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Getting to the Heart of It: Examining Intergenerational Sensemaking of Heart Disease

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GETTING TO THE HEART OF IT: EXAMINING INTERGENERATIONAL SENSE-

MAKING OF HEART DISEASE

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Using Communicated Narrative Sense-Making Theory (Koenig Kellas, 2018), this study tested how grandchildren's perceptions of risk and knowledge about heart disease in the family, as well as relational satisfaction, changed over the course of 3 weeks as a result of engaging in a storytelling experiment. Participants included 17 grandchild participants who interviewed their grandparents to tell stories about family heart health or discuss everyday events based on random assignment into a treatment or comparison group. Additionally, participants completed measures surrounding their knowledge of heart disease, relational satisfaction with their grandparent, and their perception of risk to develop heart disease in their lifetime. Thematic analysis of the stories revealed three parts to the storytelling sequence: (a) the HD Family Tree, (b) the grandparent's story and reaction, and (c) advice/lessons learned. Story themes included (a) confusion/shock, (b) acceptance of their health, and (c) disjointed reporting. Statistical analyses revealed trends for an increase in heart disease knowledge in the treatment group over time, as well as increased perceptions of dread risk over time, although relational satisfaction for grandchildren in their grandparent-grandchild relationship did not change over the 3 weeks. The results of this study provide a deeper look into how grandparents may help to socialize their grandchildren in this understudied family relationship, especially in regards to health. Moreover, these results also help to shed

light on how CNSM's proposition relating to intergenerational values, attitudes, and

beliefs are communicated through retrospective stories about health and what living

family members should be aware of for their own health moving forward.

Dedication

To my parents. Thank you for being my cheerleaders, my role models, and my favorite storytellers.

Table of Contents

List of Tables and Figures

Tables

Figures

Appendices

Introduction

The discussions we have in our families help to shape who we are and how we view our world. Over the life course, families have important conversations about health, concerning healthy behaviors, eating, or lifestyle. These can have a lasting impact, especially on how members may view or think about their health. Family communication scholars assert that families help to shape individuals' views of the healthcare system (Gage-Bouchard, 2017), illness and its stages of care (Rak, Raina, Suh, Krishnappa, Darusz, Sidoti, & Gupta, 2017), and their own health and what it means to be "healthy" versus "sick." Though parents or siblings may have the most immediate impact on one's views of health, other family figures also play a siginifcant role in this process.

One relationship that is of particular importance when looking at the health socialization of children in the family is that of the grandparent-grandchild relationship. This relationship is often one of the most enduring and supporting connections in one's life (Mansson, Myers, & Turner, 2010). As the grandparent-grandchild relationship is developed across the lifespan, grandparents are often major sources of affection (Mansson, Floyd, & Soliz, 2017), cultural beliefs and norms (Wiscott & Kopera-Frye, 2000), social support (Kemp, 2004a), and have great influence in shaping how grandchildren initiate and develop close relationships with others (Mansson & Booth-Butterfield, 2011). Through the aging process, grandparents can provide additional insight into individual and family health.

Despite our knowledge of its occurrence in the family, we know little about how families talk about hereditary illness and its prevention. This gap in knowledge is problematic as family communication is key to health awareness, disease prevention, and decision-making (Mellon, Berry-Bobovski, Gold, Levin, & Tainsky, 2006). Grandparents

may be holders of important family information; however, grandchildren may not choose to discuss health with their grandparents based on various stereotypes of grandparents not understanding information, the grandparent's own health state, and relational closeness (Anderson, Harwood, & Hummert, 2005). However, grandparents are often seen as the kinkeepers and great information sources in the family (Dubas, 2001) and grandparents and grandchildren frequently benefit each other in their relationships. Additionally, grandparents are more likely than other generations to begin discussions surrounding family health history (Ashida & Schafer, 2015). Grandparents' experience of hereditary illness can help socialize grandchildren about risk, prevention, and provide support for those affected by it (Ashida, Hadley, Goergen, Skapinsky, Devlin, & Koehly, 2011). If contact between them is limited, grandchildren may be missing important information about family health.

Heart disease (HD) is one ailment of particular concern nationally and in the family. As the number one cause of death in the United States (CDC, 2017), Americans are particularly at risk for suffering the effects of cardiovascular disease. Although linked with poor diet and lack of exercise, heart disease is also influenced by hereditary health history (American Heart Association, 2016). Despite its potential origin in the family, we know little about how families talk about this disease and its prevention.

Understanding how families communicate to make sense of health, illness, and potentially hereditary health factors is an important focus of research. One way families communicate to make sense of the past and other family members is through storytelling. The act of storytelling is a vehicle for discussion of "who we are as a family" and what values, morals, and beliefs may be held dear to its members. Storytelling can serve many

functions, such as aiding in constructing identity and allowing for processing and sharing of potentially difficult family events by giving the teller the opportunity to organize them thoughtfully with others (Koenig Kellas & Trees, 2013).

