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OVARIAN CANCER SCREENING AS A TEACHABLE MOMENT FOR HEALTH BEHAVIOR CHANGE: DETERMINING THE ROLE OF POSITIVE AFFECT AND SELF-EFFICACY

Rachel F. Steffens
University of Kentucky, Rachel.Steffens@uky.edu

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Rachel F. Steffens, Student

Dr. Michael A. Andrykowski, Major Professor

Dr. David Berry, Director of Graduate Studies

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DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Arts and Sciences
at the University of Kentucky

By
Rachel F. Steffens

Lexington, Kentucky

Director: Dr. Michael A. Andrykowski, Professor of Medical Behavioral Science

Lexington, Kentucky

2013

ABSTRACT OF DISSERTATION

OVARIAN CANCER SCREENING AS A TEACHABLE MOMENT
FOR HEALTH BEHAVIOR CHANGE: DETERMINING THE ROLE OF POSITIVE
AFFECT AND SELF-EFFICACY

In medical settings, a teachable moment (TM) has been described as an event which may lead to psychological changes prompting individuals to engage in health promoting behaviors. A cancer screening (CS) has been suggested as a potential TM because several types of positive health behavior change (HBC), ranging from dietary changes to smoking cessation, have been linked to CS. However, most research has examined the

TM in CS settings using cross-sectional and prospective methodologies and has lacked a theory-driven model. Moreover, few intervention studies have attempted to capitalize on the potential TM in CS settings. In light of this, the primary purpose of this study was to examine the potential for routine ovarian CS to serve as a TM to enhance the potential for HBC using a theory-driven conceptual model of a TM. A prospective, longitudinal design was used to track changes in positive affect, self-efficacy (SE), HBC intentions and HBC following participation in routine ovarian CS. The impact of a brief, written intervention intended to enhance SE to engage in HBC was also examined. There were three total study assessments: the baseline (T1), 24-hour follow-up (T2), and one month follow-up (T3) assessment. Results indicated positive affect and positive consequences of screening increased over time (p's$<.01$) and increases in positive affect were positively associated with greater healthy diet HBC. Additionally, greater positive consequences of screening at T2 predicted greater exercise HBC. No significant changes were observed in exercise or healthy diet intentions over time; there were no differential effects based upon the intervention for positive affect, SE, HBC, or HBC intentions (p's$>.05$). Healthy diet SE and exercise SE remained stable ($p>.05$) but were found to be a robust predictor for both exercise and healthy diet HBC intentions. While several of our hypotheses were supported, the brief health information intervention did not appear to impact SE, HBC intentions, or actual HBC. To better equip health providers in CS settings, studies should continue examining both the potential for CS settings to serve as a TM to enhance HBC and how receipt of a normal test result impacts this potential.

KEYWORDS: Cancer Screening, Teachable Moment, Health Behavior Change, Self-Efficacy, Positive Affect

Rachel F. Steffens
Student Signature

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Date

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By

Rachel F. Steffens

Michael A. Andrykowski, Ph.D.
Director of Dissertation

David T.R. Berry, Ph.D.
Director of Graduate Studies

10-21-2013

DEDICATION

This is dedicated to the women in my life including my Grandma Marie, my mama, my sisters (chosen and familial), and my baby nieces. You have provided inspiration and motivation to be an advocate for women and to continually pursue further examination and understanding of women's health and safety issues.

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To my family, I am truly blessed to have you. You have been steady and supportive throughout these challenging last six years. Alisa, you have, as long as I can recall, modeled intelligence, kindness, integrity, and strength; Elsbet, you are amazing for many reasons and have consistently welcomed my concerns and been quick to provide reassurance and love. Mom, you are one of the most competent, conscientious, compassionate, and bright women I have ever known. You taught me important lessons about honesty, ethics, and how to treat others. From these lessons, I gleaned wisdom and skills that have served me well. Dad, you are the silent but supportive rock to whom I can always turn.

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Chapter 1: Introduction

In medical settings, a teachable moment (TM) has been broadly described as a health or medical event which prompts individuals to engage in health promoting behavior change. Based on the literature, medical events, or medical "triggers," could be direct or indirect (e.g., a family member's medical event), the behavior change could be spontaneous or directed (e.g., intervention), and health behavior change (HBC) could encompass uptake of a healthy behavior such as weight loss, healthier dietary intake, and exercise (Gorin, Phelan, Hill, & Wing, 2004) or a reduction in risk behavior such as smoking cessation (Shi & Warner, 2010).

The current body of research on potential TMs suggests that TMs can occur across a wide range of medical events (Lawson & Flocke, 2009). It has been suggested a TM can occur in settings such as emergency rooms for reduction in alcohol abuse (Maio, et al., 2005), primary care settings to initiate discussions about HPV and cervical cancer screening (Sussman, et al., 2007), major surgery and hypertension diagnosis to increase smoking cessation (Shahab, Mindell, Poulter, & West, 2010; Shi & Warner, 2010), and pregnancy to promote healthy weight management (Phelan, 2010). In addition to cancer diagnosis (Hawkins, et al., 2010), cancer screening (Carlos, Fendrick, Patterson, & Bernstein, 2005) has also been identified as a potential TM for promoting positive HBC.

TMs in Cancer Settings

Cancer Diagnosis. Cancer diagnosis may serve as a TM and several studies have documented that interest in and actual HBC following cancer diagnosis is very common (Alfano, et al, 2009; Blanchard, et al., 2003; Blanchard, Courneya, Stein, 2008; Demark-Wahnefried, Peterson, McBride, Lipkus, & Clipp, 2000; Humpel, Magee, & Jones,

2007). According to the American Cancer Society, cancer diagnosis has been linked to the spontaneous increase of healthy behaviors such as physical activity and consumption of fruits and vegetables (Hawkins, et al., Stein, 2010). Furthermore, the potential for a cancer diagnosis to serve as a TM may not be limited to the patient's HBC but extend to family as well (Lemon, Zapka, & Clemow, 2004; Schnoll, et al., 2013). For example, intentions to quit smoking were greater in smokers who had recently learned of a family member having been diagnosed with cancer compared to those who had no recent familial cancer diagnosis (Patterson, Wileyto, Segal, Kurz, Glanz, & Hanlon, 2010). This relationship suggests the vicarious experience of a cancer diagnosis might also serve as a TM.

Cancer Screening. Another medical setting in which TMs have been proposed to occur are cancer screening settings (McBride, Emmons, & Lipkus, 2003; Taylor, et al., 2007; van der Aalst, de Koning, van den Bergh, Willemsen, & van Klaveren, 2012). Cancer screening settings have been examined for their potential to serve as a TM to promote smoking cessation (McBride, et al., 2003) as well as increase multiple-cancer screening uptake. For example, epidemiological data has revealed concurrent uptake of mammography and cervical cancer screening has been associated with better adherence to CRC screening. This correlational relationship has been broadly conceptualized as a potential TM (Carlos, et al, 2005). Also, a cross-sectional study of individuals enrolled in lung cancer screening trials indicated the potential for a TM. Results of this study showed motivation and readiness to quit smoking may have increased after participation in lung cancer screening suggesting of a TM (Taylor, et al., 2007). Finally, greater than average quit rates have been documented across several studies examining lung cancer screening

and its association with smoking cessation. These findings suggest the potential for cancer screening to serve as a TM to actually impact HBC (Clark, Cox, Jett, Patten, Schroeder, Nirelli, ... & Swensen, 2004; McBride, et al., 1999; Poghosyan, Sheldon, & Cooley, 2012).

Currently, many studies examining the cancer screening setting as a potential TM fail to examine how receipt of a normal versus an abnormal or even unknown result may differentially impact the potential for a TM. Among the studies that do, most focus on lung cancer screening with smoking cessation as the targeted HBC outcome. The existing literature examining how a cancer screening test result may influence the potential for a TM appears to be mixed. Qualitative data from a study of colorectal cancer screening suggested receipt of a normal (i.e., no malignancy) result might discourage interest in HBC by implying lack of need for healthier lifestyle choices. On the other hand, other data suggested a normal screening test prompted relief and this relief, in conjunction with an intervention, could promote motivation for HBC (Stead, Caswell, Craigie, Eadie, & Anderson, 2012). Prospective data from the ovarian cancer screening (OCS) setting has suggested that following receipt of a normal test result, a TM may occur during which OCS patients may be more interested in health information (Floyd, Steffens, Pavlik, & Andrykowski, 2011). Data from a cross-sectional study of individuals enrolled in lung cancer screening trials illustrated that for younger smokers, an abnormal result may be associated with greater readiness to quit (Taylor, et al., 2007). Other research from the lung cancer screening setting found receipt of abnormal (i.e., uncertain screening tests results), as compared to receipt of normal screening test results, predicted more quit attempts and greater abstinence from smoking (Styn, Land, Perkins, Wilson, Romkes, &

Weissfeld, 2009; Townsend, Clark, Jett, Patten, Schroeder, Nirelli…& Hurt, 2005). Finally, in a cervical cancer screening setting, smoking cessation rates did not differ by receipt of a normal or abnormal result (McBride, et al., 1999).

While few studies have examined how cancer screening test results impact the potential for a TM, an even smaller body of research has examined the impact of interventions intended to enhance the HBC potential embodied in the cancer screening setting. Although cancer screenings have been described as opportunities to capitalize on a potential TM (Anderson, Mackison, Boath, & Steele, 2013), the majority of studies examining the cancer screening setting as a TM have looked at "spontaneous" HBC. In other words, HBC was noted to occur without any specific prompting or intervention. Among the intervention studies that do exist, most have focused on smoking cessation as the HBC outcome. One such study included a sample of male smokers undergoing lung cancer screening who were assigned to either a computer-tailored information group or general self-help brochure group for smoking cessation. Information group was not a significant predictor of smoking cessation; rather, education and intentions to quit were positive predictors of smoking cessation (van der Aalst, de Koning, van den Bergh, Willemsen, & van Klaveren, 2012). In a study of women who were undergoing screening for cervical cancer, two groups of women were assessed on smoking cessation following either usual care or a brief intervention consisting of informational support and telephone counseling. The two groups did not differ on rates of smoking cessation or rates of serious quit attempts; receipt of a normal versus abnormal screening test result did not moderate these results. (McBride, et al., 1999).

Clinical relevance of the TM.

Research suggests many individuals may experience a TM following a medical event. Since a TM is thought to be a time when individuals may be more receptive to HBC, it would be ideal for health care providers to know how and when a TM might occur. Thus, health care providers could ideally capitalize on the behavior change potential represented by the TM and accordingly, more effectively and consistently deliver interventions to enhance the TM. In particular, there is a strong rationale for utilizing the cancer screening setting to disseminate general health interventions that focus on diet and physical activity because large numbers of individuals could be exposed to these HBC interventions, thus representing a time efficient intervention strategy. However, until factors which create, increase, and decrease the potential of an event to serve as a TM are discerned, clinical utility of these events as TMs will be limited.

Conceptual models for understanding the TM

McBride's Model. McBride's current model of a TM is heuristic-based and emphasizes subjective interpretation of medical or health-related events ('cues') as leading to certain affective and cognitive changes, such as increases in risk perception or worry, which could create heightened potential for HBC (McBride, et al., 2008). A TM is viewed as a unique, personal response to an otherwise objective medical event. In McBride's model, A TM is linked to actual behavior by positing that it can act as an antecedent to motivate HBC by increasing perceptions of efficacy for behavior change. This model of a TM has specifically posited a set of cognitive, affective, and psychosocial factors which might directly and indirectly promote HBC (McBride, et al., 2008).

From her review of the literature on TMs, McBride has suggested that a TM is characterized by meaningful changes in: a) perceptions about threat or outcomes; b) positive or negative affect; c) self-concept or social role (McBride, et al., 2003). Meaningful changes in perceptions about threat or outcomes could include increases (e.g., heightened risk perception or worry) or decreases (e.g., relief or confidence in one's health). Meaningful changes in affect could be negative (e.g., feeling afraid or distressed about a medical event) or positive (e.g., enhanced sense of well-being resulting from a medical event), and change in self-concept or social role could include feeling a need to preserve self-esteem, align with social norms, or modify behaviors to receive peer approval. From McBride's perspective, all of these factors are considered important components of a TM potentially resulting in the adoption of positive HBC. McBride also introduces self-efficacy and motivational factors as being important factors to consider. She suggests they may be prompted after the initial TM but prior to the initiation of HBC (McBride, et al., 2003).

Typically, a TM has been viewed as an event that may "frighten" or "scare" an individual into making positive HBCs. This is a limited view which suggests worry, fear, or other negative emotional reactions are core factors involved in the TM (McBride, et al., 2008). For example, McBride has drawn heavily from health behavior models emphasizing the role of vulnerability to explain the role of changes in perceptions about threat in a TM. Vulnerability is thought to prompt change as a consequence of enhancing threat appraisal and there is a body of literature to support this premise. In a study of smokers, intentions to quit smoking were greater in smokers who had recently learned of a family member having been diagnosed with cancer. This effect of a recent familial

cancer diagnosis on intentions to quit smoking was even more pronounced for those who reported heightened risk perception (Patterson, Wileyto, Segal, Kurz, Glanz, & Hndlon, 2010). Surgery is another medical setting generally associated with greater perceived and objective risk. Surgery has also been suggested as a time when individuals are more likely to quit smoking. One study compared out-patient (i.e., less invasive and associated with fewer potential complications) and major surgical in-patient (e.g., cancer, cardiovascular, or joint-related) procedures on smoking cessation. Smoking cessation rates of patients undergoing in-patient procedures were nearly double of those who were undergoing out-patient procedures (Shi & Warner, 2010). These results were interpreted to suggest heightened perception of risk and vulnerability in patient settings may prompt positive HBC.

Positive affective and cognitive changes leading to a reduction in perceptions of vulnerability and threat may also impact the potential for a TM and consequently, HBC. Hence, when patients experience a normal cancer screening test result, they may also experience reduction in risk perception which increases positive emotional experience. This combination of increased positive affect and decreased threat appraisal might enhance the likelihood of a TM and ultimately, the potential for HBC. It is important to note McBride has suggested positive emotional experiences, such as increased positive affect, should be examined for their role in the TM. She has even suggested it might also play an important role in the TM (McBride, et al., 2008; McBride, Emmons, & Lipkus, 2003). However, to date, she has not explicitly included it in her empirical model when conducting research on the TM in cancer screening settings.

