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Predicting Scheduling and Attending for an Oral Cancer Examination

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Abstract

Background—Oral and pharyngeal cancer is highly treatable if diagnosed early, yet late diagnosis is commonplace apparently because of delays in undergoing an oral cancer examination.

Purpose—We explored predictors of scheduling and attending an oral cancer examination among a sample of Black and White men who were at high risk for oral cancer because they smoked.

Methods—During an in-person interview, participants ($N = 315$) from rural Florida learned about oral and pharyngeal cancer, completed survey measures, and were offered a free examination in the next week. Later, participants received a follow-up phone call to explore why they did or did not attend their examination.

Results—Consistent with the notion that scheduling and attending an oral cancer exam represent distinct decisions, we found that the two outcomes had different predictors. Defensive avoidance and exam efficacy predicted scheduling an examination; exam efficacy and having coping resources, time, and transportation predicted attending the examination. Open-ended responses revealed that the dominant reasons participants offered for missing a scheduled examination was conflicting obligations, forgetting, and confusion or misunderstanding about the examination.

Conclusions—The results suggest interventions to increase scheduling and attending an oral cancer examination.

Keywords

Oral and Pharyngeal Cancer; Screening; Defensive Avoidance; Coping Resources; Barriers to Screening; Examination

Oral and pharyngeal cancer—cancer of the throat, larynx, nose, sinuses, and mouth—is among the most costly of all types of cancer because it is disabling, disfiguring, and

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Conflict of Interest Statement

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expensive to treat [1]. An estimated 281,000 people are living with oral and pharyngeal cancer (henceforth referred to as oral cancer) in the United States, 8,300 of whom will die from oral cancer each year [2], making it a national health problem. Importantly, the burden of oral cancer is dramatically diminished if the cancer is diagnosed early (in Stage 1 or 2) when it is easily treatable [3]. However, late stage diagnosis is commonplace [4] and likely occurs because of a failure to undergo an oral cancer examination [5]. Early examinations are more likely to result in early stage diagnosis [6], which in turn is linked to reduced mortality and favorable treatment outcomes [3]. The challenge facing health professionals is getting people, particularly people at high risk for oral cancer, to undergo an oral cancer examination. The present research examines factors associated with scheduling and follow-through to get an examination for oral cancer.

Determinants of Getting an Oral Cancer Examination

Researchers have identified three broad barriers to getting an oral cancer examination: 1) low knowledge/concern regarding oral cancer, 2) lack of material resources, and 3) defensive avoidance [7, 8]. Specifically, participants in one study reported never having heard of oral cancer and reported having a poor understanding of the causes and risk factors associated with oral cancer [9]. Participants in a second study showed similar findings and reported that a lack of material resources, such as time, money, insurance, and transportation, would keep them from getting examined for oral cancer [7]. Finally, many of the same participants reported that fears about being diagnosed with oral cancer would deter them from getting an examination if provided the opportunity [7, 8]. Importantly, these prior studies examined people's reports of the barriers that would deter them from getting an oral cancer if one were offered—a hypothetical scenario. However, these studies did not examine predictors of actually attending an oral cancer examination.

Beyond the three broad barriers just described, a variety of psychosocial factors likely influence the decision to undergo an oral cancer examination. Three factors central to several health behavior models (e.g., health belief model [10], the theory of planned behavior [11], and the extended parallel processing model [12]) are attitudes, perceived risk, and efficacy. That is, people are more likely to engage in health behaviors if they have a favorable attitude about the health behavior [11], perceive that they personally are at high risk for negative health outcomes relevant to the behavior [10], or believe their personal actions will be effective and likely to reduce their health risk [13].

A fourth psychosocial factor that is central to many health models is personal coping resources, including social support [14, 15]. Although researchers have long recognized the importance of such resources, recent studies find that having coping resources increases receptivity to potentially undesirable health information [16]. The consistent finding from research is that people are more likely to seek health-related information if they have adequate resources to cope should the news be unpleasant [17]. For example, one study found that women who reported more coping resources with bad news were more receptive to learning their lifetime breast cancer risk [18].

Schedule versus Attending an Oral Cancer Examination

The decision to undergo an oral cancer examination actually represents two distinct decision processes. The first is the decision to schedule an examination, and the second entails actually attending the scheduled examination. One goal of the present research was to explore the distinctness of these two decisions, examining whether they are determined by the same set of psychosocial predictors.

The decision to schedule an examination and the act of attending the scheduled examination may be unique in several important ways. For instance, the decision to schedule an examination entails minimal commitment, particularly when people face no consequences for failing to attend. Moreover, self-presentational concerns may prompt people to schedule an examination appointment to avoid appearing as though they do not care about their health [19]. Thus, we anticipated that many people would agree to schedule an appointment if given the opportunity. Consistently, 77% of participants in one study indicated that they agreed with the statement, "I want to get a mouth and throat cancer exam in the next 12 months" [8, 20].