The act of listening to stories also allows for individuals to learn and understand family events and history. As kinkeepers or keepers of family history (Langellier, 2006), grandparents often tell stories to grandchildren. For example, grandparents frequently choose to tell stories to grandchildren about past family memories, life lessons, or other information (Fiese & Sameroff, 1999). When grandparents tell stories to grandchildren, it can help to paint a picture of family identity (Thompson, Koenig Kellas, Soliz, Thompson, Epp, & Schrodt, 2009). Grandparents' comments are important to consider as catalysts for other topics of family identity that may arise, including health. There may be no records of health history in families other than oral report. As grandparents are often seen as gatekeepers in the family (Taylor, Fisackerly, Mauren, & Taylor, 2013), the health stories told by grandparents may allow for better understanding of important health information.

This thesis aims to explore how families discuss the hereditary aspects of heart disease (HD) by examining stories grandparents tell their grandchildren about HD. Grounded in the theory of Communicated Narrative Sense-Making (CNSM, Koenig Kellas, 2018) – which examines the links between family storytelling and health – I consider how family storytelling may influence the grandchildren's perceptions of risk and knowledge for developing HD. In what follows, I review literature surrounding HD, intergenerational family communication, and the theoretical framework. Following this review, I outline the methods and report on the results of a mixed methods quasi-

experimental design testing the impact of family storytelling on grandchild knowledge about HD.

Rationale

Heart Disease

Recent years have shown a dramatic proliferation in heart disease diagnoses. In 2014, 610,000 people died from this disease, making it the leading cause of death in the United States (CDC, 2017). HD occurs when there is a buildup of plaque in the arteries, which often leads to heart attack (American Heart Association, 2015). The onset of HD is caused by myriad factors. Both fluid and static characteristics influence the probability of developing HD, including hereditary risk, diet, level of exercise, blood pressure, among others (Buttar, Li, & Ravi, 2005; Tušek-Bunc & Petek, 2016). Currently, 47% of Americans have or experience one or more of the three major causes of HD: high blood pressure, frequent smoking, and high cholesterol (CDC, 2017). As blood pressure, smoking, and high cholesterol may be influenced by social factors, those whose immediate family members have been diagnosed with HD are more likely to develop it hereditarily (Agarwal, 2001). For example, if a immediate male relative has developed HD by the age of 55, or if a female relative has been diagnosed by age 65, one's risk increases (World Heart Federation, 2017).

Despite this, we know little about how families communicate about the hereditary risks of HD. If families do not talk about their health history, members may be ill-informed about HD as a potential health threat. For example, Green, Grant, Hill, Brizzolara, & Belmont (2003) report that young adults are more likely to perceive their potential risk of developing HD as lower than the potential risk of their peers. Further, those individuals who reported that they exercise regularly and ate a healthy diet

perceived that they were less likely to develop HD than those who do not (Green et al., 2003; Webster & Heeley, 2010). Young adults are often not aware of how other health behaviors (e.g. high cholesterol, comorbidity with other illnesses, etc.) may relate to their risk of developing HD and how these relate to its development in general (Imes, Lewis, Austin, & Dougherty, 2015). Because of this, if individuals are not aware of their risk, then they may be less likely to engage in information seeking behaviors to negate the onset of HD symptoms (Ton, Fogg, Fong, John, Li, Marshall, & Pearson, 2011). In order for individuals to perceive their risk accurately, a more open discussion of HD within the family must explored. And, if families are talking about HD, researchers should analyze the content of conversations that may help reduce the risk and increase the prevention or treatment of HD.

Though other barriers may exist, one thing preventing knowledge about HD is health literacy. When investigating potential of risk for developing HD, one must consider how health literacy, "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions" (Patient Protection and Affordable Care Act, 2010, p. 1252), may factor into the ability to seek out additional information or learn of potential prevention strategies.

Feelings of efficacy with seeking health information can be difficult, however, especially when one is unaware that he or she is at risk for HD. Additionally, a sense of control over one's health can have heavy influence on overall perceptions of risk, especially in regards to HD. For example, Senior, Marteau, & Weinman (2005) discuss that if an individual is labeled as having low cholesterol and has a limited history of HD

in the family, then they believe that they have a greater sense of control over their potential for developing HD than those who have a deeper family history and show early signs of developing HD. In this vein, individuals who are labeled as potentially "less likely" to develop HD, though they are still at risk, perceive their ability to control whether or not they contract HD. The opposite was true for those with more noticeably apparent risk factors. In Senior et al.'s (2005) study, these feelings of control were influenced by participants' premature knowledge of their risk of HD by either seeking out information, from their own experience, or being told of potential risk by family members. Because of this knowledge, participants with a higher sense of control were more likely to take necessary steps to manage their care and to lessen the likelihood of developing HD in comparison to their counterparts with lower feelings of control, due to previous experiences.