Fredrickson's Broaden and Build Theory. Fredrickson's Broaden and Build Theory conceptualizes positive emotional experience, which includes positive affect, as a potential motivator of HBC (Fredrickson & Branigan, 2005; Brnstrm, Penilla, Prez-Stable, & Muoz, 2010). Positive emotions help people generate "thought-action repertoires" such that individuals are more likely to momentarily think more broadly and behave in ways that increase available resources and ultimately promote survival. Positive emotions nurture psychological resilience and physical well-being and are associated with better perceived physical and mental health (Ashby, Isen, & Turken, 1999; Fredrickson, 2004; Lyubomirsky, King, and Diener, 2005). Currently, positive emotion has been demonstrated to play an important role in problem solving (Ashby, Isen, & Turken, 1999; DeSteno, Gross, & Kubzansky, 2013; Estrada, Isen, & Young, 1994), information processing (DeSteno, Gross, & Kubzansky, 2013), decision making (Isen, 2001), and the way in the way in which people make choices about uptake of health-promoting behaviors and maintenance of HBC (Cohn & Fredrickson, 2010; Fredrickson, 2000). Participation in a routine cancer screening, with receipt of a "normal" (i.e., no cancer present) screening test result, may reduce perceptions of threat and vulnerability, which can lead to increased positive affect and a sense of "well-being" through reduction in health-related concerns and increases in a sense of relief (Scaf-Klomp, Sanderman, van de Wiel, Otter, & van den Heuvel, 1997). In a study of individuals who had been exposed to asbestos and were being screened for lung cancer, health-related anxiety was significantly reduced following receipt of a non-malignant lung cancer screening test result (Vierikko, Kivistö, Järvenpää, Uitti, Oksa, Virtema, & Vehmas, 2009). Furthermore, as a result of greater positive affect or well-being, the

cancer screening setting may serve as a TM to enhance uptake of health behaviors. This was illustrated in the OCS setting where an increase in positive affect following participation in routine cancer screening predicted likelihood of returning for OCS testing (Gaugler, Pavlik, Salsman, & Andrykowksi, 2006). To date, however, no research has assessed the role of positive affective experiences, including positive consequences of screening (i.e., enhanced well-being), to influence general, non-cancer-specific, HBC intentions and reported HBC in a cancer screening setting.

Theory of Planned Behavior. The Theory of Planned Behavior suggests self-efficacy and intentions to engage in HBC are important predictors of HBC (Armitage, & Conner, 2001). Self-efficacy is the extent to which an individual believes he or she is capable of engaging in or performing a behavior (Bandura, 2000). There exists a well-developed body of literature providing evidence of self-efficacy playing an important role for HBC across several health behaviors including smoking cessation (Gwaltney, Metrik, Kahler, & Shiffman, 2009), physical activity (Anderson-Bill, Winett, & Wojcik, 2011; Jerome & McAuley, 2013), fruit and vegetable consumption (Kreausukon, Gellert, Lippke, & Schwarzer, 2012), and weight loss (Byrne, Barry, & Petry, 2012; Palmeira, et al., 2007; Rejeski, Mihalko, Ambrosius, Bearon, & McClelland, 2011). In a longitudinal study examining predictors of breast self-exam (BSE), several types of self-efficacy were examined. For example, results indicated preaction self-efficacy (i.e., self-efficacy prior to engaging in BSE) predicted intentions for BSE which predicted planning for BSE and eventually BSE behavior. Additional results suggested other types of self-efficacy directly predicted BSE behavior (Luszczynska, & Schwarzer, 2003). In adult patients managing diabetes, behavior-specific self-efficacy predicted patient adherence to self-

management behaviors. Behavior-specific self-efficacy was also strongly and positively associated with healthy dietary intake (King, Glasgow, Toobert, Strycker, Estabrooks, Osuna, & Faber, 2010).

In addition to self-efficacy, the Theory of Planned Behavior also posits behavioral intentions are an important precursor to actual behavior (McEachan, Conner, Taylor, & Lawton, 2011). Intentions to change behavior have a well-supported association with subsequent HBC across a range of health behaviors including physical activity (Hagger, Chatzisarantis, & Biddle, 2002; Hagger, & Chatzisarantis, 2009; Hall, Zehr, Ng, & Zanna, 2012), weight loss (Göhner, Schlatterer, Seelig, Frey, Berg, & Fuchs, 2012; Schifter, & Ajzen, 1985), and consumption of a healthy diet (Adriaanse, Vinkers, De Ridder, Hox, & De Wit, 2011; Mead, Gittelsohn, De Roose, & Sharma, 2010). Additionally, meta-analytic data on HBC interventions indicate behavioral intentions generally predict small to medium effects in actual behavior change (Webb, & Sheeran, 2006).

Conceptual model to be tested in proposed research

Drawing heavily from McBride's model of a TM (McBride, et al., 2008), Fredrickson's Broaden and Build Theory (Fredrickson, 2004), and the Theory of Planned Behavior (Ajzen, 1991), a conceptual model to be tested in the proposed research was developed. See figure 1. The model includes constructs from each of the aforementioned theoretical perspectives to help address the question of whether and why the OCS setting might serve as a TM to promote HBC intentions and ultimately foster HBC. The model suggests the OCS setting may lead to positive affective and cognitive changes which increase the potential for HBC, thus serving as a TM. These positive affective and

cognitive changes result from both engaging in a health protective behavior (undergoing the OCS test) and the receipt of a "normal" screening test result (e.g., no malignancy detected). Specifically, it is proposed the process that ensues following a "normal" screening result provides several sources of positive emotional experience including a decreased sense of vulnerability, an increase in general positive affect, enhanced well-being, and an increase in self-efficacy. As a result of these changes, patients in a cancer screening setting might exhibit greater openness to HBC which could cause an increase in HBC intentions and ultimately impact actual HBC.

Summary of Gaps in the Literature on the TM in Cancer Screening Settings

An extant body of literature suggests the potential of the cancer screening setting to serve as a TM (Floyd, Steffens, Pavlik, & Andrykowski, 2011; McBride, et al., 1999; Taylor, et al., 2007). However, few of these studies have used a prospective methodology to examine the potential of the cancer screening setting to serve as a TM. Most studies have conducted retrospective analyses, inferring that a TM has occurred from reports of spontaneous HBC after exposure to a cancer screening test (Cox, Clark, Jett, Patten, Schroeder, Nirelli,…& Hurt, 2003; van der Aalst, de Koning, van den Bergh, Willemsen, & van Klaveren, 2012). Furthermore, there is a lack of theoretically-driven research regarding the TM in cancer screening settings. As a result, most studies have not examined theoretically-derived factors which are more or less likely to create opportunities for a TM. Finally, only a small body of studies has implemented HBC interventions in the cancer screening setting in an effort to harness the potential for a cancer screening to serve as a TM.

Summary and Study Aims

In light of these gaps in the current literature, the primary purpose of this study was to use a theoretically-driven approach to examine the potential for routine OCS to serve as a TM to enhance the likelihood of non-cancer-specific HBC (e.g., exercise and healthy diet HBC). A prospective, longitudinal design was used to track changes in positive affect, well-being, and other positive consequences of screening, self-efficacy, behavioral intentions, as well as actual HBC following participation in routine OCS. The impact of a brief written intervention intended to enhance exercise and healthy diet self-efficacy for HBC was also examined.

Specific study aims and hypotheses

AIM I: To examine whether undergoing routine OCS is associated with increases in self-efficacy and positive affect.

H1: Positive affect, perceptions of positive consequences of screening, and self-efficacy will increase following routine OCS.

AIM II: To examine whether undergoing routine OCS is associated with increases in HBC intentions and reports of HBC.

H1: HBC intentions and actual HBC will increase following routine OCS.

AIM III: To examine whether a brief, written self-efficacy specific intervention is associated with increases in self-efficacy, HBC intentions, and reports of HBC.

H1: Women who received a self-efficacy enhancing written intervention will report greater positive changes in self-efficacy.

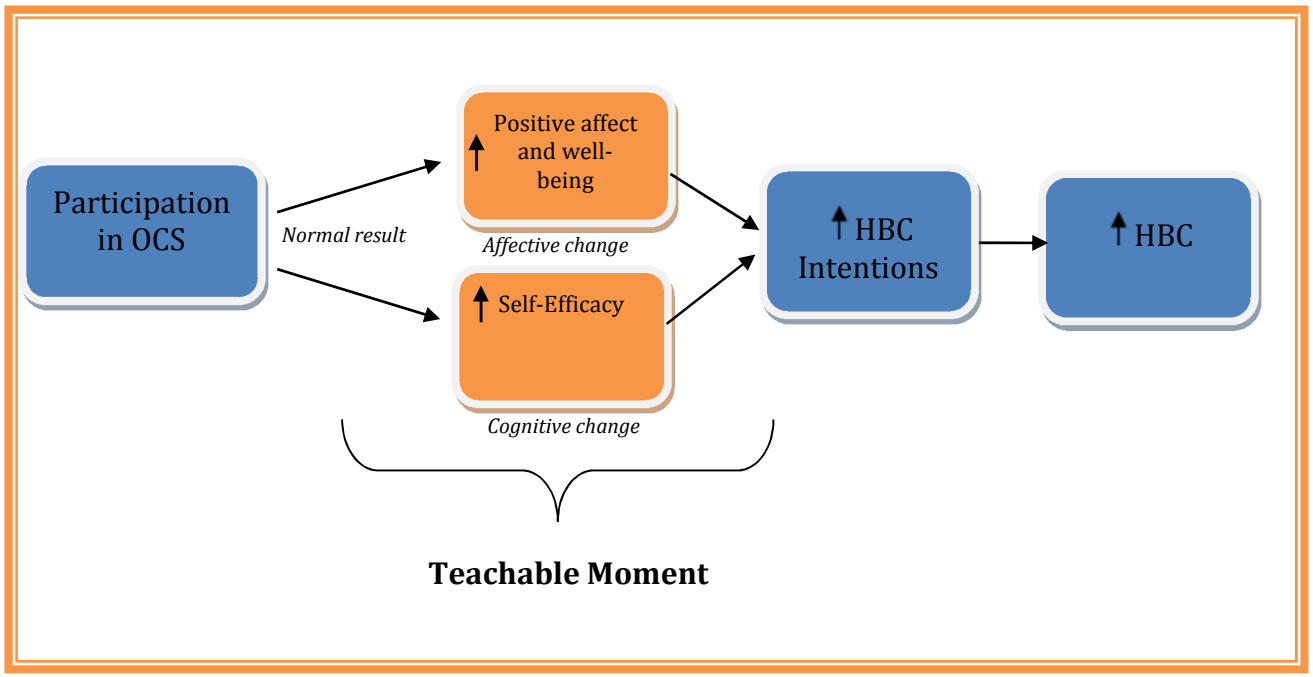
H2: Women who receive a self-efficacy enhancing written intervention will report greater positive changes in HBC intentions and reports of HBC.

AIM IV: To examine the relationship between changes in positive affect, perceptions of positive consequences of screening, and self-efficacy and HBC intentions and reports of HBC.

H1: Increases in positive affect and greater perceptions of positive consequences of screening will be associated with increases in HBC intentions and reports of HBC.

H2: Increases in self-efficacy will be associated with increases in HBC intentions and reports of HBC.

Figure 1: Conceptual Model of the OCS Setting as a TM for HBC



Chapter 2: Method

Sample

Study participants included women who were undergoing routine annual transvaginal ultrasound sonography (TVS) as part of an OCS program provided by the University of Kentucky's Markey Cancer Center (van Nagell, DePriest, Ueland, DeSimone, Cooper, McDonald, ... & Kryscio, 2007). Asymptomatic women who are at least 50 years of age are eligible for free, annual OCS. Asymptomatic women, 25 to 50 years of age, who are at increased, objective risk for OC due to personal or family history of cancer are also eligible to participate.

Eligibility criteria for the current study were as follows: a) ≥ 18 years of age (b) able to read and understand English (c) scheduled that day to undergo routine TVS screening for OC and (d) access to telephone or e-mail. Based on these criteria, approximately 230 women in a consecutive series were invited to participate in the study between March 2012 and December 2012. Of these, 173 (75%) agreed to participate in the research study.

Procedure

All study procedures were approved by the University of Kentucky Institutional Review Board (IRB). Women in the waiting area of the OCS Clinic were approached by a member of the research team prior to undergoing a routine TVS screening test. The research team member described the study procedures that would include one pre and two post OCS assessments. When participants verbally communicated consent, written documentation of informed consent was obtained.

Study Assessments

There were three study assessments which included the baseline (T1), 24-hour follow-up (T2), and one month follow-up (T3) assessments.

Baseline (T1). All participants completed a baseline questionnaire (T1) before their routine OCS test. At this time, they were given a 24-hour follow-up assessment (T2) questionnaire to complete the next day and a stamped and pre-addressed envelope to mail the 24-hour follow-up (T2) assessment back.

24-hour follow-up (T2), Participants were asked to complete the 24-hour follow-up questionnaire the day after their OCS test and mail it back in the stamped envelope that had been provided. This 24-hour follow-up (T2) assessment also included either a general health information handout with general health recommendations as endorsed by the Center for Disease Control (General Health Group; GH) or a specific health information handout that provided general health information and information about the role of self-efficacy in HBC (Self-Efficacy Specific Group; SE). Assignment to the GH or SE groups was based on the day a woman was enrolled in the study. All women enrolled on a particular day were assigned to the same group, either GH or SE. This was done to prevent women who visited the clinic as a group from becoming concerned about receiving different health information. Whether women were assigned to the GH or SE group on a particular day was not randomized but was based on a desire to enroll approximately equal numbers of women in each group over the course of the study.

In both groups, the health information handouts were 1 page long. The content of the general health (GH) information handout was directly adapted from the CDC's

handout "*Tips for a Safe and Healthy Life*" (CDC Office of Women's Health, 2012). In this handout, there were general tips and recommendations that focused on eating healthily, being active, and protecting one's self through actions like wearing a seat-belt and washing hands. Information on how to contact the CDC and visit the CDC website was also provided.

The SE-specific handout defined self-efficacy and described the role of self-efficacy in HBC. The handout also reinforced the participant's ability to enact a health behavior as indicated by their involvement in an OCS test. Minimal CDC guidelines regarding nutrition and physical activity were provided. Information on how to contact the CDC and visit the CDC website was also provided. See Appendix A and B for copies of both the GH and SE handouts.

One-month follow up (T3). The one-month follow up assessment (T3), was conducted by either telephone interview or online data collection. The T3 assessment was initiated approximately 1 month following the T1 assessment. Women who completed the T3 assessment via telephone interview were provided a copy of the questions for the interview and asked to set them aside at home until they received their phone call. Women were given general information about when they would be contacted; generally women did not set specific dates or times but were informed that they would be contacted about 4 weeks from the day of their OCS test. Women were asked to provide time of day preferences (e.g., call only after 5:00 pm) in order to streamline the process of the telephone interview.