Attending an appointment, by contrast, entails a greater obligation. It involves a time commitment, finding one's way to the examination location, and possibly learning unwelcomed news (e.g., that one has oral cancer). It also involves different considerations. For example, motivation plays a central role in intending to perform a behavior, whereas personal control and efficacy play a central role in the implementation of that behavior [21]. Consistently, research often finds a large gap between intentions and behavior. For example, a large-scale meta-analysis of meta-analyses on the topic revealed that intentions predicted only 28% of variance in behavior, on average [22]. Moreover, researchers have noted that intentions are typically poor predictors of behavior unless the intentions include a planning component that includes specific factors regarding how the behavior will be implemented [21, 23]. We thus expected that many people who scheduled an examination would fail to keep their appointment. Our chief interest, however, was in whether the same variables that predicted scheduling an examination also predicted attending the scheduled examination.

Overview

The present study examined the decision to schedule an oral cancer examination and the act of attending the scheduled examination. These data were part of a larger study examining two psychological interventions to increase getting an oral cancer examination. The manipulations of the interventions were unsuccessful and did not influence any of the variables reported here. However, we included numerous items in the study that allowed us to test other hypotheses.

The study occurred in three stages. The first stage was an in-person interview in which participants first learned about oral cancer by watching an informational video, thereby addressing the first barrier to getting an examination described earlier: lack of knowledge/concern. We then assessed six potential predictors of scheduling an oral cancer examination and attending an oral cancer examination appointment several days later. The first two predictors were the second and third barriers to getting an examination described earlier:

lack of material resources and defensive avoidance. The remaining four variables we assessed were the psychosocial variables that are common to many psychological models of health behavior or that have explained variance in health behavior in prior studies: attitudes, perceived risk, efficacy, and coping resources. During the in-person interview we offered participants an opportunity to schedule an oral cancer examination.

The second stage occurred 1–6 days later and involved an oral cancer examination for participants who opted to schedule one. The third stage was a brief phone interview that occurred two to four weeks after the in-person interview. During the phone interview participants responded to a subset of the same items asked during the in-person interview. We also included an open-ended item asking participants who failed to show for the oral cancer examination why they missed their appointment.

Our research addressed four questions. First, what predicts scheduling an oral cancer examination? In light of prior research, we hypothesized that low material resources and defensive avoidance would be the strongest predictors of scheduling an examination. However, we also explored the extent to which the psychosocial variables (attitudes, perceived risk, efficacy, and coping resources) that we assessed during the in-person interview also predicted scheduling an examination. Second, what variables assessed during the in-person interview predict attending the oral cancer examination? Again, we hypothesized that low material resources and defensive avoidance would be the strongest predictors of attending the examination. Moreover, given recent evidence linking coping resources to greater receptivity to health information [17], we predicted that greater coping resources would also predict attending the examination.

Third, what retrospective variables assessed during the follow-up phone interview predicted attending the examination? Although we expected that the variables that predicted prospectively would also predict retrospectively, we also believed that unexpected events (e.g., a family crisis, a car breakdown) might derail attending a scheduled examination. Thus, we tested the consistency of our predictors prospectively and retrospectively. Fourth, among the prospective and retrospective predictors, which explained unique variance in the decision to show for a scheduled oral cancer examination?

Method

Participants

Participants were Black and White men age 40 and older recruited from counties in North Central Florida (Alachua, Bradford, Colombia, Dixie, Gilchrist, Levy, and Putnam Counties) who had smoked at least 100 cigarettes in their lifetime, a standard established by the Centers for Disease Control to identify smokers [24, 25]. We targeted male smokers because they show greater rates of oral cancer than do women and non-smokers [2]. We focused on these six counties because they are predominantly poor and rural, and thus medically underserved [26]. We recruited participants by posting flyers in public places such as libraries, restaurants, and bars, by word-of-mouth, and by personally distributing flyers in hundreds of businesses in the targeted area. Of the 402 participants who consented, 36 served as pilot participants who helped us refine our methods and materials and train our

interviewers before the official start date of the study. Of the remaining 366 participants, we omitted data from 51 prior to data analysis: two who we discovered during the first interview did not meet the inclusion criteria and 49 whose responses clearly indicated that they did not understand the material or were disengaged from the study and not treating it seriously (e.g., they answered strongly agree to all items, irrespective of the content), leaving a final sample of 315 participants. All participants received \$40 for the initial session and an additional \$10 for completing the phone interview.

