Social Science & Medicine 282 (2021) 114144

Contents lists available at ScienceDirect

Social Science & Medicine

journal homepage: www.elsevier.com/locate/socscimed

Theory utilization in current communication of cancer genetic testing research: Identified gaps and opportunities

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ARTICLE INFO

Keywords:
Cancer genetic testing
Theory
Scoping review
Communication
Behavior change
Health psychology

ABSTRACT

Background: Effective communication of cancer-related genetic and genomic testing (CGT) with patients and the public is paramount to transforming and managing cancer prevention, detection, and care. Behavioral and social science theories could improve communication effectiveness and, in turn, health outcomes.
Methods: In this study, we characterized the use of theory in recent research on communication about CGT from 2010 to 2017.
Results: Of 513 empirical papers focusing on communication about CGT, only 119 (23%) utilized any theory in the study design. Behavior change and health psychology/cognitive representation theories (24.2% and 21.9%, respectively) were the most commonly used with minimal use of communication theories (3%). Theories were primarily used to guide hypotheses or research question development (73.9%), and for selecting measures or codes (68.9%). Approximately half of the papers (48.3%) related their study findings to the referenced theory. Fewer papers (14.3%) discussed implications of the findings for the theory.
Conclusions: While theories are being utilized to inform study design, few discuss their results in the context of theoretical implications and thus decrease potential generalizability. Greater use of theory could help scholars to identify and develop theories suited to this clinical context and inform our understanding of related communication processes more broadly.

1. Introduction

Genetic testing has become increasingly ubiquitous in both clinical and direct-to-consumer contexts. With the continued growth of genetic testing, testing technologies are transforming cancer prevention and care by helping to define cancer risk and facilitate decision making for risk management (Kensler et al., 2016). Cancer-related genetic and genomic testing (CGT) has been extensively used to provide estimates of cancer risks, generally through trained genetic counselors (Kensler et al., 2016). Given the complexity of interpreting genetic information, effective communication is essential to both the public understanding of CGT as well as an individual patient's use of their own information to manage cancer risks. Communication, while broad, in the context of the current study refers to *specific* types of communication issues relating to CGT such as patient-provider communication; communicating the importance of the tests; their purposes, results, and implications; decision making communication; and potential outcomes of communication. In a previous research scoping review, we proposed a four-phase continuum of various processes and outcomes relating to CGT (Kaphingst et al., 2019): baseline knowledge and awareness, decision-making for CGT, process of communication, and finally, intermediate and distal outcomes. Communication in all four phases is paramount to CGT uptake,

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https://doi.org/10.1016/j.socscimed.2021.114144
Received 5 September 2020; Received in revised form 31 May 2021; Accepted 11 June 2021
Available online 17 June 2021

communicating results from providers to patients, and the short- or longer-term impacts CGT will have on users. Findings from the scoping review found that current research regarding communication of CGT has primarily focused on psychosocial (e.g., anxiety, distress), and, to a lesser extent, behavioral (e.g., screening or surgical decisions) outcomes of returning genetic tests results, often in the context of breast or ovarian cancer (Kaphingst et al., 2019). Despite this focus on psychological and behavioral outcomes and impacts, little research has characterized the theoretical/conceptual frameworks or models utilized (henceforth referred to as "theory") in research on communication of CGT. We elected to use this conceptualization of CGT communication issues related to the four-phase continuum as a way to better characterize current scholarship on communication about CGT. Therefore, the present analysis is an in-depth examination of the use of theory in the communication of CGT studies identified in our scoping review.

In social and behavioral science research, *theory* is an abstract representation of proposed logical relationships among characteristics (or predictors) of an observed phenomenon (or outcome) (Craig, 1980). The utilization of theory has important implications for research and practice. Theories can be used to develop hypotheses for testing. Theory-based interventions have been shown to increase physical activity, diet, and other health behaviors more so than non-theory-based interventions (Glanz and Bishop, 2010; Gourlan et al., 2016), and the utilization of theory may facilitate long-term effects of interventions (Webb et al., 2010). Theory can also contribute to generalizability across studies through testing relationships between constructs and identifying the strongest relationships (Shoemaker et al., 2003). These findings can then be used to inform interventions and policies that are based on understanding the phenomenon (Muthukrishna and Henrich, 2019; Oberauer and Lewandowsky, 2019). Theory, in this sense, can influence decision makers in setting policy, research foci for investigators, and standards of practice across clinical settings. Current research on communication about CGT should continue to be examined to determine whether atheoretical approaches or theory-driven approaches are influencing policy and practice. Use of atheoretical approaches may limit evidence-based policy setting, prioritization of research foci, and setting standards of practices.