Women who completed the T3 assessment via online data collection were sent a de-identified link to their e-mail address through RedCap, an online survey and database

management program provided through the University of Kentucky's Center for Clinical and Translational Research. RedCap is described as "a secure, web-based application for building and managing online surveys and databases" and was used to assign and send a quick-access link to each participant for easy access and completion of the T3 assessment questions (Harris, Taylor, Thielke, Payne, Gonzalez, & Conde, 2009). To complete the T3 follow up assessment, women simply clicked on the link provided by RedCap and the questions from the assessment appeared following a brief introduction. Women had the option of completing the survey at one time or saving it and responding to the remaining questions at a later time. Once a participant had completed a survey, RedCap's system would send a participant ID-specific notification to the PI indicating the completion of a survey.

Study Measures

The baseline (T1) questionnaire consisted of items and scales assessing: (a) demographic and clinical information, (b) OC risk perception, (c) positive and negative affect, (d) general health and wellness information including intentions to exercise and eat a healthy diet; and (e) self-efficacy regarding exercise and eating a healthy diet.

The 24-hour follow-up (T2) questionnaire consisted of items assessing: (a) how carefully the health information hand-out had been read and the extent to which the handout had been helpful, (b) OCS test result, (c) future OCS intentions, (d) OC risk perception, (e) positive and negative affect, (f) positive consequences of screening, (g) general health and wellness information including intentions to exercise and eat a healthy diet; and (h) self-efficacy regarding exercise and eating a healthy diet.

The one month follow-up (T3) questionnaire consisted of items assessing: (a) future OCS intentions, (b) OC risk perception, (c) positive consequences of screening, (d)

general health and wellness information including intentions to exercise and eat a healthy diet, (e) self-efficacy regarding exercise and eating a healthy diet; and (f) behavior change regarding exercise and eating a healthy diet since the most recent OCS test. Table 1 provides a detailed breakout of the specific variables assessed at each of the three study assessments. Copies of all study measures are included in Appendix C.

Demographic and Clinical Information. Demographic items included age and education. Clinical items included number of prior OCS tests (4 response options: never, 1-2 prior tests, 3-5 prior tests, > 5 prior tests) and family history of OC in first degree relatives (FDR). FDRs included mother, sister, or daughter. Three response options were provided for each FDR: yes, no, don't know. Responses to these three family history questions were combined to create a single, dichotomous index of family history of OC in a FDR (yes vs no). "Don't know" responses were treated as "no" responses for purposes of creating this dichotomous index of family history of OC. Women were also assessed for a personal history of cancer. Responses could be 'yes,' 'no,' or 'I don't know.' Women who endorsed a personal history of cancer were invited to specify which type of cancer they had experienced.

Positive and Negative Affect. Positive and negative affect during the past 24 hours were assessed by the Positive and Negative Affect Scale–Short Form (PANAS-SF; Kercher, 1992; Mackinnon, Jorm, Christensen, Korten, Jacomb, & Rodgers, 1999). The PANAS-SF consists of two 5-item subscales measuring positive (PA) and negative affect (NA), respectively. Internal consistency in our sample for the NA subscale was $\alpha = .73$ at T1 and $\alpha = .73$ at the T2 follow-up. Internal consistency for the PA subscale was $\alpha = .81$ at T1 and $\alpha = .80$ at the T2 follow-up.

Ovarian Cancer Risk Perception. Two items assessed perceptions of lifetime OC risk. Absolute lifetime risk for OC was assessed by asking respondents to rate their lifetime personal risk of developing OC at some point during their lifetime on a 6 point rating scale ranging from 'no chance' to 'certain to happen' (Burris, Jacobsen, Loftus, & Andrykowski, 2012). Relative lifetime OC risk was assessed by asking respondents to rate their lifetime risk of developing OC relative to other women their age on a 5 point scale ranging from 'much lower' to much higher' than other age-similar women (Graves, Peshkin, Luta, Tuong, & Schwartz, 2011). For absolute lifetime OC risk perception, higher values represented greater perceptions of lifetime risk for OC. For relative lifetime OC risk perception, lower values represented greater perceptions of lifetime risk for OC.

Health Information Handout Utilization. A single item assessed the extent to which women read the health information handout: "Did you read the health education handout from the CDC on the previous page?" Response options included: "Yes, I read it thoroughly," "Yes, I skimmed it," and "No, I did not read it." A single item assessed the extent to which women found the health information handout to be helpful: "How helpful was the health education handout from the CDC?" Response options included: "Not at all helpful," "Somewhat helpful," "Very helpful," and "Not applicable, I did not read the handout."

Ovarian Cancer Screening Test Result. A single item assessed results of women's most recent OCS test: "What were you told about the results of your recent ovarian cancer screening test?" Response options included "My test result was normal," "My test result was abnormal," "They were unsure about the results of my test," and "I was not told anything about the results of my test."

Ovarian Cancer Screening Intention. Intention to return for another OCS test within the next year was assessed by the question, 'How likely is it that you will return in one year for another ovarian cancer screening test?' (Andrykowski, Zhang, Pavlik, & Kryscio, 2007; Gaugler, Pavlik, Salsman, & Andrykowski, 2006). Participants rated their intention on a six-point rating scale ranging from 'no chance' to 'certain to happen.' Higher scores represented stronger intentions to return for screening in the future.

Positive Consequences of Screening. Positive consequences of participation in routine OCS (e.g., increased sense of well-being) were assessed using the seven positive items from the 10-item Psychological Consequences Questionnaire (PCQ; Cockburn, De Luise, Hurley, & Clover, 1992). For all seven items, participants rated the extent to which they had experienced various positive consequences (e.g., reassurance of not having OC) on a four-point rating scale ranging from 0 'not at all to 3 'a great deal.' Internal consistency in our sample was $\alpha = .76$ at T2 and $\alpha = .84$ at the T3 follow-up.

Exercise and Healthy Diet Self-Efficacy. Exercise and healthy diet self-efficacy were assessed using six adapted items from the General Self-Efficacy Scale (Schwarzer & Renner, 2000). Two subscales were created: three items assessed exercise self-efficacy and three parallel items assessed healthy diet self-efficacy. For all six items, participants rated their efficacy on a four-point rating scale ranging from 0 'definitely not' to 3 'exactly true.' Higher scores represented greater self-efficacy. The three items assessed general efficacy as related to the specified health behavior as well as efficacy when very busy and efficacy in the absence of social support. The exercise self-efficacy subscale included the sum of the three items pertaining to exercise divided by the number of items. The healthy diet self-efficacy subscale included the sum of the three items pertaining to

eating a healthy diet divided by the number of items. Internal consistency in our sample was α = .93 at T1, α = .96 at the T2 follow-up, and α = .93 at the T3 follow-up for the exercise self-efficacy subscale. Internal consistency in our sample was α = .94 at T1, α = .91 at the T2 follow-up, and α = .93 at the T3 follow-up for the healthy diet self-efficacy subscale.

Health Behavior Change Intentions. Intentions to engage in HBC as related to exercise and eating a healthy diet were assessed using two parallel items. Intentions to engage in exercise were assessed by the item: "I intend to exercise for at least 20 minutes, 5 times per week for the next month (e.g., walking, jogging, bicycling, swimming)." Intentions to consume a healthy diet were assessed by the item: "I intend to eat a healthful diet 5 out of 7 days per week for the next month (i.e.: high in vegetables, fruit, and whole grains)." Responses to these two behavior change intentions items were on a seven point scale from 1, "Don't intend at all" to 7, "Strongly intend." Participants were also offered the option to mark "N/A" if this item did not apply to them because they were already engaging in the health behavior. For these two items, N/A was coded as a 7 since it indicated current engagement in the activity which is a behavioral manifestation of behavioral intentions.

Health Behavior Change. Actual HBC as related to exercise and eating of a healthy diet were assessed by two parallel items. Participants were instructed to consider any changes in these health behaviors that occurred since their most recent OCS test. Behavior change in exercise was assessed by the item: "Since my most recent ovarian cancer screening test, I have increased the amount of physical exercise that I get to 20 minutes, 5 times per week (i.e.: walking, jogging, bicycling, swimming)." Behavior

change in eating a healthy diet was assessed by the item: "Since my most recent ovarian cancer screening test, I have eaten a healthful diet for 5 out of 7 days per week (i.e.: high in vegetables, fruit, and whole grains)." Responses to these two behavior change items were on a seven point scale from 1, "Not true at all" to 7, "Very true."

Data Preparation and Analysis

All data analyses were performed using SPSS 20.0. An alpha level of .05 was used as the criterion for statistical significance.

Repeated measures ANOVA was used to examine change over time in primary study outcome variables measured at two study assessments (i.e., positive affect, positive consequences of screening). Hierarchical multiple regression was used to examine change scores (e.g., changes in intentions from T1 to T2) and their relation to reports of HBC which was only measured at the T3 study assessment.

Individual growth curve models were developed to examine change over time in primary study outcome variables measured at all three study assessments (i.e., exercise self-efficacy, healthy diet self-efficacy, exercise intentions, healthy diet intentions). Individual growth curve models are appropriate for longitudinal data and provide information about the intercept, initial status and the slope and rate of change over time at the individual and between-group level (Singer &Willett, 2003). This type of multi-level modeling approach is helpful with nested data because it allows for simultaneous assessment of Level 1, individual growth (time varying), and Level 2, between person growth (non-time-varying), variables (Jackson, 2010). Individual growth curve modeling has also been described as less restrictive than other approaches (e.g., repeated measures ANOVA) in terms of providing greater flexibility regarding time and missing

data. In this study, time was treated as a continuous variable in the growth curve models and participants were not automatically excluded from analyses if they were missing data points (DeLucia & Pitts, 2006; Singer and Willett, 2003).

Composite Model Formulations. In each individual growth curve model, Model A is the unconditional means model which provides the grand mean for the entire sample across all women and all assessments. This model does not include any predictors. The composite model used to calculate Model A was: $Y_{ij} = \gamma_{00} + \zeta_{0i} + \varepsilon_{ij}$

Model B was the unconditional growth model which included time as a level-1 and level-2 time-varying predictor. Time was treated as a continuous variable comprised of days. Model B used the following composite model:

$$Y_{ij} = [\gamma_{00} + \gamma_{10} TIME_{ij}] + [\zeta_{0i} + \zeta_{1i} TIME_{ij} + \varepsilon_{ij}].$$

Model C included time as a level-1 and 2 time-varying predictor, information group as a level-1 non time-varying predictor, and a time x group interaction. Model C used the following composite model:

$$Y_{ij} = [\gamma_{00} + \gamma_{10} TIME_{ij} + \gamma_{01} INFO_{i} + \gamma_{11} (INFO_{i} \times TIME_{ij}) + [\zeta_{0i} + \zeta_{1i} TIME_{ij} + \varepsilon_{ij}]$$

Model D was developed to examine exercise and healthy diet intentions. Model D included time as a level-1 and 2 time varying predictor, information group as a level-1 non time-varying predictor, change in positive affect (change from T1 to T2) as a level-1 and 2 non time-varying predictor, PCOS (at T2) as a level-1 and 2 non time-varying predictor, and either exercise SE or healthy diet SE as a level-1 and 2 time-varying predictor. Exercise and healthy diet SE included data from all three study assessments.

Model D for exercise intentions used the following composite model:

$$Y_{ij} = \gamma_{00} + \gamma_{10} TIME_{ij} + \gamma_{20} INFO_{ij} + \gamma_{30} POSAFFECT$$
$$+ \gamma_{40} PCOST\ 2_{ij} + \gamma_{50} ESE_{ij} + [\zeta_{0i} + \zeta_{1i} TIME_{ij} + \varepsilon_{ij}]$$

Model D for healthy diet intentions used the following composite model:

$$Y_{ij} = \gamma_{00} + \gamma_{10} TIME_{ij} + \gamma_{20} INFO_{ij} + \gamma_{30} POSAFFECT$$
$$+ \gamma_{40} PCOST\ 2_{ij} + \gamma_{50} HEALTHSE_{ij} + [\zeta_{0i} + \zeta_{1i} TIME_{ij} + \varepsilon_{ij}]$$

Variance Components. The intraclass correlation (ICC) provides a measurement of variance in intentions to exercise existing between people and was calculated by using the following formula: $\rho = \frac{\sigma_0^2}{\sigma_0^2 + \sigma_\varepsilon^2}$. A pseudo R squared statistic, R_ε^2, provides a measure of the within-person variation that is explained by linear time. An additional pseudo R squared statistic, R_0^2, provides a measure of initial status (between groups) variance explained.

Model Fit. Goodness of fit for each model was examined and assessed in these growth curve models by conducting relative comparisons between nested models using the -2 log likelihood (-2LL). To compare the fit between two models, the difference in deviance (-2LL) between the two models was calculated. The difference follows approximate Chi-Square distribution with degrees of freedom derived as the difference in the number or parameters estimated between the two models (i.e., number of parameters in the reduced model subtracted from the number of parameters in the more complex model) (DeLucia & Pitts, 2006).

Table 1: Study Variables and Instruments for T1, T2, and T3 Assessments

Variable	**Measure/Instrument**	**Study Assessment**		
		T1	**T2**	**T3**
Age at Study Participation (years)	Demographic Questionnaire	X		
Education (years)	Demographic Questionnaire	X		
Family History of OC	Demographic Questionnaire	X		
Personal History of Cancer	Demographic Questionnaire	X		
Number of prior OCS Tests	Demographic Questionnaire	X		
OCS Test Result	1 item (categorical)		X	
Intervention Handout Utilization	1 item (scale)		X	
Interventions Handout Usefulness	1 item (scale)		X	
Positive Affect	PANAS-SF (5 items)	X	X	
Positive Consequences of Screening	PCOS (7 items)		X	X
OCS Intentions	1 item (scale)		X	X
Absolute Lifetime OC Risk	1 item (scale)	X	X	X
Relative Lifetime OC Risk	1 item (scale)	X	X	X
Exercise Intentions	1 item (scale)	X	X	X
Healthy Diet Intentions	1 item (scale)	X	X	X
Exercise Self-Efficacy	General Self-Efficacy Scale (3 items)	X	X	X
Healthy Diet Self- Efficacy	General Self-Efficacy Scale (3 items)	X	X	X
Exercise HBC	1 item (scale)			X
Healthy Diet HBC	1 item (scale)			X

Table 2: Clinical, Demographic, and Psychosocial Characteristics of the Total Sample by Information Group at Baseline (T1).