Measures

Unless otherwise indicated, we assessed responses to all items using a five-step scale anchored by 1 = *strongly disagree* and 5 = *strongly agree* with a midpoint of 3 = *neither agree nor disagree*.

Demographic information—Participants answered questions about their age, race (Black = 0; White = 1), education, and household income (see Table 1 for scale anchors and sample demographic information). Two additional items tapped financial security [9, 27, 28]. The first item asked participants, “Which of these statements best describes your present financial status?” 1 = *I really can’t make ends meet*, 2 = *I manage to get by*, 3 = *I have enough to manage plus some extra*, and 4 = *Money is not a problem; I can buy about whatever I want*. The second item asked, “If you were faced with an unexpected \$500 medical bill that was not covered by insurance, how would you best describe your situation?” 1 = *Not able to pay the bill*, 2 = *Able to pay, but with difficulty*, and 3 = *Able to pay comfortably*. We transformed the items using a weighted average so that they were on the same metric to form a single index of financial security (range = 0 to 2, with 2 indicating highest financial security).

Finally, we measured health literacy with three items used in previous research [29] and adapted from prior work [30]. The items were a) “How often do you have a problem understanding the written materials about your health?” b) “How often do you have a problem understanding what is told to you about your health?” c) “How often do you have a problem filling out medical forms by yourself?” Participants responded to these items with 1 = *rarely or none of the time*, 2 = *some or a little of the time*, 3 = *occasionally or a moderate amount of time*, and 4 = *all of the time*. We reverse-coded these items and then averaged responses to the three items to form a single index ($\alpha = .72$) where higher numbers reflect greater health literacy.

Material resources—We assessed material resources for getting an oral cancer examination with six items that emerged as important barriers in prior research [8]. These items were, a) *I have time to get an oral cancer examination*, b) *I can afford treatment for oral cancer*, c) *I have transportation to go and get an oral cancer examination*, d) *I know where to go to get an oral cancer examination*, e) *It is convenient for me to have an oral cancer examination*, and f) *I have health insurance that will pay for an oral cancer examination*. We averaged the items together to form a single index of material resources ($M = 3.83$, $SD = 0.71$, $\alpha = .60$).

Defensive avoidance—We assessed defensive avoidance using four items drawn from a larger scale that measures dispositional tendencies to avoid information [20]. The items were designed to be tailored to specific types of threatening information. As in previous research [8], we adapted the items to assess avoidance of learning whether one has oral cancer. The items were, a) *Even if it will upset me, I want to know if I have oral cancer*, b) *I want to know if I have oral cancer*, c) *It is important to know if I have oral cancer*, and d) *I would want to know immediately if I have oral cancer*. We coded the items so that higher numbers indicated greater avoidance and averaged them together to form a single index ($M = 1.13$, $SD = 0.42$, $\alpha = .80$).

Attitudes—We assessed attitudes toward getting an oral cancer examination with five bipolar sets of adjectives (not useful/useful, unhelpful/helpful, not important/important, *negative/positive*, *bad/good*) [31] presented on a five-step scale that we averaged together to form a single index ($M = 4.77$, $SD = 0.43$, $\alpha = .65$).

Perceived risk—We assessed perceived risk/susceptibility of having oral cancer using six items that we developed specifically for this study. The items were, a) *I am at high risk for oral cancer*, b) *There is a good chance I have oral cancer*, c) *I believe I have oral cancer*, d) *I feel that I am at risk for oral cancer*, e) *I have problems in my mouth and throat*, and f) *I have suspicious problems in my mouth that I think might be oral cancer*. We averaged the six items together to form a single index of risk perceptions ($M = 2.46$, $SD = 0.92$, $\alpha = .77$).

Exam efficacy—We assessed exam efficacy with one item (I believe that an exam will find oral cancer if I have it), with higher numbers indicating greater exam efficacy ($M = 4.33$, $SD = 1.21$).

Perceived Coping resources—We assessed perceived coping resources with four items drawn from past research [18] and administered to all participants that we averaged to form a single index ($M = 3.74$, $SD = 1.00$, $\alpha = .70$). These items were, a) I can handle the news if I learn I have oral cancer, b) I would cope poorly if I learned that I have oral cancer, c) I am confident that I can deal with the news should I learn that I have oral cancer, and d) It would be difficult for me to deal with the news should I learn that I have oral cancer. We reverse-coded the second and fourth items prior to averaging all items.

Scheduling and attending an oral cancer examination—We coded each participant's decision to schedule an oral cancer examination ($no = 0$; $yes = 1$) and, among participants who scheduled an examination, whether they attended their examination ($no = 0$; $yes = 1$).