In our prior scoping review (Kaphingst et al., 2019), we characterized recent scholarship of communication of CGT and proposed a four-phase continuum (baseline knowledge/awareness, decision making, process of communication of CGT, and immediate/distal outcomes of CGT results) of research based on models of patient-provider communication (Epstein and Street, 2007; Peterson et al., 2018). The first two phases of the continuum generally occur prior to CGT testing, whereas the final two deal more with the communication of the results as well as any short-term, medium-term or long-term outcomes of testing. Baseline knowledge and awareness assessed an individual's beliefs and attitudes towards CGT, which form the basis for responses to communication about CGT. The decision-making phase focused on communication related to an individual's decision about uptake of CGT and processing of barriers and facilitators to testing uptake, like social networks, support, health care coverage, access, etc. Process of communication focused on clinical communication about CGT and return of results from healthcare providers. Finally, intermediate and distal outcomes were conceptualized as outcomes of CGT, such as psychological or behavioral change to mitigate cancer risk (e.g., chemoprevention, prophylactic surgery, etc.). These phases can have overlaps given the universal nature of communication and complexity of clinical genetic testing; thus, studies could be in more than one continuum phase and the groups were not mutually exclusive in the parent review and current review. The scoping review identified 513 peer-reviewed studies published between 2010 and 2017, highlighting research gaps that remain in understanding the array of factors associated with communication of CGT. The review also examined study design (quantitative, qualitative, mixed methods) to first characterize the current literature and to determine if differences emerged by continuum phase. The findings showed that studies most commonly utilized observational quantitative methods and primarily focused on psychosocial outcomes. Building upon these findings, our current analysis aimed to characterize theory utilization in papers identified in this parent scoping review and explore whether differences existed between continuum phases. Characterizing the utilization of theory in the current scholarship on communication about CGT can help researchers determine gaps, future directions and opportunities. Such work would enhance generalizability and set robust policies, research foci, and standards of care when delivering CGT services to reduce morbidity and mortality attributable to hereditary cancer.

Thus, the purpose of the present analysis was to answer the following research questions: (1) What theories were used in the recent literature on communication about CGT, and (2) How do the theories being used inform the study design, analysis, or interpretation of outcomes?

2. Methods

This study is a secondary analysis of the use of theory in the 513 studies identified in Kaphingst and colleagues' (2019) scoping review on communication about CGT (Kaphingst et al., 2019) directed for patients or public published from January 2010 to January 2017. For the scoping review, a comprehensive literature review was conducted in the following databases: Medline, Embase, CINAHL, PsycINFO, Cochrane Library, and ERIC. Controlled vocabulary (MeSH, EMTREE, and PsycInfo Subject Headings) was combined with keywords to address the lack of standard search terms in this literature. Broad categories and terms included cancer, genetic/genomic communication, provider/direct-to-consumer, and patient/public. Articles were included if they were written in English, presented empirical data, included cancer-related genetic and/or genomic information, and were relevant to at least one phase of the CGT communication continuum (baseline knowledge/awareness, decision making, process of communication of CGT, and immediate/distal outcomes of CGT results).

For the present analysis, our research team developed a theory-focused data extraction protocol, which was reviewed and piloted multiple times (See Supplemental Files for Coding Protocol). We first assessed whether the study referenced at least one theory, conceptual model or framework, identified in either the abstract or main text of the manuscript (see Kaphingst et al., 2019 and Supplemental File). We then further analyzed studies identified as using theory, assessing whether and how the study utilized an existing theory in study design or analysis (e.g., conceptualization, hypothesis generation, measures selection, interpretation of findings), or created a new theory. Additionally, using coding on CGT communication continuum phase (from our parent review using the same pool of studies (Kaphingst et al., 2019; Peterson et al., 2018), we compared theory utilization across phase categorizations based on descriptive statistics. These included baseline knowledge and awareness of CGT, decision-making, process of communication, and intermediate and distal outcomes. If theory was not utilized in the studies (e.g., only mentioned theory as having been used in other studies, or was only found in the references), those studies were not included in this analysis. Studies that stated that the grounded theory analytic method was used in analysis (Glaser et al., 1968) but did not otherwise meet our definition of utilizing theory were not included.