Variable		N	Mean	SD	p-value[a]
Age at Study Participation (years)	Total Sample	168	64.65	9.05	
	General Health	92	64.01	8.96	.32
	SE Specific	76	65.42	9.15	
Education (years)	Total Sample	172	14.26	2.86	
	General Health	95	14.40	3.06	.47
	SE Specific	77	14.08	2.61	
Lifetime OC Risk	Total Sample	167	2.92	.83	
	General Health	91	2.90	.75	.72
	SE Specific	76	2.95	.92	
Relative OC Risk	Total Sample	169	3.06	.86	
	General Health	93	3.09	.79	.66
	SE Specific	76	3.03	.95	
Exercise Intentions	Total Sample	164	5.31	2.07	
	General Health	91	5.46	1.96	.30
	SE Specific	73	5.12	2.19	
Healthy Diet Intentions	Total Sample	165	5.76	1.71	
	General Health	91	5.66	1.77	.42
	SE Specific	74	5.88	1.65	
Exercise SE	Total Sample	168	2.30	.77	
	General Health	93	2.39	.67	.08
	SE Specific	75	2.18	.87	
Healthy Diet SE	Total Sample	168	2.39	.61	
	General Health	93	2.38	.66	.83
	SE Specific	75	2.40	.54	
Positive Affect	Total Sample	167	14.94	5.15	
	General Health	92	15.39	4.79	.22
	SE Specific	75	14.40	5.55	
Time between Assessments (T1 to T2)	Total sample	127	3.04	5.67	
	General Health	68	2.99	6.53	.91
	SE Specific	59	3.10	4.54	
Time between Assessments (T1 to T3)	Total sample	107	61.17	33.17	
	General Health	57	66.77	38.30	.06
	SE Specific	50	54.78	25.00	
OCS History	Total Sample	General Health		SE Specific	
Never, Today is first time	23 (13%)	14 (61%)		9 (39%)	.58
1-2 times	25 (14%)	16 (64%)		9 (36%)	.36
3-5 times	36 (21%)	20 (56%)		16 (44%)	.99
5 or more times	87 (50%)	45 (52%)		42 (38%)	.32
Family History of OC	21 (12%)	8(38%)		13 (62%)	.22

[a] *p*-value (2-sided) for t-test or X^2, as appropriate

Table 3: Means and Standard Deviations for Primary Dependent Variables by Assessment Period (T1, T2, T3) and Information Group.

		T1			T2			T3		
Variable		N	Mean	SD	N	Mean	SD	N	Mean	SD
Lifetime OC Risk	Total Sample	167	2.92	.83	120	3.02	.71	107	3.22	.91
	General Health	91	2.90	.75	64	3.00	.69	57	3.09	.83
	SE Specific	76	2.95	.92	56	3.04	.74	50	3.38	.99
Relative OC Risk	Total Sample	169	3.06	.86	123	3.07	.80	107	3.16	.94
	General Health	93	3.09	.79	67	3.09	.77	57	3.09	.93
	SE Specific	76	3.03	.95	56	3.05	.84	50	3.24	.96
OCS Intentions	Total Sample	---	---	---	127	6.91	.60	107	6.94	.36
	General Health	---	---	---	68	6.84	.80	57	6.91	.47
	SE Specific	---	---	---	59	6.98	.13	50	6.98	.14
Exercise Intentions	Total Sample	164	5.31	2.07	124	6.07	1.72	106	5.57	1.94
	General Health	91	5.46	1.96	66	5.98	1.73	56	5.64	1.77
	SE Specific	73	5.12	2.19	58	6.17	1.71	50	5.48	2.12
Healthy Diet Intentions	Total Sample	165	5.76	1.71	124	5.98	1.48	107	6.03	1.27
	General Health	91	5.66	1.77	66	6.12	1.36	57	6.05	1.23
	SE Specific	74	5.88	1.65	58	5.83	1.60	50	6.00	1.33
Exercise SE	Total Sample	168	2.30	.77	126	2.40	.72	106	2.44	.74
	General Health	93	2.39	.67	68	2.46	.67	57	2.43	.75
	SE Specific	75	2.18	.87	58	2.33	.78	49	2.45	.73
Healthy Diet SE	Total Sample	168	2.39	.61	126	2.41	.58	106	2.57	.59
	General Health	93	2.38	.66	68	2.44	.57	57	2.51	.64
	SE Specific	75	2.40	.54	58	2.38	.59	49	2.65	.53
Positive Affect	Total Sample	167	14.94	5.15	126	16.58	4.01	---	---	---
	General Health	92	15.39	4.79	68	16.69	4.35	---	---	---
	SE Specific	75	14.40	5.55	58	16.44	3.59	---	---	---
PCOS	Total Sample	---	---	---	120	11.83	5.44	103	14.07	4.52
	General Health	---	---	---	65	11.44	5.57	56	13.42	4.75
	SE Specific	---	---	---	55	12.29	5.30	47	14.85	4.14
Exercise HBC	Total Sample	---	---	---	---	---	---	106	3.70	2.47
	General Health	---	---	---	---	---	---	57	3.40	2.34
	SE Specific	---	---	---	---	---	---	49	4.04	2.59
Healthy Diet HBC	Total Sample	---	---	---	---	---	---	106	4.90	1.95
	General Health	---	---	---	---	---	---	57	5.04	1.96
	SE Specific	---	---	---	---	---	---	49	4.73	1.93

Chapter 3: Results

Participant Sample

Initially, 173 women consented to enrollment in this study. 172 provided baseline (T1) data and 127 participants completed both the baseline (T1) and 24-hour follow-up questionnaire (T2) yielding a short-term follow-up retention rate of 73%; 107 completed the baseline and one month follow-up questionnaire yielding a long-term retention rate of 62%; 93 completed all three assessments yielding an overall retention rate of 54%. The 93 women who completed all three assessments were compared to 79 partial completers (i.e., those who completed only one or two assessments) on baseline clinical, demographic and psychosocial variables. Results indicated the two groups differed significantly only with regard to education ($p<.05$) and family history of OC ($p<.01$). Partial completers were less educated and more likely to have a family history of OC. Completion time from T1 to T2 was a mean of 3.10 days (SD=5.64); the median number of days was 1 and the modal number of days was 1. The range from T1 to T2 follow-up was 1 to 49 days. Completion time from T1 to T3 was a mean of 61.17 days (SD=33.17); the median number of days was 49 and the modal number of days was 35. The range from T1 to T3 follow-up was 18 to 153 days.

Women in the final study sample (n=172) were a mean of 64.65 years of age (*SD*=9.05; range=41–89). Mean educational level was 14.26 years (*SD*=2.86; range=8–20). The majority of women had no family history (FH) of OC in a first degree female relative (n=151; 88%). Of the 21 women who did report a FH of ovarian cancer, the breakdown by family member was as follows: mother (n=14); sister (n=9); daughter (n=0). Two participants indicated both their mother and sister had OC. Most women also

had a prior history of OCS prior to the T1 assessment (n=148; 87%). Prior OCS history was as follows: Never (n=24; 14.4%); One to two times prior (n=25; 14.5%); Three to five times (n=36; 20.8%); Five or more (n=87; 50.3%). Most women denied any personal history of cancer (n=130; 78%). Of the women (n=36; 22 %) who endorsed a personal history of cancer, the breakdown by cancer type was as follows: breast (n=17); cervical (n=5); skin (n=12); colon (n=1); thyroid (n=1); and myelodysplastic syndrome (n=1). Also, at T2, women were asked what they were told about their OCS test results. Most women (106; 84%) said they were told "nothing" and a smaller proportion was told their test was "normal" (18; 14%). Two women (2%) reported they were informed OCS staff was "unsure" of the results.

The general health (GH) information and self-efficacy (SE) specific intervention groups did not differ on demographic, clinical, or baseline psychosocial variables including time between T1 and T2 assessments ($p>.05$) and T1 and T3 assessments ($p>.05$). See Table 2 for more information on clinical and demographic characteristics of the total sample by information grouping. For additional information on the primary dependent variables at T1, T2, and T3, see Table 3 for the means and standard deviations of demographic, clinical, and baseline psychosocial variables by information grouping.

Results of Study Analyses by Study Aim

***Aim I:* To examine whether undergoing routine OCS is associated with increases in positive affect, positive consequences of screening, and self-efficacy.**

Positive Affect

To examine whether undergoing routine OCS is associated with increases in positive affect between T1 and T2, a 2 x 2 (Information Group x Time) repeated measures ANOVA was conducted. The between groups factor of Information Group was included to examine the presence of an interaction effect based upon which type of information a participant had received. Results are shown in Table 4. There was a significant main effect for Time $F(1, 123) = 8.317$, $p<.01$) such that women's positive affect increased from T1 to T2. This main effect for Time is shown in Figure 2. There was no significant main effect for Information Group $F(1, 123) = .508$, $p=.48$) and no significant Information Group x Time interaction $F(1, 123) = .412$, $p=.52$).

Positive consequences of screening

To examine whether undergoing routine OCS is associated with increases in positive consequences of screening (PCOS) between T2 and T3, a 2 x 2 (Information Group x Time) repeated measures ANOVA was conducted. The between groups factor of Information Group was included to examine the presence of an interaction effect based upon which type of information a participant had received. Results are shown in Table 4. There was a significant main effect for Time ($F(1, 84) = 14.76$, $p=.001$) such that women's PCOS increased from T2 to T3. The main effect for Time is shown in Figure 2.

There was no significant main effect for Information Group ($F(1, 84) = 1.283$, $p=.261$) and no significant Information Group x Time interaction ($F(1, 84) = .16$, $p=.69$).

Exercise Self-Efficacy

To examine whether undergoing routine OCS is associated with increases in Exercise Self-efficacy (SE), a growth curve model was developed. Model B was the unconditional growth model which included Time as the only independent variable. Results from Model B indicated there was a significant intercept ($p<.001$), no main effect for Time ($p>.05$), and only 6% of the within person variation in exercise SE was explained by linear time. Finally, results from Model B indicated 66%, ($p=.66$), of the variance in exercise SE was attributable to between person variability. As to goodness-of-fit, Model B was not significantly better than Model A, ΔDeviance = 2.473 (3 *df*, $p>.05$). See Table 5, Model B.

Healthy Diet Self-Efficacy

To examine whether undergoing routine OCS is associated with increases in Healthy Diet SE, a growth curve model was developed. Model B was the unconditional growth model which included Time as the only independent variable. Results from Model B indicated a significant intercept ($p<.001$) and a main effect for Time ($p<.05$), with 36% of the within person variation in Healthy Diet SE being explained by linear time. Finally, results from Model B indicated 55%, ($\rho = .552$), of the variance in Healthy Diet SE was attributable to between person variability. As to goodness-of-fit, Model B was significantly better than Model A, ΔDeviance = 25.42 (3 *df*, $p<.001$). See Table 5, Model B.

Aim II: **To examine whether undergoing routine OCS is associated with increases in HBC intentions and reports of HBC.**

Exercise Intentions

To examine whether undergoing routine OCS is associated with increases in exercise intentions, a growth curve model was developed. Model B was the unconditional growth model which included Time as the only independent variable. Results from Model B indicated a significant intercept (p<.001), no main effect for Time (p>.05), and 7% of the within person variation in exercise diet intentions was explained by linear time. Finally, results from Model B indicated 59%, ($\rho = .593$), of the variance in exercise intentions was attributable to between person variability. As to goodness-of-fit, Model B was not significantly better than Model A, ΔDeviance = 3.363 (3 *df*, p>.05). See Table 6, Model B.

Healthy Diet Intentions

To examine whether undergoing routine OCS is associated with increases in Healthy Diet Intentions, a growth curve model was developed. Model B was the unconditional growth model which included Time as the only independent variable. Results from Model B indicated a significant intercept (p<.001), no main effect for Time (p>.05), and 12% of the within person variation in Healthy Diet Intentions was explained by linear time. Finally, results from Model B indicated 55%, ($\rho = .552$), of the variance in healthy diet intentions was attributable to between person variability. As to goodness-of-fit, Model B was not significantly better than Model A, ΔDeviance = 6.234 (3 *df*, p>.05). See Table 7, Model B.

Exercise HBC

At the T3 assessment, 37% of women reported they had not changed their exercise level since their most recent OCS test (i.e., rating of 1). The percentage of women reporting a rating of 6 or 7 on exercise HBC was 31%. The mean exercise HBC score in the entire sample was 3.7 (SD=2.47; range 1-7).

Healthy Diet HBC

At the T3 assessment, 8% of women reported they had not changed their healthy diet consumption since their most recent OCS test (i.e., rating of 1). The percentage of women reporting a rating of 6 or 7 on healthy diet HBC was 46%. The mean exercise HBC score in the entire sample was 4.9 (SD=1.95; range 1-7).

***Aim III:* To examine whether a brief, written SE-specific intervention is associated with increases in self-efficacy, HBC intentions, and reports of HBC.**

Health Information Utilization and Helpfulness

Preliminary, descriptive analyses were conducted on utilization and helpfulness of both the GH and SE-specific health information handout prior to conducting analyses addressing study aims and hypotheses. To examine the extent to which women utilized the health information intervention, frequencies were calculated. No woman reported she had not reviewed the handout. The majority of women reported they had read the handout "thoroughly" (n=102; 79.7%); a smaller proportion of women said they had "skimmed" the information handout (n=26, 20.3%). Nine women did not respond to this item. Most women found the handout to be "somewhat helpful" (n=79, 61.7%). A smaller proportion of women found the handout to be "very helpful" (n=46, 35.9%) or "not at all helpful" (n=3, 2.3%).

To examine if there was differential handout utilization or reported helpfulness by which type of information a woman was provided (GH or SE-specific), Chi-Square tests were conducted. No differences were found between the GH and SE-specific groups on information utilization (p=.66) or on the "helpfulness" of the information handout (p=.80).

Exercise Self-Efficacy

To examine whether a brief, written SE-specific intervention would be associated with increases in exercise SE, a growth curve model was developed. Model C included Information Group, Time, and Information Group x Time as independent variables. Results from Model C indicated a significant intercept (p<.001), no main effect for Time (p>.05), no main effect for Information Group (p>.05) and no significant Information Group x Time interaction (p>.05). Finally, results from Model C indicated neither additional variance in initial status nor rate of change was explained by inclusion of these independent variables. As to goodness-of-fit, Model C was not significantly better than Model B, ΔDeviance = 1.238 (2 *df*, p>.05). See Table 5, Model C.

Healthy Diet Self-Efficacy

To examine whether a brief, written SE-specific intervention would be associated with increases in healthy diet SE, a growth curve model was developed. Model C included Information Group, Time, and Information Group x Time as independent variables. Results from Model C indicated a significant intercept (p<.001), no main effect for Time (p>.05), no main effect for Information Group (p>.05) and no significant Information Group x Time interaction (p>.05). Finally, results from Model C indicated neither additional variance in initial status nor rate of change was explained by inclusion

of these independent variables. As to goodness-of-fit, Model C was not significantly better than Model B, ΔDeviance = 2.148 (3 *df*, *p*>.05). See Table 5, Model C.