Though knowledge and talk surrounding family health history is needed, it is often missing within family discussion (Yoon, Scheuner, Peterson-Oehlke, Gwinn, Faucett, Khoury, 2002). For example, Peterson, Watts, Koehly, Vernon, Baile, & Kohlmann (2003) found that even if there is family history of a specific illness or disorder, family members often feel uninformed, knowing nothing about their health history or only knowing minimal information about it due to misinformation from other family members. Lin, Marcum, Myers, and Koehly (2017) report that only 54% of participants were able to accurately identify family members who suffered from symptoms of heart disease as evidenced by inconsistency in family report or false information.

Discussing HD in the family is vital to fully understanding risk. Because communication can increase health literacy, correct misconceptions, and increase knowledge of family history, we need to know more about how people communicate to understand HD risk. Family communication can significantly increase the accuracy and knowledge of family health history. Because family health history spans generations, grandparents may be key to family communication about HD.

Intergenerational Family Relationships

One of the most important intergenerational family relationships is the grandparent-grandchild relationship (Lin & Harwood, 2003). Intergenerational relationships have been studied in multiple contexts, including providing a basis for family identity (Soliz & Harwood, 2006), the formation and replication of family legacies (Thompson et al., 2009), and intergenerational support (Soliz, 2008). Additionally, grandparents frequently benefit from relationships with their grandchildren, which are described as close and fulfilling relationships later in life (Bengston, 2001; Ruiz & Silverstein, 2007) and include higher ratings of overall well-being and life satisfaction (Harwood & Lin, 2000). Because of this, relationships between grandparents and grandchildren are often labeled as emotionally supportive and meaningful in one's life (Kemp, 2005).

Grandparents serve a unique function in family interaction. Grandparents provide affection and support to grandchildren (Mansson, Floyd, & Soliz, 2017; Kemp, 2004a) and allow for quality family relationships outside of those with parents and siblings. Grandparents report great pride and heightened ratings of well-being from contact with their grandchildren across the lifespan (Harwood & Lin, 2000). For example, Hayslip, Henderson, and Shore (2003) explain that involvement in an adult grandchild's life helps

to add to life satisfaction for grandparents, as they are able to offer advice or aid to their grandchild. The same benefits seem to apply to grandchildren, as strong ties with grandparents can help in reducing depressive symptoms (Ruiz & Silverstein, 2007) and many grandchildren identify these relationships as strong and enduring into adulthood (Hodgson, 1992).

Various attributes impact relational closeness in the grandparent-grandchild relationship. Factors such as geographical proximity, family culture and structure, and whether or not one is interacting with their maternal or paternal grandparent(s) all influence how adult grandchildren report on their relationships with grandparents (Harwood & Lin, 2000; Harwood, 2007). The closer a relationship between the grandparent and grandchild is, the more likely the grandchild will be to seek out help or advice from their grandparent (Harwood, 2000). Kam & Hecht (2009) report that as children grow older, grandparents are more likely to feel comfortable discussing topics that they may have not discussed in the past.

Previous research has shown that grandparents also play a significant role in helping their grandchild work through discussions of difficulty or challenge (Soliz, 2008). The labeling of grandparents as supportive in adulthood also sheds light onto why grandchildren may feel more comfortable bringing up sensitive topics with their grandparents (Soliz, 2008). Additionally, grandparents are often seen as the kinkeepers or holders of family history (Dubas, 2001). As knowledgeable sources of family history, grandparents also can lend insight on various topics surrounding the family. For example, Ashida & Shafer (2015) explain that older generations are more likely to start

conversations about family health history that other generations. For these reasons, grandchildren may feel more open to talk about various topics of concern in the family.

As the concern surrounding family health may be rarely discussed and may be a nerve-wracking experience, the grandparent-grandchild relationship may be a safe place to bring up these discussions, especially since grandparents may hold more knowledge about family health history than other family members. Further, grandparents may be living with health concerns that may run in the family, such as heart disease, high blood pressure, or high cholesterol, and may be able to provide first-person insight into living with these illnesses and ailments. For example, Chambers, Rowa-Dewar, Radley, and Dobbie (2017) found that grandparents can play a beneficial role in helping grandchildren with promoting positive healthy behaviors or behavior changes, such as a healthy diet or quitting smoking.

Because of this, the grandparent-grandchild relationship is an important site to examine how families choose to discuss family health and how grandparents may influence their grandchild's health opinions. Grandparents can provide ample knowledge, based on their own experience or knowledge of family history regarding health, especially with HD. As previously mentioned, grandparents can influence health behaviors for their grandchildren (Chambers, Rowa-Dewar, Radley, & Dobbie, 2017) and thus, it is also important to consider how grandparents may influence their grandchildren in seeking out their own information about their family health history, especially in terms of inheritable diseases, such as HD.

Moreover, grandparents also offer social support to their grandchildren, often providing this through affection (Mansson, Floyd, & Soliz, 2017) or advice (Hayslip,

Henderson, & Shore, 2003). Much like health can provide a view or connection to identity, so do feelings of relational satisfaction with grandparents. Fowler (2015) found that a shared family identity influences grandparent-grandchild relational satisfaction. This shared identity, then, may be brought about by discussions of close family matters, such as health and hereditary illness. In this study, relational satisfaction will be analyzed based on the sharing of stories and how this affects closeness over time.