For included studies, we assessed whether the study: 1) mentioned and/or provided a citation for a specific theory or theories; 2) used multiple theories; and/or 3) developed their own theory. We then assessed how the theory was applied through a comprehensive review of the manuscript, specifically, if the theory was used to: a) develop hypotheses or research questions; b) select measure(s)/theme(s)/code(s) (dependent on the design, previous theory cited, or if the authors created their own theory); c) explain or discuss findings in the discussion section; and/or d) discuss implications for the particular theory based on study results. Additionally, we explored whether theory utilization varied by study design (i.e., quantitative, qualitative, mixed methods)

from reviewing the methods section of each paper, as well as by CGT communication continuum phase from our parent review.

A single coder (DCY, JZ, CR, AB, KK) extracted information from each article, with a second coder extracting information for 20% of the articles. A third coder (DCY, KAK) reconciled all discrepancies and determined a final code. Across the 108 codes, there was an average inter-coder agreement of 95% with a range from 74% to 100% agreement. Data were collected through the online database platform, REDCap (Patridge and Bardyn, 2018), and quantitative analyses were conducted using SPSS Version 25 (IBM, 2009). We examined descriptive statistics overall and by continuum phase and study design. We did not test differences in proportions by study design or continuum phase using chi-squared tests or other test statistics due to the small cell sizes of some categories and because continuum phases were not mutually exclusive. Despite this limitation, this analysis helped us explore variations in theory utilization across study design or the communication continuum phases to determine if patterns emerged.

Because a variety of theories from different disciplines were identified, we categorized the general types of theories to better characterize the most prominent theory types. An iterative review process yielded the following types of theory categories based upon factors such as discipline, process studied, and outcomes (Glanz and Bishop, 2010): *behavior change* (theories focused on proximal factors affecting behavior or behavioral intention, e.g., Health Belief Model, Theory of Reasoned Action, Theory of Planned Behavior); *decision making* (theories focused on decisional processes, e.g., Decisional Analytic Framework, Informed Choice Model, Decisional Conflict Theory); *information processing* (theories focused on individuals' processing of health and/or risk information, e.g., Cognitive-Social Health Informational Processing, Risk Information Seeking and Processing Model, Cue Adaptive Reasoning Account); *communication* (theories focused on communication processes, e.g., Imagery Model of Narrative Communication, Uncertainty Management Theory), *health psychology/cognitive representations* (theories focused on cognitive processing and representations, e.g., Self-Regulation Theory, Common Sense Model, Stress and Coping); *author(s) created*; *non-specific theories* (theories that were not specifically named, e.g., "multifactorial model of health psychology"); and *other* (theories that did not fit into any of the previous groups, e.g., Cultural Consensus Theory, Social Constructivist Theory, Need for Closure Theory).

3. Results

3.1. Use of theory

Of the 513 studies included in the parent scoping review, only 119 (23%) mentioned theory in any way. Fig. 1 shows the proportion of studies published in each year between 2010 and 2016 that utilized theory. Because we only included studies published through January 2017, that year is not included in the figure. Use of theory did not increase over the time period covered by the scoping review, with a slight downward trend. Table 1 presents study characteristics of interest and theory type of our current project across the CGT communication phases. Among the studies that used theory, 46 articles (38.7%) used multiple theories. There was mention of 169 theories across the 119 manuscripts. In this subsample of 119 studies, 106 (89.1%) identified a specific theory or theories, meaning 13 studies referenced theory in a non-specific way. Most of the studies mentioning a specific theory (92 of 106, 86.8%) provided a citation to an original paper describing that theory. A subset of studies ($n = 25$; 14.8%) alluded to a general category of theories (e.g., social psychological theories) but did not reference a specific theory (see Theory Category in Table 1). Only five papers (4.2%) included a theory completely created by the authors. Theory expansion, taking an existing theory and adding other predictors or pathways, was a more common approach to an author-created theory ($n = 9$; 7.6%).