Exercise Intentions

To examine whether a brief, written SE-specific intervention would be associated with increases in Exercise Intentions, a growth curve model was developed. Model C included Information Group, Time, and Information Group x Time as independent variables. Results from Model C indicated a significant intercept (*p*<.001), no main effect for Time (*p*>.05), no main effect for Information Group (*p*>.05) and no significant Information Group x Time interaction (*p*>.05). Finally, results from Model C indicated neither additional variance in initial status nor rate of change was explained by inclusion of these independent variables. As to goodness-of-fit, Model C was not significantly better than Model B, ΔDeviance = .531 (2 *df*, *p*>.05). See Table 6, Model C.

Healthy Diet Intentions

To examine whether a brief, written SE enhancing intervention would be associated with increases in healthy diet SE, a growth curve model was developed. Model C included Information Group, Time, and Information Group x Time as independent variables. Results from Model C indicated a significant intercept (*p*<.001), no main effect for Time (*p*>.05), no main effect for Information Group (*p*>.05) and no significant Information Group x Time interaction (*p*>.05). Finally, results from Model C indicated neither additional variance in initial status nor rate of change was explained by inclusion of these independent variables. As to goodness-of-fit, Model C was not significantly better than Model B, ΔDeviance = 2.542 (2 *df*, *p*>.05). See Table 7, Model C.

Exercise and Healthy Diet Health Behavior Change

The impact of the brief information intervention with self-reported exercise and healthy diet HBC at T3 was examined and is reported in Results under Aim 4.

Aim IV: **To examine whether increases in positive affect, positive consequences of screening, and self-efficacy are associated with increases in HBC intentions and reported HBC.**

Exercise Intentions

To examine the effects of positive affect change scores (PACS) between T1 and T2, positive consequences of screening (PCOS) at T2, and exercise SE across all study assessments on exercise intentions, a growth curve model was developed. In Model D, PACS between T1 and T2, PCOS at T2, and Exercise SE were added to those included in Model C, minus the Time x Information interaction term, as independent variables. Results from Model D indicated a significant intercept ($p<.001$), no main effect for Time ($p>.05$), no main effect for Information Group ($p>.05$), no main effect for PACS ($p>.05$), and no main effect for PCOS at T2 ($p>.05$). There was a significant main effect for Exercise SE such that for each 1 point increase in Exercise SE, Exercise Intentions increased by 1.059 points ($p<.001$). Finally, results from Model D indicated an additional 40% of the variance in initial status, ($R^2_0 = .404$), was explained by inclusion of these independent variables. No additional variance in rate of change was explained. As to goodness-of-fit, Model D was significantly better than Model C, ΔDeviance = 51.727 (2 *df*, $p<.001$). See Table 6, Model D.

Healthy Diet Intentions

To examine the effects of PACS between T1 and T2, PCOS at T2, and healthy diet SE across all study assessments on healthy diet intentions, a growth curve model was developed. In Model D, PACS between T1 and T2, PCOS at T2, and Healthy Diet SE were added to those included in Model C, minus the Time x Information interaction term, as independent variables. Results from Model D indicated a significant intercept (p<.001), no main effect for Time (p>.05), no main effect for Information Group (p>.05), and no main effect for PACS (p>.05). There was a significant main effect for PCOS at T2 such that for each one point increase in PCOS at T2, healthy diet intentions would increase by .049 points (p<.01). There was also a significant main effect for healthy diet SE such that for each 1 point difference in healthy diet SE, healthy diet intentions increased by 1.081 points (p<.001). Finally, results from Model D indicated an additional 53% of the variance in initial status, (R^2_0 = .529), was explained by inclusion of these independent variables. No additional variance in rate of change was explained. As to goodness-of-fit, Model D was significantly better than Models C, ΔDeviance = 69.24 (2 *df*, p<.001). See Table 7, Model D.

Exercise Health Behavior Change

To examine the relationship between PACS (T1 to T2), PCOS at T2, changes in exercise SE (T1 to T2), and changes in exercise intentions (T1 to T2) with self-reported exercise HBC at T3, a hierarchical multiple regression model with four steps was developed. To control for the influence of demographic variables, age and education were entered on the first step of the model. The second step of the model assessed for the main effect of PACS (T1 to T2), PCOS (T2), and changes in exercise SE (T1 to T2). The third step assessed the impact of informational group and the fourth step assessed the main

effect of changes in exercise intentions (T1 to T2) on exercise HBC. Results indicated the seven-variable final model was able to account for 13.4% of the variance in exercise HBC (p =.17, n.s.). In the final model, only PCOS at T2 ($t(71)=2.246$, $p < .05$) was a statistically significant predictor of exercise HBC. Greater increases in self-reported exercise HBC were associated with greater PCOS at T2. See Table 8.

Healthy Diet Health Behavior Change

To examine the relationship between PACS (T1 to T2), PCOS at T2, changes in healthy diet SE (T1 to T2), and changes in healthy diet intentions (T1 to T2) with self-reported healthy diet HBC at T3, a hierarchical multiple regression model with four steps was developed. To control for the influence of demographic variables, age and education level were entered on the first step of the model. The second step of the model assessed for the main effect of PACS (T1 to T2), PCOS (T2), and changes in healthy diet SE (T1 to T2). The third step assessed the impact of informational group and the fourth step assessed the main effect of changes in healthy diet intentions (T1 to T2) on healthy diet HBC. Results indicated the seven-variable final model was able to account for 11.4% of the variance in healthy diet HBC (p = .255, n.s.). In the final model, only PACS between T1 to T2 ($t(72)=2.154$, $p < .05$) was a statistically significant predictor of exercise HBC. Greater increases in self-reported exercise HBC were associated with greater PACS between T1 and T2. See Table 9.

Table 4: *Effect of Time and Information Group on Positive Affect and Positive Consequences of Screening (PCOS).*

Variable	Study Assessments T1	T2	T3	*p*-value[a]
Positive Affect (n=125)				
General Information Group	15.882 (4.53)	16.6912 (4.36)	---	---
SE Specific Group	15.140 (5.22)	16.412 (3.61)	---	---
Time Main Effect	---	---	---	.005
Group Main Effect	---	---		.477
Group x Time Interaction	---	---	---	.522
PCOS (n=86)				
General Information Group	---	11.631 (5.374)	13.479 (4.687)	---
SE Specific Group	---	12.466 (5.677)	14.744 (3.781)	---
Time Main Effect	---	---	---	.000
Group Main Effect	---	---	---	.261
Group x Time Interaction	---	---	---	.690

[a] *p*-value shown for repeated measures ANOVA
Note: Data shown in table are Mean (SD)

Table 5: Unconditional Means Model and Individual Growth Curve Models for Exercise SE and Healthy Diet SE (N=320).

		Parameter	Model A	Model B	Model C
Fixed Effects (Exercise SE)					
Composite Model	Intercept (initial status)	γ_{00}	2.426 (.059)***	2.409 (.062)***	2.457 (.084)***
	Time (rate of change)	γ_{01}		.001 (.001)	-.108 (.124)
	Information Group	γ_{02}			.000 (.001)
	Informational Group x Time	γ_{03}			.002 (.002)
Variance Components					
Level-1:	Within-person	σ^2_ε	.179 (.018)***	.168 (.019)***	.168 (.019)***
Level-2:	In intercept	σ^2_0	.347 (.055)***	.364 (.060)***	.360 (.059) ***
	In rate of change	σ^2_1		.000 (.000)	-.000 (.001)
Goodness-of-fit	-2 Log Likelihood		571.530	569.057	567.819
Fixed Effects (Healthy Diet SE)					
Composite Model	Intercept (initial status)	γ_{00}	2.462 (.046)***	2.424 (.050)***	2.4293 (.068)***
	Time (rate of change)	γ_{01}		.003 (.001)*	.001 (.001)
	Information Group	γ_{02}			-.014 (.100)
	Information Group x Time	γ_{03}			.003 (.002)
Variance Components					
Level-1:	Within-person	σ^2_ε	.156 (.015)***	.100 (.013)***	.100 (.013)***
Level-2:	In intercept	σ^2_0	.192 (.033)***	.241 (.039)***	.240 (.039)***
	In rate of change	σ^2_1		.000 (.000)**	.000 (.000)**
Goodness-of-fit	-2 Log Likelihood		484.574	459.154	457.006

*P<.05; **P<.01; ***P<.001

Model A: Unconditional Means Model, no predictors; Model B: Unconditional Growth Model with inclusion of the predictor time; Model C: Additional inclusion of the non-time varying predictor of information group and the information group x time interactionNote: Data shown in table are Mean (Standard Error)

Note: N is equal to the number of valid cases for use in models A-D after removing participants with substantially missing data from the person-period dataset.

Table 6: Unconditional Means Model and Individual Growth Curve Models Results for Exercise Intentions (N=314).

		Parameter	Models			
			A	B	C	D
Fixed Effects						
Composite Model	Intercept (initial status)	γ_{00}	5.713 (.150)***	5.756 (.160)***	5.709 (.220)***	2.751 (.444)***
	Time (rate of change)	γ_{10}		-.003 (.002)	-.001 (.003)	-.003 (.002)
	Informational Group	γ_{20}			.110 (.321)	.091 (.244)
	Informational Group x Time	γ_{30}			- .003 (.005)	--
	Positive Affect Change	γ_{40}				-.008 (.030)
	Positive Affect x Time	γ_{50}				.011 (.024)
	PCOS at T2	γ_{60}				.035 (.022)
	Exercise SE (T1, T2, T3)	γ_{70}				1.059 (.137)***
Variance Components						
Level-1:	Within-person	σ^2_{ε}	1.436 (.145)***	1.333 (.164)***	1.333 (.165)***	1.367(.182)***
Level-2:	In intercept	σ^2_0	2.089 (.352)***	2.307 (.407)***	2.319 (.408)***	1.374 (.301)***
	In rate of change	σ^2_1		.000 (.000)**	.000 (.000)**	.000 (.000)**
Goodness-of-fit	-2 Log Likelihood		1189.546	1186.183	1185.652	1133.925***

*p<.05; **p<.01; ***p<.001

Model A: Unconditional Means Model, no predictors; Model B: Unconditional Growth Model with inclusion of the predictor time; Model C: Additional inclusion of the non-time varying predictor of Information Group and the information group x time interaction; Model D: Additional inclusion of non-time varying predictors, positive affect change and PCOS at T2 and the time-varying predictor, healthy diet SE.

Note: Data shown in table are Mean (Standard Error).

Note: N is equal to the number of valid cases for use in models A-D after removing participants with substantially missing data from the person-period dataset.

Table 7: *Unconditional Means Model and Individual Growth Curve Models Results for Healthy Diet Intentions (N=317).*

	Parameter		Models			
			A	B	C	D
Fixed Effects						
Composite Model	Intercept (initial status)	γ_{00}	5.945 (.131)***	5.769 (.118)***	5.881 (.180)***	2.765 (.353)***
	Time (rate of change)	γ_{10}		.001 (.002)	.003 (.002)	-.001 (.002)
	Informational Group	γ_{20}			.158 (.263)	-.093 (.176)
	Informational Group x Time	γ_{30}			- .006 (.004)	--
	Positive Affect Change	γ_{30}			-	-.001 (.022)
	PCOS at T2	γ_{40}				.049 (.022)**
	Healthy Diet SE (T1, T2, T3)	γ_{50}				1.45 (.250)***
Variance Components						
Level-1:	Within-person	σ^2_{ε}	1.043 (.100)	.922 (.104)	.926 (.100)***	.913 (.101)
Level-2:	In intercept	σ^2_0	1.286 (.219)	1.541 (.283)	1.545 (.264)***	.726 (.173)
	In rate of change	σ^2_1		.000 (.000)***	.000 (.000)***	.000 (.000)***
Goodness-of-fit	-2 Log Likelihood		1058.966	1052.732	1050.190	980.950***

*P<.05; **P<.01; ***P<.001

Model A: Unconditional Means Model, no predictors; Model B: Unconditional Growth Model with inclusion of the predictor time; Model C: Additional inclusion of the non-time varying predictor of information group and the information group x time interaction; Model D: Additional inclusion of non-time varying predictors, positive affect change and PCOS at T2 and the time-varying predictor, healthy diet SE.

Note: Data shown in table are Mean (Standard Error).

Note: N is equal to the number of valid cases for use in models A-D after removing participants with substantially missing data from the person-period dataset.

Table 8: *Regression Analysis for Self-Reported Exercise HBC with Demographic Information, Affective Change, PCOS, Exercise SE Change, Informational Group, and Exercise Intentions Change (N=77).*

Variable	*B*	*SE B*	*β*	*p*-value
Step 1				
Age	.015	.032	.053	.641
Education	-.154	.093	-.188	.103
R^2 Change = 4.1%				.209
Step 2				
Age	.024	.033	.084	.475
Education	-.094	.098	-.115	.338
Positive Affect Change	.021	.080	.031	.790
PCOS (T2)	.122	.054	.265	.027
Exercise SE Change	-.563	.507	-.131	.270
R^2 Change = 7.3%				.125
Step 3				
Age	.023	.033	.081	.490
Education	-.092	.097	-.112	.351
Positive Affect Change	.016	.080	.024	.840
PCOS (T2)	.121	.053	.263	.027
Exercise SE Change	-.504	.506	-.117	.323
Information Group	.713	.555	.162	.203
R^2 Change = 2.0%				.203
Step 4				
Age	.024	.034	.084	.481
Education	-.085	.105	-.103	.423
Positive Affect Change	.013	.082	.019	.875
PCOS (T2)	.122	.054	.266	.028
Exercise SE Change	-.524	.521	-.121	.318
Information Group	.685	.578	.137	.240
Exercise Intentions Change	.036	.195	.023	.855
R^2 Change = 0.0%				.855
Full Model R^2 = 13.4%				.165

Note: Positive Affect Change, Exercise and Diet SE change, and Exercise and Diet intentions change all refer to change between the T1 and T2 assessments.

Table 9: *Regression Analysis for Self-Reported Healthy Diet HBC with Demographic Information, Affective Change, PCOS, Healthy Diet SE Change, Informational Group, and Healthy Diet Intentions Change (N=80).*

Variable	*B*	*SE B*	*β*	*p*-value
Step 1				
Age	.006	.023	.031	.790
Education	-.020	.069	-.033	.777
R^2 Change = 0.2%				.913
Step 2				
Age	-.005	.023	-.025	.829
Education	-.036	.072	-.061	.617
Positive Affect Change	.118	.054	.252	.033
PCOS (T2)	.057	.039	.170	.148
Healthy Diet SE Change	.357	.455	.092	.435
R^2 Change = 10.9%				.034
Step 3				
Age	-.005	.023	-.025	.833
Education	-.036	.073	-.060	.623
Positive Affect Change	.119	.055	.256	.032
PCOS (T2)	.058	.039	.172	.146
Healthy Diet SE Change	.312	.473	.080	.512
Information Group	-.160	.421	-.040	.705
R^2 Change = 0.2%				.705
Step 4				
Age	-.011	.025	-.054	.664
Education	-.045	.071	-.073	.535
Positive Affect Change	.114	.055	.244	.041
PCOS (T2)	-.039	.042	-.106	.348
Healthy Diet SE Change	.143	.349	.051	.683
Information Group	-.081	.422	-.022	.849
Healthy Diet Intent. Change	.135	.157	.109	.395
R^2 Change = 0.0%				.936
Full Model R^2 = 11.4%				.255

Note: Positive Affect Change, Exercise and Diet SE change, and Exercise and Diet intentions change all refer to change between the T1 and T2 assessments.