In sum, the grandparent-grandchild relationship is important to consider in terms of how family health information is not only relayed to others, but the impact that this relationship can have on various health factors. It is also important to consider the method by which grandparents may present this pertinent health information to their grandchildren. One way grandparents do this is through telling family stories.

Communicated Narrative Sense-Making

According to Fisher (1984), "Man is, in his actions and practices, as well as in his fictions, a story-telling animal" (p. 1). Humans employ the use of storytelling to help make sense of, cope with, and to organize thoughts, events, feelings, and behaviors. The use of stories are important in myriad contexts, especially within the family (Gergen, 1994; Koenig Kellas, 2005). Communicated Narrative Sense-Making theory (CNSM, Koenig Kellas, 2018) aims to explore the links between storytelling and health. Koenig Kellas and Kranstuber Horstman (2015) define CNSM as "an empirical approach to understanding the ways in which narratives and storytelling affect and reflect individual and relational well-being in the family" (p. 82). CNSM is divided into three main heuristics: retrospective, interactional, and translational storytelling (Koenig Kellas & Kranstuber Horstman, 2015). In the current study, I employ the retrospective and translational heuristics to analyze how stories shared may not only allow for further

understanding, but also to influence health behaviors or beliefs. In order to fully

understand how each heuristic of CNSM works in tandem as the process of storytelling

and content of the story shared, it is important to first consider them as their own

independent frames of thinking.

Retrospective storytelling. Retrospective storytelling refers to stories that we

hear or tell that have had a significant or lasting impact on our lives. Retrospective

storytelling helps to reflect our feelings of personal and family identity, what is important

to us, and what morals, attitudes, and beliefs may have been passed down to us through

the use of retrospective family stories. For example, Manoogian, Harter, & Denham

(2010) found that "(family) members inherit and re-story health legacies, and in so doing

influence their own well-being and that of succeeding generations of family members"

(p. 53) in their discussion of Type 2 Diabetes. From this, family members were able to

share health legacies throughout generations and communicate about health management

and preventative care. Using these stories as a method to not only share family health

history, but also influence future healthcare is also important to consider for other

hereditary illnesses, such as HD.

The intergenerational impact of retrospective storytelling is important to consider

within the grandparent-grandchild relationship. As previously mentioned, relational

satisfaction is influenced by shared family identity in the grandparent-grandchild

relationship (Fowler, 2015). Sharing family stories of the past and present may be

necessary in order to contribute to a joint sense of identity and connect generations

(Manning, 1997). Retrospective storytelling examines the stories that we hear and tell

and how they may influence future behavior. Grandparents may tell their grandchildren

stories about the family, including stories about health. Proposition 1 of CNSM Theory states that "the content of retrospective storytelling reveals individual, relational, and intergenerational meaning-making, values, and beliefs (Koenig Kellas, 2018, p. 64). In the current study, I am interested in understanding the beliefs, values, and norms communicated about health in families in stories told by grandparents to grandchildren about HD, making CNSM's retrospective storytelling heuristic an important theoretical lens.

Grandparent-Grandchild Stories of HD

As mentioned earlier, the grandparent-grandchild relationship can have significant influence over one's life and views of family. Life stories told or advice told by grandparents can be seen as more applicable than those told by young adults (Adams-Price, 1998). Additionally, grandparents often choose to communicate or impart wisdom on their grandchildren through the use of stories (Koenig Kellas & Trees, 2013). Grandparents often will choose to share stories about family hardships or concerns, as well as stories about "who we are" as a family (Kornhaber & Woodward, 1981). As stories of hardship may surround health in the family, CNSM is an appropriate theoretical lens in order to investigate the role that stories may play in the grandparent-grandchild discussion of health history. Communication is vital surrounding family health history in order to help educate about the potential health risks that may arise, as well as how to prevent them.

Given the importance of stories during stressful times (Pennebaker et al., 1997; Bosticco & Thompson, 2005), stories are important to consider when making sense of how one may conceptualize their family's lineage of hereditary illness. For example,

Aleman & Helfrich (2010) examined the importance of family stories when discussing Alzheimer's and dementia in order to make sense of its hereditary nature and relation to others within the family. These narratives aided in shaping meaning across generations in order to create family legacies (McAdams, 2004). Having these family health legacies is important as one's health is uncertain, but knowing of past familial experience can help in preparation to reduce potential health risk. Further, storytelling may also shed light onto how perceptions of risk or knowledge about HD may be altered based on family history.

Communication has the ability to affect and reflect various facets of well-being. Since the root of family often lives in stories (Stone, 1988), the telling of these stories is pivotal to understand what health concerns may be influenced by family lineage. Discourse surrounding health within the family, then, will not only affect how one views their health moving forward, but also shows how health was viewed in the past. Storytelling has often been cited as a major method of making sense of individual or shared events (Koenig Kellas & Trees, 2006) and coping with these events (Smyth & Pennebaker, 1999). Because of this and the socializing nature of stories, and in order to test CNSN's Proposition 1, I asked:

> *RQ₁:* What attitudes, values, and beliefs are communicated in stories told by
> grandparents to grandchildren regarding family health history and HD?