3.2. Types of theory used

Of the categories of theories used, two were most common: behavior change (24.2% of theories) and health psychology/cognitive representation (21.9%). Among behavior change theories, Health Belief Model, Theory of Reasoned Action, and Theory of Planned Behavior were most common, and among health psychology/cognitive representation theories, Self-Regulation Theory, Common Sense Model, and Stress and Coping were most used. The categories of non-specific theories (e.g., "multifactorial model of health psychology"; n = 25, 14.6%), information processing theories (e.g., Cognitive-Social Health Informational Processing, Risk Information Seeking and Processing Model; n = 21, 12.2%) and other (e.g., Cultural Consensus Theory, Social Constructivist Theory, Need for Closure Theory; n = 25, 14.6%) were also found in more than 10% of the studies. Communication was the least represented theory category (e.g., Imagery Model of Narrative Communication, Uncertainty Management Theory) ($n = 5$; 3.0%).

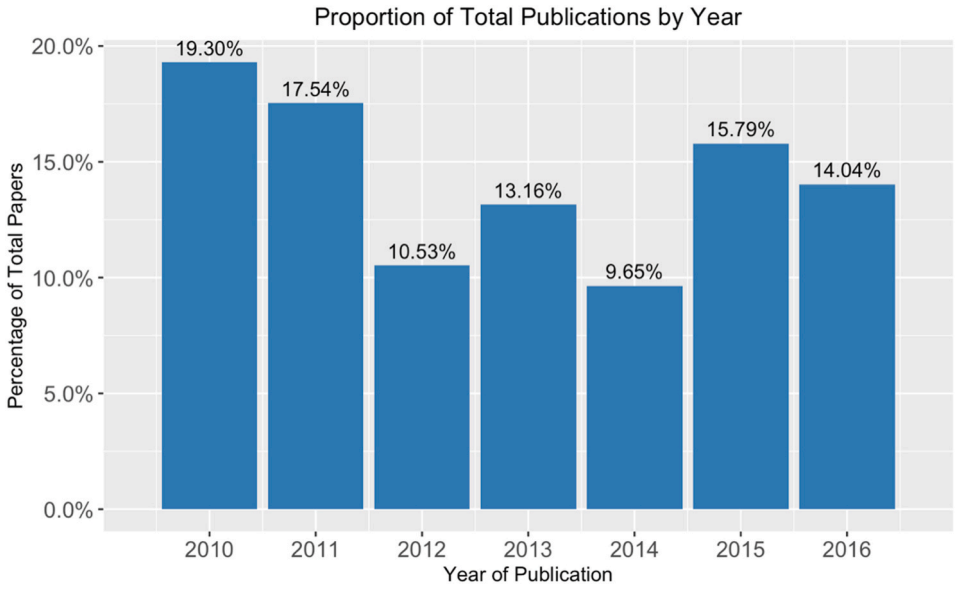

Fig. 1. Proportion of published studies about communication of cancer genetic testing utilizing theory by year of publication.

Table 1
Use of theory in research on communication of cancer genetic testing information between 2010 and January 2017 by phase in the CGT Communication Continuum and overall.