Figure 2: Positive Affect (PA) and Positive Consequences of Screening (PCOS) over Time by Informational Group

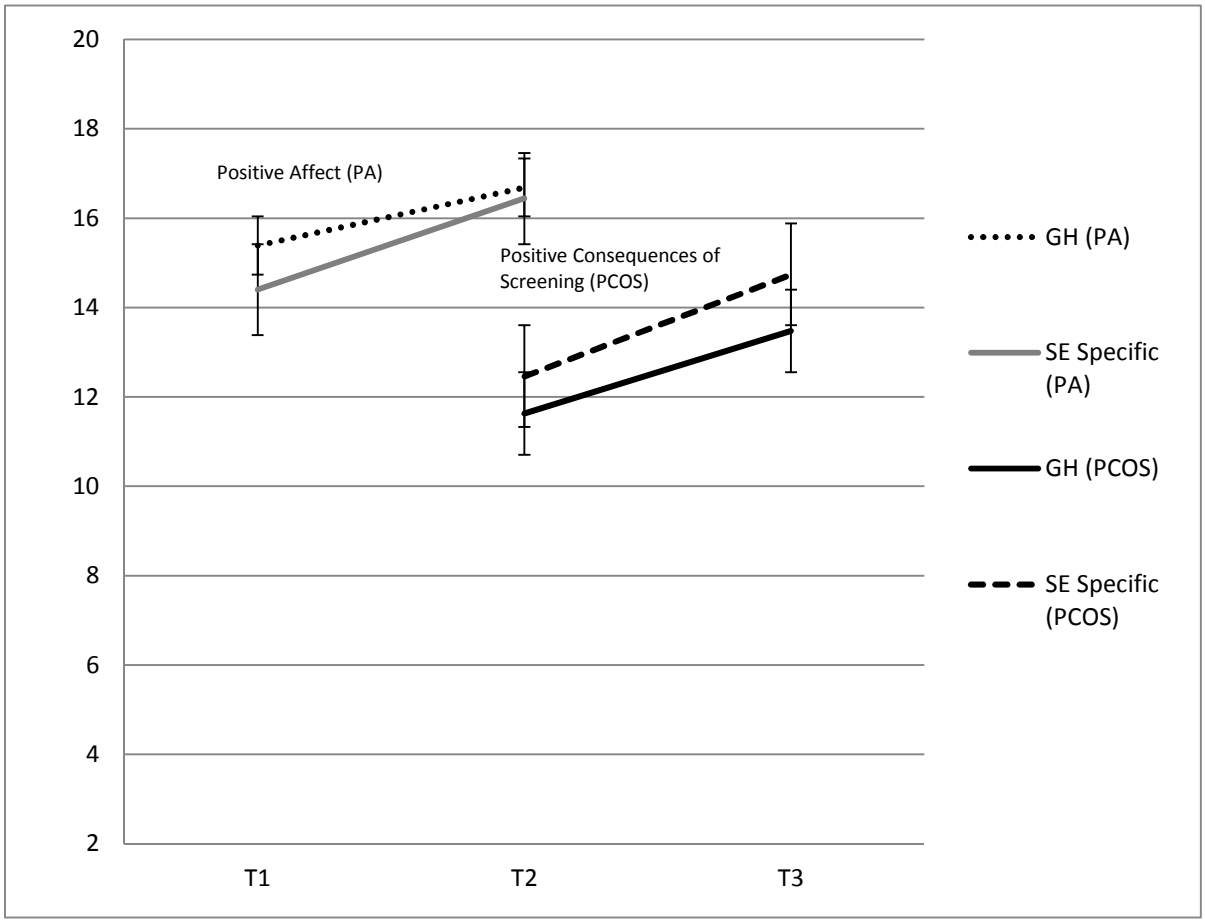
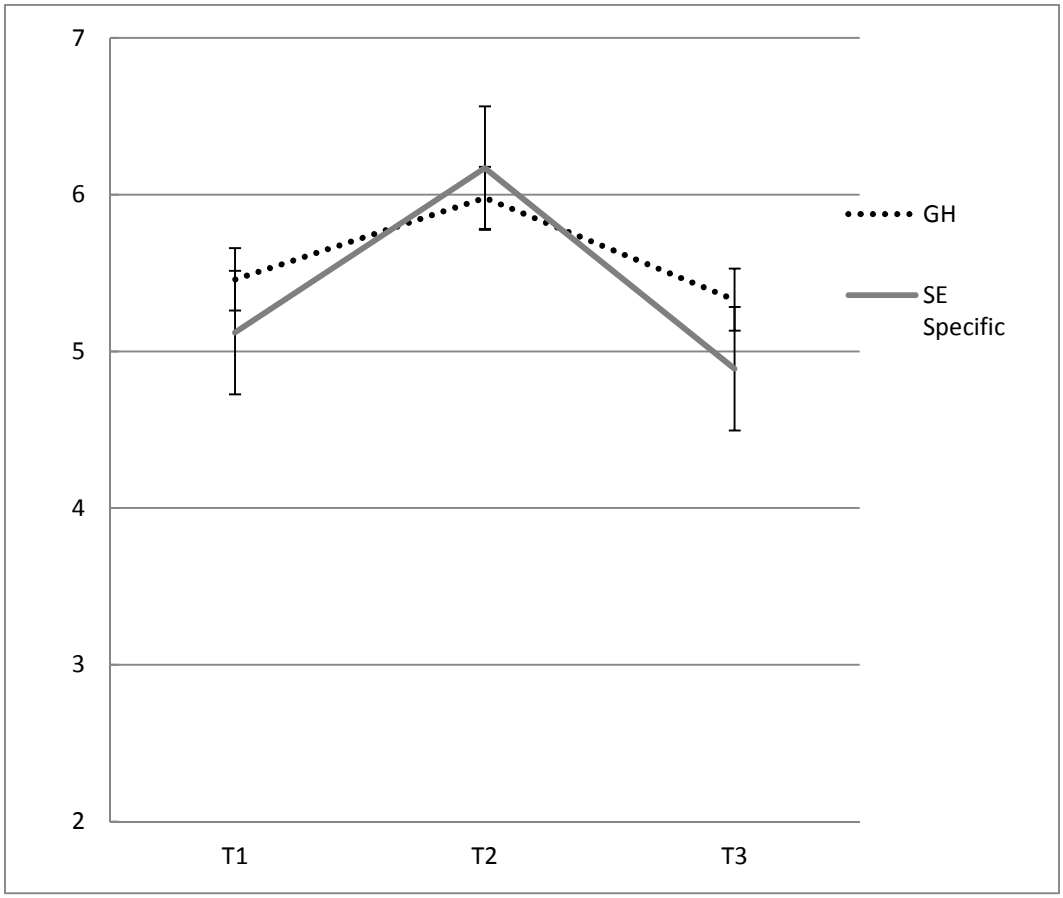


Figure 3: Exercise Intentions over Time by Informational Group



Chapter 4: Discussion

Results were generally consistent with the hypothesized impact of undergoing routine OCS: increases in positive affect, positive consequences of screening, and self-efficacy (SE) were observed after participation in routine OCS. Thus, the proposed conceptual model for a TM in a cancer screening setting (See Figure 1) was at least partially supported. In particular, in the short-term, there was an increase in positive affect from T1 to T2. Over a longer period of time, from T2 to T3, women also reported a significant increase in their perceptions of the positive consequences of OCS. Healthy diet SE also increased between the T1 and T3 assessments.

In contrast, exercise SE did not change over time. However, it should be noted exercise SE did appear to increase in the shorter-term aftermath of OCS, from T1 to T2, but then decreased from T2 to T3 (see Figure 3). As anticipated, this pattern of results suggests in the short-term, OCS may have produced a boost in exercise SE that dissipated over time. Because our sample generally consisted of older women (the mean age in the sample was approximately 65 years), the lack of a continuous increase in exercise SE over a longer period of time is not surprising. This lack of increase in exercise SE over the entire period between T1 and T3 might relate to perceived barriers to exercise unique in older women which became more salient over time. For example, concerns about physical problems, injury, and other medical issues might present as legitimate barriers in older women and these barriers limit exercise SE beliefs. This is consistent with other research in older adult samples where physical disability and health problems were cited as the most common barriers to exercise (Newsom, Kaplan, Huguet, & McFarland, 2004). Furthermore, environmental barriers, such as poor weather, limited access to gyms and trainers, concerns about learning exercise routines, etc. may have also played an

important role in women's beliefs about their ability to increase their exercise or to be more physically active in the current study (Purdie & McCrindle, 2002).

Good support for the first part of the conceptual model of a TM in a cancer screening setting developed for the present study was found. However, other parts of the model received less support. HBC intentions did not evidence any spontaneous change over time for either exercise or healthy diet. There is research suggesting intentions to exercise among older adults may be better predicted by the extent to which they accept and agree with the perceived benefits of exercise such as the health, social aspect, and pleasurable nature of exercise, etc. (Yardley, Donovan-Hall, Francis, & Todd, 2007). While neither exercise (Table 6) nor healthy diet intentions (Table 7) changed over time, SE was a robust predictor of between-person variability in both exercise and healthy diet intentions. Across women, greater exercise SE was associated with greater exercise intentions and greater healthy diet SE was associated with greater healthy diet intentions. These findings are clearly consistent with the Theory of Planned Behavior, one of the three models from which the present study's conceptual model was developed.

Mixed support was found for the other hypotheses regarding affective change and its relationship to HBC intentions and reports of HBC. Specifically, exercise intentions were not impacted by affective changes or perceived positive consequences of OCS. However, greater increases in positive affect between T1 and T2 did predict reports of greater healthy diet HBC. These results are not surprising because positive affective experience has been shown to "broaden and build" the way in which people problem-solve and facilitate health promoting behaviors (Cohn & Fredrickson, 2010; Fredrickson, 2000; Isen, 2001). Therefore, it makes sense women who had boosts in positive affect would also be the same women who would report enacting greater healthy diet HBC.

There is also data suggesting older women tend to consume more fruits and vegetables in general; thus, it may be easier to channel the positive boost furnished by participation in OCS into greater intentions to eat a healthy diet than in intentions to increase exercise (Wakimoto & Block, 2001). Additionally, women could intend to eat a healthier diet more readily since this type of HBC is contingent upon fewer environmental resources and is not prohibited by things such as physical disabilities or medical problems. Accordingly, observed increases in diet SE may lead more readily to an increase in healthy diet intentions and ultimately, healthy dietary change.

The role of perceived positive consequences of screening also appears to be important. As hypothesized, women who reported greater positive consequences of screening at T2, reported greater intentions to eat a healthy diet and greater exercise HBC at T3. Perhaps women who perceived greater benefits (e.g., greater sense of well-being) from their most recent cancer screening test were able to focus this positive "boost" on developing greater intentions or commitments to eating a healthy diet. This is reasonable because eating a healthy diet was the more feasible choice relative to increasing exercise. Eating a healthy diet is contingent on fewer environmental resources and has fewer environmental barriers associated with it relative to exercise.

As to reports of HBC, a large proportion of women reported improvements in exercising and eating a healthy diet since their last OCS test. For exercise, 63% reported some degree of positive change and for healthy diet, 93% reported some degree of positive change. In the absence of a control group, interpretation of this data is somewhat limited as it is unknown how many women in the general population might have reported similar changes in diet and exercise over a similar period of time. Even so, it is encouraging to note more women reported HBC than not. In terms of cognitive and

affective predictors of HBC, increased positive consequences of screening, from T2 to T3, predicted greater exercise HBC. Additionally, in the short-term, increases in positive affect from T1 to T2, predicted greater healthy diet HBC. Thus, our data provided some support for the hypothesized linkage of the positive affective and cognitive impact of routine OCS with increased likelihood of later HBC.

While several of our findings allowed greater understanding of between groups differences with regard to Aim 4, it was a bit disappointing that no evidence was found linking differences in the affective and cognitive impact of routine OCS (increased SE, positive affect, or positive consequence) on individual trajectories, or within person rate of change in SE, HBC intentions, or HBC. However, this was likely related to lack of variability in the slopes of individual growth trajectories. For most of the SE and intentions dependent variables examined, time did not appear to play a significant role in explaining variance across all three assessments (i.e., slopes tended to be flatter). Thus, being able to predict how individual rates of change could be explained by individual variables would be very difficult from a statistical perspective.

Finally, the brief written SE-specific intervention did not appear to have a differential, positive impact on exercise SE, healthy diet SE, HBC intentions, or reported HBC, relative to the GH information intervention group. While disappointing, results are consistent with a large existing literature demonstrating brief written, untailored interventions tend to be associated with minimal effects on SE or intentions for HBC (Bull, Kreuter, & Scharff, 1999; Noar, Benac, & Harris, 2007). Therefore, it was not altogether surprising the brief, 1-page written and untailored SE-specific intervention used in this study had little impact on SE, HBC intentions, or actual HBC. While no differential impact of the intervention between the GH and SE-specific informational

groups was demonstrated, it is important to note the lack of a control group receiving standard of care (i.e., no intervention and no exposure to health information). Thus, there is no way to discern if either or both interventions would have had a differential impact relative to no intervention. It is possible that while the SE-specific intervention did not have a significantly greater impact on our primary DVs relative to the GH information intervention, both may have been impactful relative to standard of care.

Study limitations

As noted above, an important study limitation was the lack of a control group. Without a control group, it was not possible to evaluate and compare the natural trajectory of our primary DVs (positive affect, PCOS, exercise and healthy diet SE, HBC intentions, and HBC) over time against the trajectories shown by women in the current study. An appropriate control group could have included women who had experienced an OCS test within the last year but were far enough out from the last test that the short-term impact of the OCS test would not confound comparisons. For example, a control group could be comprised of age-matched women who were 6 months from their most recent OCS test and who had received a normal, non-malignant test result. Having this type of control group would have been particularly helpful in allowing us to determine if the screening experience and receipt of a normal result explains significant variance in the primary DVs.