Because grandparents may be living with health concerns that may run in the family, such as heart disease, high blood pressure, or high cholesterol, they may be able to provide first-person insight into living with these illnesses and ailments and those stories might affect the attitudes and behaviors of their grandchildren. For example,

Chambers, Rowa-Dewar, Radley, and Dobbie (2017) found that grandparents can play a beneficial role in helping grandchildren with promoting positive healthy behaviors or behavior changes, such as a healthy diet or quitting smoking. From this, hearing their grandparents tell stories about HD may increase the grandchild's knowledge, as well as increase their sense of risk, surrounding HD. Because of this, I claimed:

H_1: Grandchildren who hear stories about HD from their grandparents will report higher perceptions of risk over time when compared to grandchildren who heard about everyday events.

H_2: Grandchildren who hear stories about HD from their grandparents will report higher HD knowledge over time when compared to grandchildren who heard about everyday events.

The grandparent-grandchild relationship may also be strengthened by the sharing of stories, as sharing these reflects important familial values and beliefs (Koenig Kellas, 2018). As support is an important attribute in the grandparent-granchild relationship (Soliz, 2008), the sharing of stories may be seen as additional support and grandchildren's satisfaction in the relationship as a whole may change. Thus, I claimed:

H_3: Grandchildren who hear stories about HD from their grandparents will report higher levels of relational satisfaction over time when compared to grandchildren who heard about everyday events.

This study expands various understanding of the literature surrounding heart disease, as well as storytelling in intergenerational family relationships. Theoretically, this study aims to test the first retrospective storytelling proposition within CNSM by examining grandparents' stories of HD and the potential these stories have for affecting

grandchildren's perceptions of risk and establishing preventative health behaviors. This study provides context for how grandparents and grandchildren share stories of hereditary health history in the family and how this information may help in growing knowledge and awareness about family health history/risk.

Methods

In order to fully investigate the preceding research questions and hypotheses, grandchildren were recruited in order to interview their grandparents about stories of family health history surrounding heart disease. Participants were required to meet the following criteria: (a) be at least 19 years of age or older, (b) grandparent currently has and/or have a family history of heart disease [e.g. heart attacks, heart disease related surgeries, high cholesterol, feelings of pressure or tightness on chest, atherosclerosis (buildup of plaque in arteries), shortness of breath caused from heart-related problems, heart failure, arrhythmia (problems associated with the heartbeat), and/or coronary artery disease], (c) grandparents were willing and cognitively able to engage in an interview and fill out survey measures, and (d) grandchildren had the capability of audio recording the interview (e.g., on an iPhone or Android device) and sending it electronically to me. Those for whom all these criteria apply were allowed to participate.

Grandchildren were recruited for this study in order to interview their grandparents. The process of the grandchild interviewing their grandparent allows for a free-flowing and organic conversation between grandparents and grandchildren, especially since a researcher is not present (Nussbaum & Bettini, 1994). Participants were first recruited through solicitations in various Communication Studies courses at UNL. Second, announcements via a posting to the UNL Department of Communication Studies research page advertised the study for students. Lastly, the recruitment script was shared

as a personal status update on the primary researcher's Facebook page in order to recruit participants. Grandparents were only able to participate once with one grandchild in order to not have overlapping data.

All information about this study, as well as information regarding informed consent, privacy, and the procedure of this study, were clearly outlined for all eligible participants in every recruitment strategy. Finally, participants were assigned individual and dyad numbers in order to ensure confidentiality in all measures, interview information, and demographics.

Participants

17 college-aged students and their grandparents participated in this study. Grandchildren were an average of 19.82 years old (range = 19 to 21, SD = .951). The sample included 12 women and 5 men. All participants identified as White. In the current study, due to its relation to heart disease, questions were also asked about whether or not participants smoke, drank and exercised, as well as how much this occurred on an average week. 94% of participants reported not smoking, while 82% of participants reported drinking during the week, averaging 2-3 drinks per week (M = 2.88, SD = 1.654). All participants reported that they engage in at least 1 session of physical activity, defined as exercise periods of 30 minutes or more, during the week (M = 2.88, SD = 1.404).

Grandparents were an average of 77.88 years old (range = 66 to 92, SD = 6.54). This sample included 8 grandfathers and 9 grandmothers and all participants identified as White. Due to its relation to heart disease, grandparents were asked questions as to whether or not they suffer from high blood pressure, high cholesterol, obesity, and diabetes (Type I and II), as well as if they drank, smoked, and how much they regularly

exercised. 58% of grandparents reported having high blood pressure, 53% of grandparents suffered from high cholesterol, 24% reported being obese, and 29% had been diagnosed with either Type I or II diabetes. None of the grandparents in this sample smoked, though 47% of grandparents reported drinking during the week, averaging 1-2 drinks per week ($M = 1.44$, $SD = 1.01$). Lastly, 82% of grandparents engaged in at least 1 session of physical activity during the week ($M = 3$, $SD = 1.41$).