Phone interview measures—During the phone interview we asked participants a subset of the items from the in-person interview. The phone interview items addressed material resources (five items), perceived risk (one item), and exam efficacy (one item). All items began with a stem (“On the day of my oral cancer exam....”) followed by the item worded in the past tense. We asked five of the original seven items to assess material resources (omitted convenience for time space reasons and insurance because the exam was free). Participants indicated the extent to which they agreed with the statements *On the day of my*

oral cancer exam...: a) *I had time to get an OC exam* ($M = 4.04$, $SD = 1.34$), b) *I could afford treatment for oral cancer* ($M = 3.18$, $SD = 1.58$), c) *I had transportation to go and get an oral cancer exam* ($M = 4.24$, $SD = 1.36$), d) *I knew where to go to get an oral cancer exam* ($M = 4.26$, $SD = 1.28$), and e) *I had other things in my life that are more important* ($M = 2.21$, $SD = 1.36$). Given that these five items addressed distinct material barriers participants might have experienced during a specific time interval, it is perhaps not surprising that these five material resource items displayed low intercorrelation (average $r = .13$) and did not load on a single factor. We thus analyzed them individually.

We asked one of the original risk/susceptibility items: *I felt I was at risk for oral cancer* ($M = 3.21$, $SD = 1.58$). Regarding exam efficacy, we again asked, *I believe an exam could find oral cancer* ($M = 3.90$, $SD = 1.33$). We did not repeat the items assessing defensive avoidance, attitudes, and coping resources because of time constraints on the phone interview and because we believed responses to these measures would change little between the in-person and phone interviews. Finally, we asked participants who scheduled yet did not attend the oral cancer examination why they did not attend. Participants' open-ended responses were transcribed and then coded by independent judges.

Procedure

In-person interview—The in-person interviews occurred in community spaces such as churches or community college classrooms. Trained interviewers greeted prospective participants and queried them to ensure they met the examination criteria (male, age 40 or older, and smoked at least 100 cigarettes in their lifetime), then obtained consent from eligible participants.

During the experiment, the interviewers read aloud all instructions and survey items and recorded participant responses on a tablet computer. We chose to have an interviewer read all instructions and items to participants because pilot testing and prior experience with a similar sample suggested that many people recruited from these communities have limited reading skills and limited experience with electronic survey devices [32].

The first set of items consisted of a variety of health questions that are not relevant to the present study and are not discussed further. However, a full set of stimuli and items are available from the authors upon request. Participants then watched a 5-minute informational video about oral cancer that we developed and pilot tested on participants from the target community. The video highlighted the risk factors for oral cancer (e.g., smoking, drinking, human papillomavirus), signs and symptoms of oral cancer (white or red patches on the inside of one's mouth, difficulty or pain when chewing or swallowing, etc.), rates of oral cancer and rates of death due to oral cancer, and information about what an oral cancer examination entails (a dentist swabbing one's tongue, examining the insides of one's mouth, and feeling the exterior throat region). These topics were included so that participants would have a basic understanding of oral cancer, the risk factors, and the examination. The video can be viewed at <https://youtu.be/k0oinNAocCc>.

After the video, the interviewer asked participants if they wished to schedule a free oral cancer examination with a dentist for the following week. Participants who agreed then

scheduled an appointment time and received an appointment card with the date, time, location of the appointment, and a phone number to call should they need to change their examination.

Next, participants responded to the items assessing material resources, defensive avoidance, risk perception, attitudes, exam efficacy, and coping resources. Pilot testing and prior research experience suggested that people from low-income, low-education community samples sometimes have difficulty responding to Likert scales [8]. We used two strategies to better facilitate understanding. First, the interviewer displayed to participants a visual aid that portrayed the scale that participants would use to respond to most items. The visual aid showed a five-step Likert scale (numbered 1–5) with labels below each number (1 = *strongly disagree*; 2 = *somewhat disagree*; 3 = *neither agree nor disagree*; 4 = *somewhat agree*; 5 = *strongly agree*). The interviewer guided the participant through the visual aid and made sure he understood how to use the response format. Second, consistent with prior research [8], after reading each item, the interviewer asked the participant if he agreed, disagreed, or neither agreed nor disagreed with the item. If the participant reported that he agreed, the interviewer asked if he strongly agreed or somewhat agreed. If the participant reported that he disagreed with the item, the interviewer asked if he strongly disagreed or somewhat disagreed. Finally, participants responded to the five bi-polar attitude items and responded to demographic items asking about race, age, income, and education.

Oral cancer examination— All oral cancer examinations occurred 3–21 days after the first interview. The longer intervals between the interview and examination date resulted because some participants rescheduled. Participants who scheduled and kept their appointment received a free oral cancer examination from a dentist trained in detecting oral cancer, which took approximately 15 minutes. During the examination, the dentist counseled participants about smoking cessation and, at the participants' request, provided resources to local agencies and groups that offered smoking cessation programs or oral care facilities. The dentist made referrals for 11 participants because they had oral health issues that needed greater attention.