Study Characterizations	CGT Communication Continuum Phase (n = 144)[a]				Overall (*n* = 119)
	Baseline Knowledge and Awareness (*n* = 44)	Decision Making (*n* = 25)	Process of Comm (*n* = 21)	Intermediate and Distal Outcomes (*n* = 54)	
Identified a specific theory/theories	35 (79.5%)	22 (88.0%)	18 (85.7%)	47 (87.0%)	106 (89.1%)
Citation to original paper describing theory (n = [b])	31 (88.9%)	21 (95.4%)	16 (89.9%)	43 (91.5%)	92 (86.8%)
Used multiple theories	23 (52.3%)	7 (28.0%)	6 (2.9%)	20 (37.0%)	46 (38.7%)
Created a new theory	5 (11.4%)	3 (12.0%)	1 (4.5%)	5 (9.3%)	5 (4.2%)
Expanded an existing theory	5 (11.4%)	2 (8.0%)	1 (4.8%)	6 (11.1%)	9 (7.6%)
Application of theory to inform methods					
Hypothesis and research question development	32 (72.7%)	18 (72.0%)	17 (81.0%)	38 (70.4%)	88 (73.9%)
Selection of measures/themes/codes	28 (63.6%)	20 (80.0%)	14 (66.7%)	33 (61.1%)	82 (68.9%)
Explicitly stated use of theory for measures selection	18 (41.0%)	4 (16.0%)	7 (33.3%)	15 (27.8%)	46 (38.7%)
Explanation of study results	24 (54.5%)	15 (60%)	10 (47.6%)	26 (48.1%)	58 (48.7%)
Discussion of implications for particular theory	7 (15.9%)	2 (8.0%)	2 (9.5%)	8 (14.8%)	17 (14.3%)
Only mentioned in Introduction section	5 (11.4%)	7 (28.0%)	6 (28.6%)	11 (20.4%)	22 (18.5%)
Theory Categorization					
Behavior Change	13 (29.5%)	9 (36.0%)	3 (14.3%)	7 (13.0%)	41 (24.2%)
Decision Making	2 (4.5%)	3 (12.0%)	2 (9.5%)	3 (5.6%)	37 (21.9%)
Information Processing	9 (20.5%)	4 (16.0%)	0 (0%)	5 (9.3%)	25 (14.6%)
Other	4 (9.1%)	1 (4.0%)	4 (19.0%)	7 (13.0%)	25 (14.6%)
Non-Specific Theories	7 (15.9%)	3 (12.0%)	2 (9.5%)	13 (24.1%)	21 (12.2%)
Communication	0 (0%)	1 (4.0%)	2 (9.5%)	2 (3.7%)	10 (6.5%)
Psychology/Health Psychology	9 (20.5%)	4 (16.0%)	8 (38.1%)	17 (31.5%)	5 (3.0%)
Author(s) Created	1 (2.3%)	1 (4.0%)	1 (4.8%)	2 (3.7%)	5 (3.0%)

[a] Continuum Phase assignments were not mutually exclusive and studies could have more than 1 phase represented.
[b] *n* refers to previous row variable of specifically identified theory/theories.

3.3. Utilization of theory to inform study methods

The majority of studies (*n* = 88, 73.9%) that used theory did so to develop hypotheses and research questions. Many studies (*n* = 82, 68.9%) used theoretical constructs to select measures/codes, although this was not always made explicit by the authors. When discussing their study results, fewer than half (*n* = 58, 48.7%) discussed their findings in light of the theory referenced. Discussions of theoretical implications (i.e., implications of the study findings for the theory) were uncommon (*n* = 17, 14.3%). In some studies, the theory was only mentioned in the Introduction section (*n* = 22, 18.5%), but not mentioned in the Methods, Results, or Discussion sections, and the theory did not seem to influence the study methods.

3.4. Use of theory across continuum phases

Of studies utilizing theory, 30.6% were in the baseline knowledge and awareness phase, 17.4% in decision-making, 14.6% in process of communication, and 37.5% in the intermediate and distal outcomes. Across continuum phases we found similar utilization of theory. Most studies identified a specific theory (79.5%–88.0%), provided a citation to the theory (88.9%–95.4%), and applied theory to develop research questions (70.4%–81.0%) and select measures/themes/codes (61.1%–80.0%). However, across continuum phases, there was less utilization of theory for explicitly selecting measures (16.0%–41.0%) or explaining study results (47.6%–60.0%), and few studies discussed the implications of the findings for theory (8.0%–15.9%). There was a trend toward greater utilization of multiple theories in the baseline knowledge and awareness phase studies compared with the other continuum phases (52.3%–2.9%–37.0%). Decision-making, process of communication, and intermediate and distal outcomes continuum phases were the best users of theory (85.7%–88.0%), despite not using multiple theories in comparison to the baseline knowledge and assessment phase.

We found generally similar patterns for the types of theories being utilized across continuum phases. The most common types of theories in the baseline knowledge and awareness phase were behavior change (29.5%), information processing (20.5%), and psychology/health psychology (20.5%); the most common specific theories were the health belief model, integrated model of behavioral prediction, fuzzy-trace theory, self-regulation theory of health behaviors, and the common sense model of health and illness. In the decision-making continuum phase, behavior change theories (e.g., health belief model, theory of planned behavior) were more utilized than decision-making theories (36.0%–12.0% respectively). In the process of communication continuum phase, psychology/health psychology theories (e.g., self-regulation theory, transactional model of stress and coping) were most common (38.1%), with communication theories being among the least common (9.5%). Finally, among the continuum phase of intermediate and distal outcomes, psychology/health psychology theories (e.g., self-regulation theory, transactional model of stress and coping) were the most utilized (31.5%), with non-specific theories (24.1%) next most common (e.g., "Chronic Risk Trajectory", "Simple Health Economics Model", "Conceptual framework of psychosocial issue faced by genetic conditions").