Procedures

Participation in this took approximately 60-90 minutes. Student participants ($n = 17$) received extra credit in the communication courses for participating. In order to ensure compensation at each step of the study, half of the participant's research credit was recorded following the completion of the interview, and the other half was recorded following the completion of the survey measures two weeks after the interview. Participation in this study was completed in the following steps.

First, I went in to various Communication Studies courses at UNL in order to discuss this study and its participation. I had prior approval by course directors or faculty to go and present in these classes. If students were interested in participating and met the criteria, they signed up for participation and provide their name and email. I then individually emailed these students the day before their next class period regarding their interest in participation and let them know I would be in their next class period to hand out participation material. Before this next class period, the potential participants were encouraged to mention participation to their grandparent.

Second, during the next class period, I went into these classes again and talked with the students who mentioned interest in this study. If they were still interested and

agreed to participate, they were given a packet including an informed consent form for them to keep for their records, two printed demographics forms for the grandparent and grandchild, and instructions on how to complete their portion of the study. Prompts to begin the interview varied on the instructions based on random assignment into treatment ($n = 8$) or control ($n = 9$) group. The participant then read over and sign the informed consent and returned it to me if they agreed to participate. Following this, I emailed the student participants to remind them of their participation and send them a link to initial survey questions and grandchild demographics information, as well as to find out when they would interview their grandparent. All survey measures included in each step included the Heart Disease Knowledge Questionnaire, the Perceptions of Risk for Heart Disease Questionnaire, and the Relational Satisfaction Scale. All grandchild participants completed these measures and were completed at three times: prior to interviewing their grandparent (Time 1), immediately following the interview with their grandparent (Time 2), and two weeks following their interview (Time 3).

If a student was not recruited through a presentation in a UNL Communication Studies course but through a different recruitment strategy ($n = 4$), the potential grandchild participant emailed the primary researcher to express his/her interest in participating and set up a time with me to pick up a participation packet from my office in Oldfather Hall on UNL's City Campus. They could also use this time to ask any questions they had and to sign an informed consent form. At this time, I recorded the grandchild participant's name and email as a participant in the study and sent them a link to initial survey questions and grandchild demographics information, as well as to find out when they would interview their grandparent. For all grandchild participants, prior to

the interview, the grandchild asked the grandparent to participate and then provided me with the grandparent's contact information. I then contacted the grandparent and gained consent from the grandparent over the phone in a recorded phone conversation per the approved IRB protocol. At this time, I also answered any questions the grandparent had.

Third, participants were required to set up a time to interview their grandparent either in-person or over-the-phone. Once this time had been set up, the grandchild emailed me to inform me of this interview time. The day of the interview, the participant either called or went to interview their grandparent at a pre-determined location decided by the grandchild and grandparent. The grandchild used the voice recording feature on either an iPhone or Android device to record the interview. Prior to starting the interview, the grandchild did a test of the audio recording device they used to ensure quality and volume are understandable and clear. This test was conducted by recording 30 seconds of audio at the place in the room where the audio recording device was located with normal volume of talking occurring. Once 30 seconds had elapsed, the grandchild listened to the audio to see if it was clear and understandable. The audio also needed be clear to the grandparent as well. If it was not, they needed to move the audio recording device accordingly and test the audio again until it was clear and understandable.

Following the test of the audio recording device, the grandchild prompted his or her grandparent with one of the following questions based on their random assignment based into the treatment ($n = 8$) or comparison ($n = 9$) group. The treatment group question was: Tell me a story about a time when you or someone in our family experienced troubles with heart disease, such as heart attacks, heart surgeries, etc. What did you learn about our family health history from these and what should I know about

our family health? The comparison group question was: Tell me about what you have done today step-by-step. How has your day been so far? The entirety of this free-flowing conversation was recorded. The grandchild was free to ask any follow-up questions that may have come up from conversation as well. Other than these questions, there were no differences in data collection between the two groups.

Once both the grandchild and grandparent had agreed that their discussion was complete, the recording device was turned off and the grandchild ensured that the audio recording was saved. The grandchild then filled out the grandparent demographics form with their grandparent. Once this was complete, the interview portion of participation was complete. The grandchild participant needed to be sure that the demographics forms and a signed instructions form were returned in the original packet and given back to me, the primary researcher, within 5 (business) days.

Following the completion of the interview portion, the grandchild emailed the audio recording of the interview to the specified UNL email address within 24 hours of the interview being completed. Once I received the audio file, I listened to it to ensure clarity and saved the audio to a secure and private Box folder that was shared with the secondary researcher. Ensuring that the audio was saved and accessible to both researchers on the private Box folder, I then properly deleted the email containing the audio recording file from my UNL email account and emailed the grandchild participant using a new email message not connected to the audio file. Once this was completed, the grandchild received a confirmation email from me stating that half of their extra credit (1.5 credits) have been recorded and reminding them that they will be sent one more link in two weeks for a final round of survey measures. While we strongly encouraged

grandchildren to delete the audio recording following the interview, we could not guarantee that this would occur.

