navigation services are being used, since POC scores were unassociated with screening colonoscopy adherence.

Participants in this study were screened for CRC at a significantly higher rate of 82% than Latinos in the US (49.9%) [2]. Patient navigation to facilitate CRC screening among medically underserved groups has been previously demonstrated to be effective in increasing screening completion rates [29,42–44]. Since all study participants received patient navigation, the high completion rate is unsurprising. Navigators assist patients in overcoming logistical barriers to receiving screening tests, answer process-related questions and provide emotional support [43,45]. It is possible that, for many non-adherent individuals, the POC are less crucial for screening adherence than the practical matters of negotiating a complicated health system's unfamiliar screening test.

Limitations.

Though the present study has many strengths, there are a number of limitations. The fourth POC factor identified in prior research [14,15]—avoids contact with health care—could not be studied because all participants were recruited from within the health care system at their primary care clinic office. Also, the present study narrowly focused on the POC from the TTM as it relates to screening colonoscopy among Latinos. This study does not attempt to address every possible explanation for health behavior relating to screening colonoscopy adherence, or to explain the POC test scores' lack of association with screening colonoscopy adherence.

The rate of attrition presents another limitation. Sixty-two (20.4%) of the 304 eligible, consented and randomized participants who received the patient navigation intervention did not have POC scores at all three timepoints. Thus, complete total and POC subscale scores for these 62 individuals could not be obtained. Also, attrition was unbalanced on gender, with females more likely to be reached at T2 (92% vs. 84% of males, $p = 0.05$). Adjusted models show that gender does not affect the association of the POC to screening colonoscopy adherence, and baseline POC scores did not differ between those who did and did not complete the study. However, it is still possible that an association would emerge had that data been available.

Despite a lack of increased adherence to screening among patients with higher POC scores in this study, POC may still be an important avenue for impacting screening adherence in non-navigated Latino populations. Due to low variation in screening outcomes for the participants that did not receive navigation services, neither the association between screening adherence and POC for non-navigated patients, nor the interaction of navigation and POC scores on adherence could be adequately assessed. Thus, whether navigation precludes the processes that translate POC into screening adherence, or whether the role of POC on screening adherence differs among our Latino population as compared to other groups, may only be speculated. Additionally, this study did not address adherence to other screening modalities, such as gFOBT/FIT. POC may be related to screening adherence for these less invasive tests which, to our knowledge, have not been examined in isolation for association with POC.

Finally, the present study was conducted in East Harlem, NY. Just 31% of study participants were US-born. The majority of foreign-born participants were born in Puerto Rico or the Dominican Republic and included those with health care access and health insurance. The results may not be generalizable to Latinos with differing backgrounds or to other health care delivery systems, as the Mount Sinai Health System has the resources to offer consistent physician referrals for screening colonoscopy. Most eligible patients in the US face greater barriers to screening and lower access to health care.

Implications and suggestions for future research.

This study replicates previous findings that patient navigation is highly effective in promoting screening colonoscopy [29,30]. Given that screening rates achieved by study participants far surpassed the national rate for Latinos, future research should examine how to best expand navigation resources to high-barrier communities. Innovation in approaches to patient navigation should also be examined, such that patient attrition is minimized.

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Table 1.**Demographic Characteristics and Association with Screening Colonoscopy Adherence**

Variable	Value	Adherent N = 248	Not Adherent N = 56	Total N = 304	Chi- square p-value
Age	Mean Age (Min, Max)	59.6 (50, 81)	61.3 (50, 83)	59.9 (50, 83)	0.1475
Gender	Male	92 (37%)	23 (41%)	115 (38%)	0.5796
	Female	156 (63%)	33 (59%)	189 (62%)	
Nativity	Born in United States	72 (29%)	21 (37%)	93 (31%)	0.0327
	Born in Puerto Rico	81 (33%)	24 (43%)	105 (35%)	
	Born outside US	94 (38%)	11 (20%)	105 (35%)	
	Missing	1 (<1%)	0	1 (<1%)	
Education	Less than 6 years	48 (19%)	7 (13%)	55 (18%)	0.5689
	6 – 12 years	88 (35%)	22 (39%)	110 (36%)	
	High School	64 (26%)	17 (30%)	81 (27%)	
	Some College or higher	48 (19%)	10 (18%)	58 (19%)	
Annual HH Income	Less than 10,000/year	149 (60%)	23 (41%)	172 (57%)	0.0146
	\$10,000/year or more	99 (40%)	33 (59%)	132 (43%)	
Language	Spanish more	129 (52%)	28 (50%)	157 (52%)	0.8507
	Both Equally	45 (18%)	12 (21%)	57 (19%)	
	English more	74 (30%)	16 (29%)	90 (30%)	
Insurance	Private	26 (10%)	5 (9%)	31 (10%)	0.7283
	Public	222 (90%)	51 (91%)	273 (90%)	

Note: P-value is for the Chi-square distribution of demographics groups to screening colonoscopy adherence, excluding any missing values, except in the case of age, where the p-value is for a t-test comparison of screening colonoscopy adherent to not adherent individuals.

Table 2.

POC Subscales and Total, by Study Timepoint

	T1 Mean (SD)	T2 Mean (SD)	T3 Mean (SD)	Paired Diff. (T2 – T1)		Paired Diff. (T3 – T1)	
				Mean (SD)	P-value	Mean (SD)	P-value
1 – Commitment to Screening	4.34 (0.47)	4.24 (0.53)	4.28 (0.45)	–0.094 (0.54)	0.005	–0.073 (0.50)	0.017
2 – Information Sharing and Communication	4.39 (0.44)	4.24 (0.46)	4.32 (0.39)	–0.141 (0.50)	<0.0001	–0.090 (0.46)	0.001
3 – Thinking Beyond Oneself	3.70 (0.81)	3.76 (0.66)	3.87 (0.67)	0.074 (0.73)	0.093	0.161 (0.76)	0.001
POC Total	4.16 (0.47)	4.09 (0.46)	4.17 (0.41)	–0.060 (0.46)	0.033	–0.007 (0.46)	0.805
N	304	270	266	270		266	

Table 3.

Odds ratios (*p* values) from logistic regression models assessing relationship of screening colonoscopy completion to POC subscales and total.

Study Timepoint	POC Subscale or Total	Unadjusted		Adjusted*	
		OR	P-value	OR	P-value
Baseline (T1) POC	1 – Commitment to Screening	0.966	0.912	1.249	0.504
	2 – Information Sharing and Communication	0.843	0.611	1.168	0.676
	3 – Thinking Beyond Oneself	0.976	0.893	0.997	0.987
	POC Total	0.912	0.768	1.119	0.737
T2 POC	1 – Commitment to Screening	1.013	0.968	1.014	0.968
	2 – Information Sharing and Communication	1.367	0.389	1.267	0.528
	3 – Thinking Beyond Oneself	1.482	0.111	1.398	0.191
	POC Total	1.473	0.284	1.402	0.380
POC Change (T2 – T1)	1 – Commitment to Screening	1.018	0.956	0.903	0.752
	2 – Information Sharing and Communication	1.487	0.224	1.166	0.655
	3 – Thinking Beyond Oneself	1.256	0.338	1.223	0.405
	POC Total	1.451	0.307	1.205	0.620

Note: Adjusted models included dichotomous adjustment for annual household income (above or below \$10,000), nativity classified into one of three birth location categories (US, Puerto Rico, or other), and baseline LOT-R score.