3.5. Use of theory across study designs

We also explored the use of theory by study design. Of the 119 studies, quantitative designs were most common (66.4%), followed by qualitative designs (26.1%), and mixed methods designs (7.6%). The majority of studies in each group referenced a specific theory: 91% of quantitative, 87.1% of qualitative, and 77.8% of mixed-methods studies. For mixed-methods studies, utilization of theory was similar in the quantitative and qualitative components. Types of theories used were also similar across study designs.

4. Discussion

This analysis characterized the use of theory within the recent research on communication of CGT. We found that fewer than one-

quarter of studies in this area were grounded in theory or theories, and that utilization of theory did not improve over the years reviewed and may have decreased. Of those studies that did use theory, the majority used one specific theory, generally from the disciplines of health psychology or public health. The most common uses of theory were to guide hypotheses or research question development, and for selecting measures or codes. Only about half of studies used theory to frame the findings from the study, and few studies discussed the implications of the study findings for the specific theory (e.g., fit of the theory to the data and suggested modifications to the theory). These trends were similar across continuum phase and study design. These results, therefore, highlight gaps and opportunities for future research for theory building and development within research about communication of CGT. Similar concerns regarding the need for greater use of theory have been raised for public health interventions (Glanz and Bishop, 2010; Michie and Prestwich, 2010) and cancer screening behavioral interventions (Kobrin et al., 2015).

We identified the need for deeper integration of theory in discussing study findings and greater discussion of the theoretical implications of study findings. Even in the subset of studies which used theory to some extent, authors generally did not discuss how their findings were consistent or inconsistent with the predictions of the theory or relay implications of their findings for the theory. This finding, in particular, highlights a major limitation of the current communication about CGT scholarship. With a lack of emphasis on theoretical implications, researchers will be unable to determine which theories are a good fit and best assess the processes and outcomes of interests across any study design or continuum phase. This highlights opportunities for researchers to identify and further develop theories particularly suited for the context of communication about CGT. However, from our current study and previously published works (Epstein and Street, 2007; Kaphingst et al., 2019; Peterson et al., 2018), there have not been enough papers published comparing outcomes in these various designs, highlighting an additional opportunity for CGT scholarship focused on communication deliveries and modalities. We believe theory-driven research may lead to findings that are more generalizable, since theories are typically used to understand how constructs relate and affect an outcome. Better policies, research foci, and standards of care can be created for clinical implementation based on generalizable results from rigorously designed studies using theory as a guiding framework compared to atheoretical approaches that exists within the scholarship on communication about CGT.

In addition, theory-driven research would inform testing theories with different target populations in different contexts, determining mediating and moderating constructs, and identifying direct and indirect effects as well as testing alternative models as a way to thoroughly test the predictive power of a theory in this context (Slater and Gleason, 2012). Testing of existing theories to predict outcomes of communication of CGT may also lead to theory building based on existing theories, clinical observations, or empirical data. Using theories to develop research questions or hypotheses, to test the theory, or to inform the building of a theory for an outcome of interest can improve the ability of researchers to maximize generalizability and strengthen evidence bases for intervention design and clinical care and policy. Despite a relatively small number of studies using these types of approaches, we found some exemplars within our current study.

One example of a study that effectively used theory was from Agurs-Collins et al. (2015), which used Social Cognitive Conceptual Framework (Glanz et al., 1999) assess how demographics and awareness and use of CGT could be influenced by predisposing (e.g., perceived risk, worry about cancer, fatalism) and enabling factors (e.g., numeracy, health information-seeking behavior, internet use) by analyzing data from a nationally representative survey, the Health Information National Trends Survey. The authors then highlighted the theoretical implications of the observed associations between predisposing and enabling factors that influence awareness of CGT, specifically noting that predisposing factors had no impact on CGT uptake in their sample, but enabling factors, specifically awareness were key predictors. As such the authors made recommendations and highlighted theoretical implications concerning how researchers should incorporate these associations between enabling and predisposing factors that likely would translate into important intervention designs to encourage participant engagement.