Finally, two weeks following the completion of the initial survey measures, I sent a reminder and a link to the grandchild participant to complete the final round of survey measures. This instructed them that other half of their extra credit (1.5 credits) would be added following the completion of this third round of survey measures. The use of quality checks was used to ensure that participants are were fully reading and understanding the survey rather than answering from memory. These quality checks included the questions: Please purposefully skip this response, Please select option 3 for this question, and Please write the word communication in the box below. These quality check questions were split up throughout the second and third rounds of surveys. 94% of participants completed all quality check questions.

Following the completion of the final round of interviews and all necessary forms/information had been received, I sent a follow-up email to the grandchild participant stating that their participation was complete and all of their research credits (3 credits in total) had been recorded. This acted as their receipt for their compensation.

Measures

Heart disease knowledge questionnaire (HSKQ). In order to assess how much grandchildren participants had knowledge about heart disease in general, they completed the HSKQ. This measure is a 30-question self-report scale used to test an individual's knowledge regarding heart disease (Bergmen, Reeve, Moser, Scholl, & Klein, 2011). Questions are answered on a "true" and "false" basis and include items such as, "Eating a high fiber diet increases the risk of getting heart disease" and "Most people can tell

whether or not they have high blood pressure." Questions also surround topics such as sex differences in risk, other questions about diet, exercise, and how age may also affect diagnosis (see Appendix B). This questionnaire has an internal reliability rating of .73 in previous research (Bergmen, Reeve, Moser, Scholl, & Klein, 2011). Questions were scored based on whether or not the participant answered the question correctly; participants would get 1 point for correct answers and a 0 for incorrect answers. Scores could, therefore, range from 0 to 30 (in the current study, they ranged from 11 to 27). Table 1 presents all reliability scores, means, and standard deviations for the three separate time points for this and all other measures.

Perception of risk of heart disease scale (PRHDS). This is a 20-question scale used to assess how individuals perceive their self-risk of developing CHD (Ammouri & Neuberger, 2008). Items for this self-report include statements such as, "My lifestyle habits do not put me at risk for heart disease" and "I am at risk for getting heart disease." This measure contains subscales surrounding dread risk (e.g. "There is a possibility that I have heart disease"), risk (e.g. "I am too young to have heart disease"), and unknown risk (e.g. "The causes of heart disease are unknown"). Participants were asked to rate their reaction to the items on this measure on a 4-point Likert type scale with answers ranging from "strongly agree" to "strongly disagree" (see Appendix A). This scale has been tested reliably in previous research with an alpha of .80 (Ammouri & Neuberger, 2008). After testing all sub-scales for reliability, unknown risk was not used due to low reliability scores across all 3 time points ($\alpha = .17$). Items were scored and summed for the dread risk and risk sub-scales and for the overall measure; 12 items were reverse-scored. High scores from the PRHDS indicate higher perceptions of risk overall.

Relationship assessment scale (RAS). The Relationship Assessment Scale (Hendrick, Dicke, & Hendrick, 1998) is a 7-question scale self-report used to investigate relational satisfaction from a global standpoint of the relationship. This measure asks questions such as, "To what extent has your relationship met your original expectations?" and "How good is your relationship compared to most?" Participants rated their satisfaction with their grandparent on a 1-5 Likert type scale (see Appendix C). The version of the scale used in this study was adapted to include wording related to the grandparent-grandchild relationship (e.g. "How well does your grandparent meet your needs?") This scale has been reliable in previous research ($\alpha = .73$, Hendrick, Dicke, & Hendrick, 1998). Two items were reverse coded and all items were averaged to create a composite score. Higher scores are related to higher perceptions of relational satisfaction.

Results

Data Analysis

Data analysis occurred in two parts, based on the use of both quantitative and qualitative data in this study. Qualitative data were analyzed through the use of interpretive thematic coding in order to test RQ_1. This analysis was completed in four steps. First, I listened to all interviews to become aquainted with the data. Second, I listened to interviews again, being sure to only listen to those who were randomly assigned to the treatment group in order to gain understanding how the assigned prompt may affect the story told. After listening to these interviews, I made notes from each treatment interview to outline the story's theme and important information about the interview.

Third, going through all notes I took for the interviews, a codebook was made in order to establish themes present within all interviews, as well as propositions of CNSM. Fourth, I used thematic analysis (Braun & Clarke, 2006) and read through all emergent codes and reviewed the research question in order to be sure that all areas of question were being analyzed. Theoretical saturation (Morse, 2004) was reached at interview 8 with the treatment interviews as multiple beliefs and attitudes surrounding HD and advice began to repeat in information from grandparents and no new data was identified. Pseudonyms were given to all participant in order to ensure confidentiality in data reporting. Quantitative analysis of the three study hypotheses included the use of split plot ANOVAs.