Phone interview— Two to four weeks after the in-person interview (and always after the appointment date for participants who scheduled an examination), we called all participants to take part in a phone interview. We contracted a calling center to make the phone calls and conduct the phone interviews. The calling center dialed either the primary or secondary number provided by participants up to 10 times over a two-week period. We sent letters to participants who were unreachable by phone, asking them to call us. Of the 315 participants whose data we analyzed, 248 (78.7%) participated in the phone interview.

Data Analysis

Closed-Format Responses— We tested our hypotheses in three steps using Stata. First, we correlated our predictors with our two outcome measures (scheduling an oral cancer examination and attending the examination). Next, in instances where we had more than one statistically significant predictor of the outcome, we conducted a logistic regression using

backward elimination [33] to explore which of the predictors uniquely accounted for the outcomes.

Open-Ended Responses—Two judges sorted the open-ended responses into eight categories and we used kappa to evaluate the reliability of the sorting.

Results

Demographic Characteristics

Table 1 presents the demographic characteristics of the sample. The majority of our participants were Black. The majority of participants that supplied a response reported a high school education or less and under \$20,000 in annual household income. Responses to our measure of health literacy ($M = 3.5$, $SD = .74$) were skewed with 86% of participants averaging 3.0 or more on the 1-4 scale, suggesting that our participants were high in health literacy. It is noteworthy, however, that our experimenters reported that the general literacy skills of our participants were low, which was consistent with what we observed during the piloting stage of this project (hence the need to read all items to participants). Viewing this finding along with the finding that participants reported low levels of educational attainment suggests that our finding of high health literacy may reflect an acquiescence bias. That is, participants may have claimed greater health literacy than they possessed to produce a positive impression. Preliminary analyses revealed no main effects or interactions involving race on whether participants scheduled or showed for an oral cancer examination appointment. In addition, education, health literacy, household income and financial status were all uncorrelated with scheduling or attending an oral cancer examination. Thus we do not discuss race, income, or financial status further.

Preliminary Analyses

We repeated in the phone interview variations of some of the items asked during the in-person interview. The correlations between the items asked at the two time points were generally low. For instance, the five items asking about material resources during the phone interview were at best weakly correlated with the corresponding items asked during the in-person interview (r s ranged from $-.16$ to $.23$; all p s $< .05$), suggesting fluctuations in available resources in our sample. Although the wording of the material resource items had to change, the change was minor (e.g., (In-person Interview – *I have time to get an oral cancer examination*; Phone Interview – *On the day of my oral cancer exam I had time to get an OC exam*), which makes us believe that it is not a change in the meaning of the item that contributed to the low test-retest correlations. The correlation for the risk/susceptibility item was moderate ($r = .29$, $p < .01$). However, the correlation for the exam efficacy item was near zero ($r = -.01$), a point we return to in the discussion.

Predicting Scheduling an Oral Cancer Examination

Table 2 presents the zero-order correlations between our predictors and outcomes. Most of our participants ($n = 277$; 87.9%) scheduled an oral cancer examination. As is evident by the correlations in Table 2, participants were less likely to schedule an examination if they reported higher oral cancer defensive avoidance tendencies, $r = -.17$, $p < .01$, and were

more likely to schedule an examination the more they believed the examination would be effective in detecting oral cancer, $r = .14$, $p = .01$. When both predictors were entered into a logistic regression model, both uniquely predicted scheduling an examination: defensive avoidance $OR = .50$, $SE = .16$, $CI_{95\%} = .26 - .93$, $z = -2.18$, $p = .03$; exam efficacy $OR = 1.28$, $SE = .15$, $CI_{95\%} = 1.00 - 1.63$, $z = 2.01$, $p = .05$.

Predicting Attending the Oral Cancer Examination

Our second question was, what prospective variables predicted who did versus did not attend their scheduled examination? Of the 277 participants who scheduled an examination, 111 (40.1%) attended. As evident in Table 2, three of our predictors were associated with attending examination. Participants who scheduled an examination were more likely to show if they reported greater coping resources, $r = .15$, $p < .05$, greater material resources, $r = .13$, $p < .05$, and more favorable attitudes toward getting an examination, $r = .12$, $p < .05$. As evident in the top section of Table 3, backward-elimination logistic regression revealed that both coping resources and material resources significantly predicted attending the examination. Importantly, when we examined the six prospective material resource items separately, none correlated significantly with attending the examination (all $rs < .12$), suggesting that it is a general lack of resources, rather than any one specific resource, that predicts failing to attend an examination appointment.