A second study limitation is the lack of assessment regarding the women's actual OCS test results. It is possible that a small number of women in our study received an abnormal test result following the baseline (T1) assessment. The conceptual model proposed in this study is predicated on participants having received a normal, non-malignant OCS test result. However, OCS test result was not definitively assessed in the

present study. At T2, when participants were asked what they were told regarding their results, the vast majority of women reported they did not know what their results were. In retrospect, OCS test results should have been assessed at T3 as well. Despite this, we know the base rate of abnormal OCS test results following routine OCS (whether a true or false positive) is rather low and in the range of 1 to 6% (Andrykowski, Zhang, Pavlik, & Kryscio, 2007; Andrykowski, Boerner, Salsman, & Pavlik, 2004; van Nagell, DePriest, Ueland, DeSimone, Cooper, McDonald, ...& Kryscio, 2007). This would suggest approximately 2-10 women (1-6%) in our sample, might have received an abnormal or suspicious test result. Given this rather small number, study findings would likely not be markedly affected by inclusion of these women in the analyses.

A third study limitation is related to measurement weakness, specifically, the lack of a true pre- and post-assessment of HBC. Ideally, we would have assessed current diet and exercise using validated, multi-item measures of these health behaviors at both baseline T1 (baseline) and at T3. The current measures of exercise and healthy diet HBC were both retrospective and consisted of only a single item for each health behavior.

A fourth weakness of the current study involves sample size. It would have been optimal to have a greater number of participants who completed all three assessments. Having more "completers" would have yielded greater statistical power and helped to minimize the impact of attrition for specific statistical tests which required list-wise deletion.

Finally, the study sample was limited in generalizability as it pertains to age, sex, education, and racial/ethnic identification. The mean age of our sample was approximately 65 years and it is possible that HBC, especially related to exercise, may have been less salient to this age group. While the need to engage in healthy behaviors,

including exercise, is very relevant to an aging population, the number of potential physical comorbidities in this group could have posed a serious barrier for participants to feeling efficacious, developing intentions, and engaging in actual HBC as it relates to exercise. As to educational level, the sample in the present study did not appear to be representative of educational attainment in the state of Kentucky as 37% of women in our sample reported having completed 16 or more years of post-high school education (i.e., bachelor's degree or more). According to the US Census (2009), only 21% of Kentucky residents have attained a bachelor's degree or more and so our study sample appeared to be a bit more educated relative to the state norm. It is known education is consistently and positively associated with engagement in health protective behaviors. Having a well-educated and perhaps, already "healthy" sample who had little HBC to make, may have precluded our ability to find much in terms of change over time in HBC intentions or reports of HBC. A related limitation was the lack of assessment of race/ethnicity in the present study. However, previous research in this setting has indicated the racial composition of participants in the UK OCS program is primarily White (Andrykowski & Pavlik, 2011; Salsman, Pavlik, Boerner, & Andrykowski, 2004). Consequently, it is difficult to generalize the current study findings to other racially and ethnically diverse groups. In general, testing the conceptual model of a TM in the cancer screening setting needs to be done in a more heterogeneous sample. Future research will need to focus on the intentional sampling of patients across sex, race, ethnicity, age, and education as this will be important to identify this conceptual model's limits and yield the greatest range of applicable and clinically helpful data.

Future directions

Future research should continue to examine the cancer screening setting as a potential TM since cancer screening settings may foster certain psychological changes (e.g., increases in positive affect, perceptions of well-being) which create an environment facilitative of positive HBC. While evidence from this study did not indicate overwhelming, spontaneous HBC following OCS, it did suggest the cancer screening setting may create opportunities for targeted interventions to capitalize on a psychological environment (otherwise known as a TM) conducive to HBC.

Further research is warranted to elucidate the important factors which characterize the TM across a variety of cancer screening settings and which factors most effectively enhance the potential for a wider range of HBC. In particular, only minimal research (apart from this study) has examined the role of positive affect in fostering a TM and how a cancer screening setting can actually impact non-cancer-specific HBC. Both of these areas merit additional examination as generalizability and usefulness of findings will be considerably greater. Specifically, continued research in these areas would be a worthwhile endeavor because positive affect has been shown to be an important component of health protective and health-promoting behaviors. Additionally, underutilization of general health behaviors (e.g., consistent exercise and eating a nutritious diet) is extremely prevalent in the general population of the United States and is cited as contributing considerably to the majority of chronic diseases (CDC, 2009). Therefore, exploring additional venues to promote these general types of HBC is essential.

Although this study showed increases in positive affect and increases in a sense of well-being appear to be a clear consequence of participating in routine OCS, like most

research, it failed to distinguish the influential nature of the cancer screening test result in determining the potential for a TM. Whether an individual receives a negative, positive, or uncertain result is an important, yet neglected variable in most studies. Therefore, future research should clearly focus on determining the potential for a TM in women who have received normal cancer screening test results. Finally, future research should also continue to examine how brief, cost-effective, and ideally, tailored interventions could be employed to capitalize on the HBC potential created by a TM. Had women received tailored information or some interpersonal contact (e.g., a telephone call in the present study) in addition to the brief written intervention, greater positive effects on SE, HBC intentions, and ultimately, HBC might have been observed (Noar, Benac, & Harris, 2007).

Overall, our findings were generally consistent with the conceptual model. The conceptual model served to illustrate theoretically how a TM may occur in a cancer screening setting and how the focus of HBC does not necessarily need to be cancer-specific. First, the conceptual model was supported by results demonstrating how short-term increases in positive affect and longer-term increases in well-being occurred following participation in routine cancer screening. Second, the conceptual model was supported by results demonstrating how these short-term increases in positive affect and longer-term increases in well-being could be linked to non-cancer-specific HBC intentions as well as HBC.

Support for the important role of SE in the context of a TM in a cancer screening setting was also established. Findings from the current study are consistent with the literature examining the important role of SE in other health and medical settings as it relates to HBC intentions and HBC. In conclusion, the conceptual model received some

important support and would benefit from additional elaboration and modification so it could be used to develop theory, inform intervention, and improve clinical practice.

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Tips for a Safe and Healthy Life

Take steps every day to live a safe and healthy life.

Eat healthy.

- Eat a variety of fruits, vegetables, and whole grains every day.
- Limit foods and drinks high in calories, sugar, salt, fat, and alcohol.
- Eat a balanced diet to help keep a healthy weight.

Be active.

- Be active for at least 2½ hours a week. Include activities that raise your breathing and heart rates and that strengthen your muscles.
- Help kids and teens be active for at least 1 hour a day. Include activities that raise their breathing and heart rates and that strengthen their muscles and bones.

Protect yourself.

- Wear helmets, seat belts, sunscreen, and insect repellent.
- Wash hands to stop the spread of germs.
- Avoid smoking and breathing other people's smoke.
- Build safe and healthy relationships with family and friends.
- Be ready for emergencies. Make a supply kit. Make a plan. Be informed.

Manage stress.

- Balance work, home, and play.
- Get support from family and friends.
- Stay positive.
- Take time to relax.
- Get 7-9 hours of sleep each night. Make sure kids get more, based on their age.
- Get help or counseling if needed.

Get check-ups.

- Ask your doctor or nurse how you can lower your chances for health problems based on your lifestyle and personal and family health histories.
- Find out what exams, tests, and shots you need and when to get them.
- See your doctor or nurse as often as he or she says to do so. See him or her sooner if you feel sick, have pain, notice changes, or have problems with medicine.

For more information about these tips, visit: www.cdc.gov/family/tips

Centers for Disease Control and Prevention, Office of Women's Health
404-498-2300 (tel) • owh@cdc.gov (e-mail)

Self-efficacy can be defined as confidence or belief that you can engage in an activity. Increasing self-efficacy can be helpful for you when trying to increase certain health behaviors like eating more nutritiously or being more physically active.

So how do you foster self-efficacy? First, think of an event when you were able to act according to your intentions. A perfect example is having recently undergone your ovarian cancer screening test. **Congratulations**! You not only intended to have the screening test but you followed through! See, you certainly can manage to overcome barriers and stick to a positive decision about your health.

As you consider your recent ovarian cancer screening test, you may have felt some positive feelings that accompanied the successful achievement of your goal. In any case, you can be proud of yourself and feel successful. You achieved what you intended to do. Feeling good about your healthy choices is important and can help you feel more self-efficacy.

Remember, the fact that you can schedule an appointment to have a cancer screening test **and** follow through with your appointment is evidence that you can be successful and act in a way that is important for your health. Eating nutritiously and getting enough physical activity is also very important to overall health. Lastly, colorectal cancer screenings are recommended for individuals over the age of 50.

Another part of increasing success in health behavior change is planning. For example, thinking about **when**, **where**, and **how** you will maintain your healthy choices is important. The more details your can consider, the better. This will likely be the most successful strategy. For example, research that indicates action plans are powerful and useful if you want to make a healthy behavior change.

Lastly, if you can think about different barriers to success and how you can respond to them, that will be helpful. For example, you could make a list where you write down the barriers to your plan for healthier behavior and then write down how you will react.

Remember, maintaining a healthy diet and exercise routine is very important. The Center for Disease Control (CDC) recommends that you eat a variety of fruits, vegetables, and whole grains every day. They also recommend limiting food/drinks that are high in calories, sugar, salt, fat, and alcohol. The CDC recommends that you eat a balanced diet to maintain a healthy weight. It is also known that adequate nutrition is a necessary part of general health and wellness.

With respect to physical activity, the CDC recommends that adults need to be active for at least 2.5 hours each week. This time should be spent engaging in activities that raise breathing and heart rates and strengthen muscles. Lastly, it is recommended that most adults, 50 years and older, have colorectal cancer screenings.

For more information about these tips, visit: **www.cdc.gov/family/tips**
Or call Centers for Disease Control and Prevention, Office of Women's Health
Phone (404) 498 – 2300

Appendix C: Study Measures by Study Assessment (T1, T2, T3)

Baseline (T1)

OC Risk

How likely do you think you are to develop ovarian cancer at some point during your lifetime?

No chance	Very unlikely	Unlikely	Likely	Very Likely	Certain to happen

Compared to other women your age, do you think your chances of getting ovarian cancer during your lifetime are?

Much higher than other women my age	***A little higher*** than other women my age	***About the same*** than other women my age	***A little lower*** than other women my age	***Much lower*** than other women my age

PANAS

Read each item and then mark the appropriate answer in the box. Indicate to what extent YOU HAVE FELT THIS WAY DURING THE PAST DAY.

1. During the past day**, I have felt upset**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

2. During the past day, **I have felt hostile**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

3. During the past day**, I have felt alert**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

4. During the past day**, I have felt ashamed**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

5. During the past day, **I have felt inspired**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

6. During the past day, **I have felt nervous**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

7. During the past day, **I have felt determined**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

8. During the past day**, I have felt attentive**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

9. During the past day, **I have felt afraid**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

10. During the past day**, I have felt active**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely
(0)	(1)	(2)	(3)	(4)	(5)

HBC Intentions

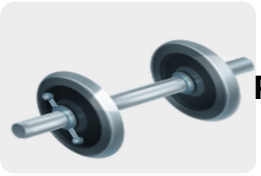
I intend to exercise for at least 20 minutes, 5 times per week for the next month (i.e.: walking, jogging, bicycling, swimming).

Don't intend at all						Strongly intend	Not applicable, I am already exercising for at least 20 minutes, 5 times per week (i.e.: walking, jogging, bicycling, swimming).
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐

I intend to eat a healthful diet for 5 out of 7 days per week for the next month (i.e.: high in vegetables, fruit, and whole grains).

Don't intend at all						Strongly intend	Not applicable, I am already eating a healthful diet for 5 out of 7 days per week (i.e.: high in vegetables, fruit, and whole grains).
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐

Exercise and Healthy Diet SE



ENSE
Please mark the box that is most true for you.

1. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week
for the next month (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

2. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week for the next month, even if I was very busy (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

3. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week for the next month, even if did not receive a great deal of support from others when making my first attempts (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

4. If I wanted to, I could eat a healthful diet 5 out of 7 days of the week for the next month (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True

5. If I wanted to, I could eat a healthful diet 5 out of 7 days of the week for the next month,even if I was very busy (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True

6. If I wanted to, I could eat a healthful diet 5 out of 7 days a week for the next month, even if did not receive a great deal of support from others when making my first attempts (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True
(0)	(1)	(2)	(3)

24-hour follow-up (T2)

1) Did you read the health education handout from the CDC on the previous page (please mark one box)?

☐ Yes, I read it thoroughly

☐ Yes, I skimmed it

☐ No, I did not read it

2) How helpful to you was the health education handout from the CDC (please mark one box)?

☐ Not at all helpful

☐ Somewhat helpful

☐ Very helpful

☐ Not applicable, I did not read the handout

Do you intend to return in one year for another ovarian cancer screening test?

Don't intend at all						Strongly intend
☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7

What were you told about the results of your recent ovarian cancer screening test? Please check all that apply.

_____	My test was normal	(1)
_____	My test was abnormal	(2)
_____	They were unsure about the results of my test	(3)
_____	I was not told anything about the results of my test	(4)

OC Risk

How likely do you think you are to develop ovarian cancer at some point during your lifetime?

No chance	Very unlikely	Unlikely	Likely	Very Likely	Certain to happen

Compared to other women your age, do you think your chances of getting ovarian cancer during your lifetime are?

Much higher than other women my age	***A little higher*** than other women my age	***About the same*** than other women my age	***A little lower*** than other women my age	***Much lower*** than other women my age

PANAS

Read each item and then mark the appropriate answer in the box. Indicate to what extent YOU HAVE FELT THIS WAY DURING THE PAST DAY.

11. During the past day**, I have felt upset**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

12. During the past day, **I have felt hostile**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

13. During the past day**, I have felt alert**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

14. During the past day**, I have felt ashamed**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

15. During the past day, **I have felt inspired**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

16. During the past day, **I have felt nervous**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

17. During the past day, **I have felt determined**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

18. During the past day**, I have felt attentive**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

19. During the past day, **I have felt afraid**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely

20. During the past day**, I have felt active**.

Not at all	Very slightly	A little	Moderately	Quite a bit	Extremely
(0)	(1)	(2)	(3)	(4)	(5)

PCOS

Instructions: All things considered, would you say your **recent screening test at the UK Ovarian Cancer Screening Clinic** has caused you to experience any of the following?

Please check one box for each item.