Another notable finding was the lack of use of communication theory in this literature. This was seen across all continuum phases but especially within the Process of Communication and Decision-Making continuum phases where, arguably, prior communication theory could be particularly useful as one type of social and behavioral theory to consider. Given that research on communication of CGT is investigating various health communication processes (e.g., patient-provider communication, responses to mass media), theory from the communication discipline, and particularly from health and/or interpersonal communication, could assist researchers in identifying what constructs predict the outcomes of those processes (e.g., message effects, affective response, decision to get tested). As one example, given the increasing uncertainty of findings generated by next-generation technologies (Han et al., 2017), Uncertainty Management Theory could prove useful in investigating communication about these types of results. The theory posits that an individual's personal tolerance for uncertainty will determine how willing that person is to invest (e.g., behavior, monetary) when the likelihood of the desired outcome is unclear (Brashers, 2001). Fisher et al. (2017) used this theory and its underlying assumptions to conduct a thematic analysis of genetic counseling sessions with practitioners and mothers at risk for carrying *BRCA1/2*. Interpersonal communication skills models such as the Comskil Conceptual Model (Brown and Bylund, 2008) might also be useful in improving patient-provider communication about CGT, which work to enhance 5 communication components in explicit detail, specifically goals, strategies, skills, processes tasks, and cognitive appraisals that draw upon communication, psychological, and educational theories. CGT researchers may be unfamiliar with these types of theories, highlighting that one purpose of interdisciplinary studies in this area might be to suggest theory from different disciplines relevant to different phases of the continuum. This would allow CGT researchers to determine the fit of different theories to different communication processes in various contexts and populations and lead to further theory development.

4.1. Limitations

The limitations of our analysis should be considered. The definitions and inclusion criteria of the parent study limited the types of communication research considered (e.g., family communication was not a focus). However, in assessing use of theory in this literature, we utilized well-established inclusion criteria based upon rigorous descriptions of theory and their applications (Craig, 1980; DeAndrea and Holbert, 2017; Shoemaker et al., 2003; Slater and Gleason, 2012). Although we conducted exploratory analyses, we could not compare applications of theory across study design types due to small cell sizes. Another possible limitation is that a study may have utilized a theory but not referenced the theory in the published manuscript. However, we believe that the data are important as the published manuscript is what generally reaches other researchers and practitioners. Lastly, unpublished works or works in progress were not able to be assessed as this project only included peer-reviewed publications. Despite these limitations, our study is the first to characterize the use of theory within current research on communication of CGT.

5. Conclusion

In conclusion, much of the recent research on the clinically critical issue of communication about CGT is not using theory. In addition, this work generally does not test theory or utilize theory in discussing the

implications of study findings. Although research in this area has yielded findings of strong clinical importance, greater use of theory could add to the importance of this work in developing evidence-based interventions, improving the replicability of findings, and understanding communication processes more broadly (DeAndrea and Holbert, 2017; Kaphingst et al., 2019; Shoemaker et al., 2003). This would facilitate achievement of the broader goal of CGT in preventing and treating cancer and enhancing utilization across population subgroups. Working towards theory development in this field will also build a deeper understanding of the processes at play in this specific context and how it may be different or similar to other clinical contexts.

Credit author statement

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Declaration of competing interest

The authors have no conflict of interest to declare.

Acknowledgements

We thank Tae Kyoung Lee for her helpful comments on an earlier version of this manuscript. Additionally, we thank Devon Cantwell for helping to build the figure in R. Financial support was provided by the National Cancer Institute's Behavioral Research Program through HHSN261201700078P. We also acknowledge the direct financial support for the research reported in this publication provided by the Huntsman Cancer Foundation. We acknowledge assistance from the Clinical and Translational Science Award (CTSA) Systematic Review Core at the University of Utah. The opinions expressed by the authors are their own and this material should not be interpreted as representing the official viewpoint of the U.S. Department of Health and Human Services, the National Institutes of Health, or the National Cancer Institute.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2021.114144.

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