Our third question was, what retrospective variables predicted attending the examination? We were able to reach for phone interviews 90.1% (100 of 111) of the participants who attended their examination and 69.9% (116 of 166) of the participants who did not. For the items assessed during the phone interview, three of the five material resource items correlated significantly with attending an examination (Table 4). Specifically, participants were less likely to show for the examination if they reported having other things more important in their life, $r = -.22$, $p < .01$, and were more likely to show for their examination if they reported having time for the examination, $r = .39$, $p < .01$, and transportation to the examination site, $r = .22$, $p < .01$. In addition, participants were more likely to show for their examination if they believed it would effectively detect cancer, $r = .18$, $p < .01$, and if they saw themselves as being at high risk for oral cancer, $r = .19$, $p < .01$.

As the middle section of Table 3 shows, regression analyses revealed that three of the five variables remained significant predictors of attending the examination: having time, exam efficacy, and having transportation.

Our fourth question was, among the prospective and retrospective predictors, which explain unique variance in attending the examination? To answer this question we included in our regression analysis the two prospective predictors (coping resources and material resources) and the three retrospective predictors (exam efficacy, having time, and having transportation) that were significant predictors in our prior regression analyses. As the bottom section of Table 3 shows, four of our variables predicted statistically significant variance in attending the examination: coping resources, exam efficacy, having time for an exam, and having transportation (rs ranged from .15 to .39, $ps < .01$). Only the prospective measure of material resources no longer significantly predicted attending the examination, likely because of high multicollinearity.

Opened-Ended Explanations for Missing the Examination Appointment

An initial evaluator (A.E.) read thorough all the open-ended reasons that participants offered for missing their examination appointment and created eight general categories of reasons: 1) lack of transportation, 2) illness or conflicting medical appointment, 3) work conflict, 4) forgot the appointment, 5) family/life obligations, 6) psychological reasons, 7) confusion about the process (e.g., unsure about the location, date, or time of the appointment, expecting a reminder call), and 8) out of town. Table 5 provides example responses for each category. Next, two independent judges sorted participants' open-ended responses into the eight categories (inter-rater reliability $\kappa = .90$).

Table 5 displays the frequency with which each reason was listed in the open-ended responses. The most commonly listed reasons were work conflict, forgetting the appointment, confusion about the process, lack of transportation, and illness, or a conflicting medical appointment. Three of the specific categories of reasons for not attending the appointment—work conflict, illness or conflicting medical appointment, and family/life obligation—tapped a common theme (i.e., personal conflict) and accounted for 49.2% of responses. All three suggest that participants encountered a more important event or obligation that kept them from attending the appointment. Two other categories—forgetting and confusion/misunderstanding—accounted for an additional 35.3% of responses.

Discussion

We examined the decisions to schedule an oral cancer examination and to attend the examination appointment. Regarding scheduling, lower defensive avoidance tendencies and greater exam efficacy independently predicted the decision to schedule an examination. Surprisingly, material resources did not. Regarding attending the examination, when prospective and retrospective predictors were included together in our prediction model, coping resources (believing that one could cope with learning that one had oral cancer), exam efficacy, and the material resources of time and transportation predicted getting an examination. The findings for coping resources and exam efficacy are consistent with research on other types of cancer examinations (e.g. breast cancer; [34, 35]), which suggests that the perception that one has personal or interpersonal resources may influence the decision to undergo a cancer examination more generally. It is noteworthy, however, the vulnerability predicted getting an examination (for breast cancer; [36]) in other research but not in our study. Although coping resources were only measured prospectively, the remaining three predictors were measured prospectively and retrospectively, yet were significant predictors only when measured retrospectively. The fact that exam efficacy predicted retrospectively but not prospectively suggests two possibilities: either participants who showed for the examination came to view the examination as more efficacious in finding oral cancer or, conversely, participants who did not show for the examination came to view the examination as less efficacious. The fact that individual material resources predicted retrospectively and not prospectively suggests that unexpected events (e.g., a family crisis, a car breakdown) that happened in the interval between scheduling and attending an examination can influence whether resources affect attending. Indeed, we found

that our prospective and retrospective measures of exam efficacy were uncorrelated, which supports our argument that exam efficacy beliefs changed across time.

Limitations and Future Directions

The limitations of the present study suggest important questions for future research. First, we purposely targeted low-income male smokers, particularly Black individuals, because they are the most likely to die from oral cancer [3, 4] and thus could benefit most from interventions designed to increase examination rates. Our sample was also highly skewed on income, educational attainment and health literacy (although health literacy response also likely reflected an acquiescence bias), which may explain why these variables did not predict scheduling or attending and oral cancer examination. However, it remains unknown how well our findings extend to other groups (e.g., women, people who drink but do not smoke). Second, we were able to contact for phone interviews only 69.9% of participants who failed to show for their examination appointment. The missing participants may have influenced the retrospective variables that emerged as significant predictors in our analyses. Indeed, the same factors that made these missing participants unavailable for the examination may also have made them unavailable for the phone interview.