1. A sense of reassurance that you do not have ovarian cancer.

Not at all	**A little bit**	**Quite a bit**	**A great deal**

2. Feeling more relaxed.

Not at all	**A little bit**	**Quite a bit**	**A great deal**

3. Feeling more hopeful about the future

Not at all	**A little bit**	**Quite a bit**	**A great deal**

4. Increased interest in living a healthier lifestyle.

Not at all	**A little bit**	**Quite a bit**	**A great deal**

5. Feeling less anxious about ovarian cancer.

Not at all	A little bit	Quite a bit	A great deal

6. Feeling more confident about your general health.

Not at all	A little bit	Quite a bit	A great deal

7. A greater sense of well-being.

Not at all	A little bit	Quite a bit	A great deal
(0)	(1)	(2)	(3)

HBC Intentions

I intend to exercise for at least 20 minutes, 5 times per week for the next month (i.e.: walking, jogging, bicycling, swimming).

Don't lintend at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly intend

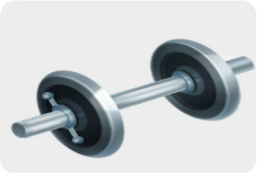
☐ Not applicable, I am already exercising for at least 20 minutes, 5 times per week (i.e.: walking, jogging, bicycling, swimming).

I intend to eat a healthful diet for 5 out of 7 days per week for the next month (i.e.: high in vegetables, fruit, and whole grains).

Don't intend at all ☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 Strongly intend

☐ Not applicable, I am already eating a healthful diet for 5 out of 7 days per week (i.e.: high in vegetables, fruit, and whole grains).

Exercise and Healthy Diet SE



ENSE
Please mark the box that is most true for you.

1. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week

for the next month (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

2. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week for the next month, even if I was very busy (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

3. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week for the next month, even if did not receive a great deal of support from others when making my first attempts (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

4. If I wanted to, I could eat a healthful diet 5 out of 7 days of the week for the next month (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True

5. If I wanted to, I could eat a healthful diet 5 out of 7 days of the week for the next month,
even if I was very busy (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True

6. If I wanted to, I could eat a healthful diet 5 out of 7 days a week for the next month, even if did not receive a great deal of support from others when making my first attempts (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True
(0)	(1)	(2)	(3)

One Month Follow-Up (T3)

Do you intend to return in one year for another ovarian cancer screening test?

Don't intend at all						Strongly intend
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

OC Risk

How likely do you think you are to develop ovarian cancer at some point during your lifetime?

No chance	Very unlikely	Unlikely	Likely	Very Likely	Certain to happen

Compared to other women your age, you think your chances of getting ovarian cancer during your lifetime are: (check one)

_____	*Much higher* than other women my age	(1)
_____	*A little higher* than other women my age	(2)
_____	*About the same* as other women my age	(3)
_____	*A little lower* than other women my age	(4)
_____	*Much lower* than other women my age	(5)

HBC Intentions

I intend to exercise for at least 20 minutes, 5 times per week for the next month (i.e.: walking, jogging, bicycling, swimming).

Don't lintend at all						Strongly intend	Not applicable, I am already exercising for at least 20 minutes, 5 times per week (i.e.: walking, jogging, bicycling, swimming).
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐

I intend to eat a healthful diet for 5 out of 7 days per week for the next month (i.e.: high in vegetables, fruit, and whole grains).

Don't intend at all						Strongly intend	Not applicable, I am already eating a healthful diet for 5 out of 7 days per week (i.e.: high in vegetables, fruit, and whole grains).
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7	☐

Exercise and Healthy Diet HBC

Lastly, we would like to find out more about any changes that may have occurred over the last month with regard to exercise and diet. Please answer the following questions as honestly as you can. There are no "right" or "wrong" answers.

Please mark one box for each of the following statements

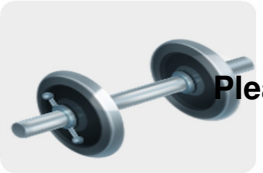
Since my most recent ovarian cancer screening test, I have increased the amount of physical exercise that I get to 20 minutes, 5 times per week (i.e.: walking, jogging, bicycling, swimming).

Not true at all						Very true
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

Since my most recent ovarian cancer screening test, I have eaten a healthful diet for 5 out of 7 days per week (i.e.: high in vegetables, fruit, and whole grains).

Not true at all						Very true
☐ 1	☐ 2	☐ 3	☐ 4	☐ 5	☐ 6	☐ 7

Exercise and Healthy Diet SE



ENSE

Please mark the box that is most true for you.

1. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week
for the next month (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

2. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week for the next month, even if I was very busy (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

3. If I wanted to, I am confident that I could exercise for at least 20 minutes, 5 times per week for the next month, even if did not receive a great deal of support from others when making my first attempts (i.e.: walking, jogging, bicycling, swimming).

Definitely Not	Hardly True	Moderately True	Exactly True

4. If I wanted to, I could eat a healthful diet 5 out of 7 days of the week for the next month (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True

5. If I wanted to, I could eat a healthful diet 5 out of 7 days of the week for the next month,
even if I was very busy (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True

6. If I wanted to, I could eat a healthful diet 5 out of 7 days a week for the next month, even if did not receive a great deal of support from others when making my first attempts (i.e.: a diet high in vegetables, fruit, and whole grains).

Definitely Not	Hardly True	Moderately True	Exactly True
(1)	(1)	(2)	(3)

PCOS

Instructions: All things considered, would you say your **recent screening test at the UK Ovarian Cancer Screening Clinic** has caused you to experience any of the following?

Please check one box for each item.

8. A sense of reassurance that you do not have ovarian cancer.

Not at all	**A little bit**	**Quite a bit**	**A great deal**

9. Feeling more relaxed.

Not at all	**A little bit**	**Quite a bit**	**A great deal**

10. Feeling more hopeful about the future

Not at all	**A little bit**	**Quite a bit**	**A great deal**

11. Increased interest in living a healthier lifestyle.

Not at all	**A little bit**	**Quite a bit**	**A great deal**

12. Feeling less anxious about ovarian cancer.

Not at all	**A little bit**	**Quite a bit**	**A great deal**

13. Feeling more confident about your general health.

Not at all	**A little bit**	**Quite a bit**	**A great deal**

14. A greater sense of well-being.

Not at all	**A little bit**	**Quite a bit**	**A great deal**
(0)	(1)	(2)	(3)

Rachel F. Steffens, M.S.

Vita

EDUCATION

University of Kentucky
Doctoral Candidate, Clinical Psychology, 2009 - Present
Concentration: Behavioral Oncology
Dissertation Topic: *Ovarian Cancer Screening as a Teachable Moment for Health Behavior Change*
Mentor: Michael A. Andrykowski, Ph.D.

University of Kentucky
Clinical Research Development and Operations Center
Graduate Certificate in Clinical and Translational Science, May 2010
Mentor: Jamie L. Studts, Ph.D.

University of Kentucky
Master of Science, Clinical Psychology, May 2009
Master's Thesis: *Distress and Health Information Interests of Women Following a Benign Breast Biopsy*
Mentor: Michael A. Andrykowski, Ph.D.

Indiana University-Purdue University Indianapolis
Bachelor of Arts, Psychology, May 2007
Concentrations: Clinical Rehab. Psychology/Drugs & Addictions
Honor's Thesis: *Predictors of Psychological Distress and Appraisals of Risk of Breast Cancer in First Degree Female Relatives of Breast Cancer Patients*
Mentor: Silvia M. Bigatti, Ph.D.

PROFESSIONAL POSITIONS

Teaching experience

Purdue University North Central: PSY342: Personality Psychology
PSY375: Introduction to Counseling
Assistant Professor — Fall 2013 - current

University of Kentucky: PSY100: Introduction to Psychology — Fall 2012; Spring & summer 2013
Lab Instructor/Teaching Assistant in an introductory psychology course.

University of Kentucky. PSY100: Introduction to Psychology — Summer 2012
Teaching Assistant in an introductory psychology course.

University of Kentucky. PSY430: Research in Personality — Fall 2011; Spring 2012
Lab Instructor/Teaching Assistant in a methods-based psychology course.

University of Kentucky. PSY223: Developmental Psychology — Fall 2010
Teaching Assistant in an introductory developmental psychology course.

Research experience

University of Kentucky. Kentucky Behavioral Oncology Research Group
Project Coordinator
Spring 2009 to fall 2011.
Mentor: Michael A. Andrykowski, Ph.D.

University of Kentucky. **Behavioral Oncology Lab East**
Research Assistant
Fall 2007 to fall 2010.
Mentor: Jamie L. Studts, Ph.D.

Indiana University – Purdue University Indianapolis
Undergraduate Honors Research Assistant
Fall 2006 to summer 2007.
Mentor: Silvia M. Bigatti, Ph.D.

Clinical experience

University of Kentucky Internship Consortium Program. Lexington, KY.
Orofacial Pain Clinic (College of Dentistry)
January 2013 to June 2013.
Supervisor: Charles R. Carlson, Ph.D.

University of Kentucky Counseling Center
July 2012 to December 2012.
Supervisor: Federico Aldarondo, Ph.D.

Women's Health (Kentucky Clinic)
January 2012 to June 2012.
Supervisor: Charles R. Carlson, Ph.D.

Eastern State Hospital
July 2011 to December 2011.
Supervisor: David Susman, Ph.D.

Harris Psychological Services Center. Lexington, KY.
Groups Coordinator
July 2010 to July 2011
Supervisor: David Susman, Ph.D.

Family Practice Medicine. Lexington, KY.
August 2009 to July 2010
Supervisor: William Elder, Ph.D.

UK Psychiatry. Lexington, KY.
Student Clinician
August 2008 to July 2009
Supervisor: Maureen Dennis, M.S.; John D. Ranseen, Ph.D.

PROFESSIONAL PRESENTATIONS

Steffens, R.F. & Andrykowski, M.A. (2013) O*varian Cancer Screening as a Teachable Moment for Health Behavior Change: The Role of Positive Screening Consequences and Efficacy Beliefs..* Poster presented at the Society of Behavioral Medicine's 34th Annual Meeting and Scientific Sessions, San Francisco, CA.

Steffens, R.F. & Andrykowski, M.A. (2012) O*varian Cancer Screening as a Teachable Moment for Health Behavior Change.* Poster presented at the Society of Behavioral Medicine's 33rd Annual Meeting and Scientific Sessions, New Orleans, LA.

Steffens, **R.F.** & Andrykowski, M.A. (2011). *Sex Differences in Positive Psychosocial Adjustment of Lung Cancer (LC) Survivors*. Poster presented at the Society of Behavioral Medicine's 32nd Annual Meeting and Scientific Sessions, Washington, DC.

Steffens, **R.F.**, Pavlik, E.L., Studts, J.L., & Andrykowski, M.A. (2010). *Interest in Health Information after Ovarian Cancer (OC) Screening: Testing a Model of a Teachable Moment (TM)*. Poster presented at the Society of Behavioral Medicine's 31st Annual Meeting and Scientific Sessions, Seattle, Washington.

Steffens, **R.F.** & Andrykowski, M.A. (2010). *Positive and negative mental health status in lung cancer (LC) survivors*. Poster presented at the Annual Markey Cancer Center Research Day, Lexington, Kentucky.

Steffens, **R.F.**, Kilkus, J.K., & Studts, J.L. (2010). *Patient decision making regarding lung cancer screening (LCS)*. Poster presented at the Society of Behavioral Medicine's 31st Annual Meeting and Scientific Sessions, Seattle, Washington.

Steffens, **R.F.**, Atwood, K.A., Zimmerman, R.S., Cupp, P.K., Kilkus, J.L., & Studts, J.L. (2009). *Predicting reported likelihood to vaccinate daughters against HPV: A survey of mothers residing in public housing*. Poster presented at the Society of Behavioral Medicine's 30th Annual Meeting and Scientific Sessions, Montreal, Canada.

Steffens, **R.F.**, Kilkus, J.L., Floyd, A., Andrykowski, M.A., Hayslip, J.J. & Studts, J.L. (2009). *Patient preference influences oncologist recommendations for chemotherapy in follicular lymphoma*. Poster presented at the Society of Behavioral Medicine's 30th Annual Meeting and Scientific Sessions, Montreal, Canada.

Steffens, **R.F.**, Graue, L.O., Likens, E. B., Hester, M.Y., Wright, H.R., & Andrykowski, M.A. (2009). *Factors associated with distress after a benign breast biopsy (BBB).* Poster presented at the Society of Behavioral Medicine's 30th Annual Meeting and Scientific Sessions, Montreal, Canada.

Steffens, **R.F.** & Studts, J.L. (2009). *Informed decision making about the human papillomavirus (HPV) vaccine among parents of adolescent daughters*. Poster presented at the Kentucky Psychological Association's Student Academic Conference, Lexington, Kentucky.

Steffens, **R.F.**, Graue, L.O., Likens, E. B., Hester, M.Y., Wright, H.R., & Andrykowski, M.A. (2008). *Distress and health information interests after benign breast biopsy (BBB)*. Poster presented at the Society of Behavioral Medicine's 29th Annual Meeting and Scientific Sessions, San Diego, California.

INVITED PAPER PRESENTATIONS

Steffens, **R.F.**, Byrne, M. M., Brooks, M.A., Arnold, S.M., & Studts, J.L. (2010). *Patient decision making regarding lung cancer screening (LCS)*. Paper presented at the Center for Clinical and Translational Science 5th Annual Conference, Lexington, Kentucky.

PUBLICATIONS

Andrykowski, M. A., **Steffens, R. F**., Bush, H. M., & Tucker, T. C. (2013). Reports of 'growth' in survivors of non-small cell lung cancer and healthy controls: What is the value-added by the cancer experience?. *Psycho-Oncology*.

Steffens, **R.F.**, Wright, H.R., Hester, M.Y., & Andrykowski, M.A. Clinical, demographic, and situational factors linked to distress associated with benign breast biopsy (2011). *Journal of Psychosocial Oncology*, 1, 35-50.

Floyd, A., **Steffens, R.F**, Pavlik, E. & Andrykowski, M. (2011). Receipt of a false positive test result during routine screening for ovarian cancer: A teachable moment? *Journal of Clinical Psychology in Medical Settings, 18*, 70-77.

BOOK CHAPTERS

Yozwiak, J. A., Settles, R. E., & **Steffens**, **R.F.** (2011). Psychosocial functioning in youth with chronic illness. In Patel, D. R., Greydanus, D. E., Donald E., Omar, H.A. & Merrick, J. (Ed.), Neurodevelopmental Disabilities, (pp. 449 – 462). New York, NY: Springer.

SCHOLASTIC AND PROFESSIONAL HONORS

Graduate Student and Behavioral Science Travel Awards ($1000), 2008-2012

Daniel R Reedy Quality Achievement Fellowship Award ($3000), 2007-2010

Professional Students Mentored Research Fellowship ($3000), 2009
Decisions to Undergo Lung Cancer Screening

Undergraduate Research Opportunity Program Grant ($500), 2007
Psychological Distress in First Degree Female Relatives of Breast Cancer Patients