Third, we were aware from prior research [8, 32] that our target population had low general literacy skills and thus would struggle in responding to the items asked in our interviews. In recognition of our sample's low literacy we found it necessary to reject some commonly used measures of the constructs we assessed in favor of ad hoc measures that we hoped would be more interpretable by our sample. Despite our efforts to tailor our interviews to a low literacy sample, we were forced to omit data from many participants prior to analysis. Moreover, the reliability of some of our measures was lower than desired, which likely diminished our ability to find effects. We suspect that the problems we encountered are common to researchers examining poor, low literacy samples and illustrate the need to develop new methods to assess predictors of health outcomes in this group. Fourth, several of our measures demonstrated low reliability, perhaps owing to the low literacy of our sample. Unreliable measures can undermine the ability to find effects. It is noteworthy; however, that we found several predicted effects despite having measures with low reliability, suggest that our effects may be particularly robust.

Fifth, we examined predictors based on prior research exploring barriers to oral cancer examinations and based on various health behavior models. Undoubtedly, there are predictors that we did not examine that might help account for variance in examination behavior. Indeed, the responses to the open-ended item during the phone interview hint at what some of these other variables might be (e.g., conflicting commitments or obligations), but future research is necessary to fully investigate alternative possibilities.

Finally, all of our predictors were self-reported. It is unknown the extent to which these self-reports accurately portray the true source of participants' behavior. Indeed, people often are unaware of or unable to articulate the causes of the behavior [37], and may respond in specific ways to achieve a desired impression [19]. These concerns are perhaps greatest for the open-ended item that asked participants who missed their examination to explain why

they did not attend. Future studies may benefit from using either indirect measures [38] or methods that can circumvent self-presentation concerns [39, 40].

Implications

Other research finds that defensive avoidance is a primary reason participants offer for why they would not undergo an oral cancer examination were one offered [7, 8]. Our study examined whether participants actually scheduled an oral cancer examination and replicated the finding. We suspect, however, that the effect we observed here underestimates the true size of the effect in the population. Our participants knew in advance from the flyers we distributed that the study examined thoughts about oral cancer and that they would be offered an opportunity for a free oral cancer examination as part of the study. It is likely that people who were high in defensive avoidance opted not to participate in our study. If health professionals want to increase examinations for oral cancer among high-risk groups, they need to adopt interventions that have successfully increased receptivity to other types of health examinations.

Scheduling an examination can be thought of as an *intention* to get screened for oral cancer. Researchers have often noted that intentions sometimes correspond poorly with behavior and have speculated about what accounts for the gap between intentions and behavior [22]. Our findings suggest that unanticipated events sometimes undermine intended health behaviors. Responses to the open-ended question during the phone interview revealed that other events or obligations accounted for about half of the reasons participants offered for missing their examination. Interventionists may be able to address this problem by allowing people to get an examination immediately rather than having to schedule the examination for some later date. Alternatively, they could find ways to elevate the importance of the appointment in the eyes of participants so that appointment is less likely to be sacrificed when participants face a conflict. For example, in line with consistency theories, interventionists could emphasize in messages delivered during scheduling, or in follow-up phone calls, letters or texts/emails, the importance of behaving consistent with self-expressed values by attending the scheduled examinations [41].

Finally, a third of our participants reported confusion about the process or forgetting their appointment. Although these two reasons for missing the examination differ, they suggest a common solution. Health providers can decrease the proportion of people who miss a scheduled examination by instituting a follow-up letter, phone call, or text/email that reminds people of their appointment [42-44] and that addresses any confusion or questions people might have regarding their appointment. Or they can routinely ask people to offer a suggestion for the best way to remind them of the upcoming appointment.

Conclusions

The variables that predict scheduling an oral cancer examination differ somewhat from the variables that predict attending an oral cancer examination. For instance, whereas defensive avoidance predicted scheduling but not attending examination, greater coping resources predicted attending but not scheduling an examination. We also found that variables that predicted prospectively versus retrospectively can differ. Most notably, two of the material

resources (having time and having transportation) predicted retrospectively but not prospectively. Collectively, our findings suggest that researchers must be mindful of what outcomes they assess (scheduling versus attending an appointment) and when they assess them (prospectively versus retrospectively).

Our findings also have implications for interventions. Notably, getting an oral cancer examination represents both the decision to schedule an examination and keeping the appointment. As such, researchers may need to take a multifaceted intervention approach. For example, interventions that reduce defensive avoidance—such as increasing perceptions of control [18], affirming the person's overall integrity [20], and contemplating reasons [45] may increase scheduling an examination. Conversely, interventions that increase coping resources and exam efficacy concerns and that address time and transportation problems may increase actual examination attendance. Finally, our findings suggest that interventionists should find ways to address the issue of other obligations that can interfere with attending an examination, and that follow-up contacts that address forgetfulness and confusion about the examination appointment may increase attending an examination.

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Table 1

Demographic Information

	N	%
Education		
Less than 9 th grade	14	4.46%
9–11 years of school (no degree)	65	20.70%
12 years or completed high school	125	39.81%
Post high school training other than college	10	3.18%
Some college	55	17.52%
Associates degree	17	5.41%
College graduate	20	6.37%
Postgraduate	7	2.23%
Chose Not to Answer	1	.32%
Race/Ethnicity		
White	198	62.86%
Black	117	37.14%
Household Income		
\$0–\$9,999	123	39.17%
\$10,000–\$19,999	82	26.11%
\$20,000–\$34,999	31	9.87%
\$35,000–\$49,999	14	4.46%
\$50,000–\$74,999	10	3.18%
\$75,000 or above	4	1.27%
Chose Not to Answer	50	15.92%

Table 2

Correlations Among Prospective Predictors and Outcomes

	Material Resources	Defensive Avoidance	Attitudes	Perceived Coping Resources	Risk	Exam Efficacy	Scheduling Appoint.
Material Resources	—						
Defensive Avoidance	-.22**	—					
Attitudes	.19**	-.35**	—				
Perceived Coping Resources	.16**	-.06	.23**	—			
Risk	-.08	-.07	-.08	-.13*	—		
Exam Efficacy	.10	-.18**	.10	.06	.08	—	
Scheduling Appointment	.05	-.17**	-.001	-.04	.09	.14*	—
Attending Appointment	.13*	-.06	.12*	.15*	.05	.11	.05

Note.

* $p < .05$

** $p < .01$

Table 3

Logistic Regressions Predicting Attending the Oral Cancer Examination

Prospective Predictors	OR	SE	z	CI_{95%}
Perceived Coping Resources	1.33	.18	2.12 [*]	1.02 – 1.72
Material Resources	1.60	.33	2.27 [*]	1.07 – 2.40
Retrospective Predictors	OR	SE	z	CI_{95%}
Exam Efficacy	1.31	.16	2.20 [*]	1.03 – 1.67
Had Time for Exam	1.99	.29	4.46 [*]	1.49 – 2.67
Had Transportation	1.35	.17	2.43 [*]	1.06 – 1.73
Including All Predictors	OR	SE	z	CI_{95%}
Coping Resources	1.52	.26	2.45 [*]	1.08 – 2.13
Exam Efficacy	1.29	.16	2.10 [*]	1.02 – 1.66
Had Time for Exam	2.05	.31	4.79 [*]	1.52 – 2.75
Had Transportation	1.30	.17	2.04 [*]	1.01 – 1.67

Note.

*
 $p < .05$ **
 $p < .01$

Table 4

Correlation Among Retrospective Predictors and Attending the Examination

	Other Things More Important	Had Time	Can Afford	Had Transportation	Knew Where to Go	High Risk	Exam Efficacy
Other Things More Important	—						
Had Time	-.46 *	—					
Can Afford	.05	.12	—				
Had Transportation	-.04	.21	.02	—			
Knew Where to Go	.06	-.05	-.07	.18 *	—		
High Risk	.06	.14 *	.21 *	.14 *	.07	—	
Exam Efficacy	-.06	.13	.12	.01	.03	.21 *	—
Attending Examination	-.22 *	.39 *	.01	.22 *	.10	.19 *	.18 *

Note.

*
 $p < .05$ **
 $p < .01$

Table 5

Frequency of Reasons Given By Participants for Failing to Show for Examination

Category	Example Response	N	%
Work Conflict	<i>Because I am a barber and I didn't have coverage.</i>	21	18.1
Forgot the Appointment	<i>It slipped my mind.</i>	21	18.1
Confusion / Misunderstanding	<i>I didn't get nothing saying that I had to get an appointment.</i>	20	17.2
Lack of Transportation	<i>I didn't have transportation that day.</i>	19	16.4
Illness or Conflicting Medical Appointment	<i>I had a doctor's appointment.</i>	17	14.7
Family/Life Obligations	<i>On the day before there was a family emergency.</i>	12	10.3
Psychological Reasons	<i>I probably freaked, to be honest with you.</i>	3	2.6
Out of Town	<i>I was out of town.</i>	3	2.6
TOTAL		116	100.0