Research Question 1

RQ_1 aimed to explore what attitudes, values, and beliefs were present regarding family health history and HD in the stories grandparents told their grandchildren. Analyses revealed that storytelling between grandparents and grandchildren evolved in three parts: (a) the HD Family Tree, (b) the grandparent's story and reaction, and (c) advice/lessons learned. Thematic analysis of the stories themselves revealed that grandparents told stories of (a) confusion/shock, (b) acceptance of their health, and (c) disjointed reporting. Interviews ($n = 8$) were reviewed only from the treatment group and ranged from 1 minute to 16 minutes in length ($M = 06:43$, $SD = 05:09$).

The HD family tree. 8 grandparents began their interviews with discussion of a "family tree" of heart disease or troubles in the family. These family tree discussions preceded story information and led into specific stories of family history of HD. Participants, when giving the assigned prompt to their grandparent, first them to tell a

story of a time where someone in the family suffered from HD. From this, grandparents would frequently list those in the family tree that have been treated for some form of HD. For many grandchildren, this was the first time either hearing specific stories or hearing about the history of HD in their family in general. For example, Megan's grandmother, when asked about who in the family had suffered from some form of HD symptoms or illness, responded with, "any one you want to talk about" and went on to list 5 family members who had died or suffered from HD. Grandparents also frequently cited the first story they were told about HD in the family and re-told it for their grandchild, passing it from one generation to the next. Janelle's grandmother also echoed similar lineage in their family as well regarding how many people in the family were affected by heart issues. She explained that:

> It's been almost every generation. The older generations ate so much healthier than the younger ones and still had these heart problems…there was to be a little something there (genetic).

It seems as though discussing the lineage or making apparent how many family members are/were influenced by HD in the family helped to shed light on the importance for discussing HD. Further, being able to see this "family tree" of HD may help to show grandchildren why heart health is important to consider from a younger age, rather than putting it off until later years. After discussing the family tree, grandparents would then tell specific stories of HD in the family.

Grandparent's story and reaction. These stories surrounded how family members found out about their HD, how they managed it and their life currently with it, or just gave general information about HD and its impact on the family. These stories

centralized around the themes of: (a) confusion/shock, (b) acceptance, and (c) disjointed reporting.

Confusion/shock. Five grandparents discussed what I called confusion/shock stories: stories about their own or another family member's sudden HD diagnosis after a seemingly healthy lifestyle. All grandparents mentioned that they had kept up with a healthy lifestyle prior to their HD diagnosis, whether that be regular exercise, a healthy diet, among other things. For example, Miranda's grandfather described the instance of his first heart attack, despite the fact that he ran for an hour two days prior to the heart attack, ran multiple times per week, and maintained a healthy diet. He mentioned that:

> Two days later, Grandma and I were out walking up the road here, probably 100 yards up the road and I had this chest pain right in the middle; right in the sternum. And I said to Grandma, "Let's go to the hospital…" And I was laying on my back (in the emergency room) and they have protein tests to see if you are really having a heart attack. They went to that and the emergency room doctor looked over to me and said, "Buddy, this is the real deal."

Miranda's grandfather's story shows that while HD may run in the family, it is a disease that may come on suddenly and it is important for family members to know of their HD risk.

Other grandparents explained that their shock/confusion with their HD diagnosis did not come on from a sudden heart attack, but from routine doctor's visits about pain and discomfort they were experiencing. For example, Samantha's grandfather noticed that he was tiring easily and was having minor chest pains as he was working. He mentioned that:

I figured I'd better go to the doctor and get it checked out. They scheduled

a procedure where they tried stints at that time, and they put in one in one artery

and they couldn't do it in the second artery…and I had a triple bypass surgery.

Though seeming to be healthy with no heart issues, instances where HD-related

symptoms are suddenly prevalent is important to consider, due to extensive family

history of heart issues and since many people find out their diagnosis suddenly, due to a

heart attack or necessary heart surgeries.

    Acceptance. Stories of shock/confusion frequently molded into stories of

acceptance, as four grandparents reported accepting their new health diagnosis, making

necessary changes to their lifestyle, and not allowing it to run their lives. Grandparents

would tell their grandchildren about how they needed to manage their HD and what

changed from their life before their diagnosis to after. For example, Sara's grandmother

explained how her high blood pressure and her shortness of breath lead to a diagnosis of

having holes in her heart. She explained that:

    They were able to do open heart surgery and ever since then, I've been very

    careful about what I eat…foods with salt (I rarely eat)…I feel better now than I

    have in a few years.

This change in diet following the diagnosis and surgery for Sara's grandmother showed

that while this would take a major lifestyle change in diet, Sara's grandmother had come

to accept this new aspect of her health, especially since she had been feeling so much

better.

    Other instances of acceptance revolved around accepting their new health

diagnosis when knowing that they were susceptible to it, due to family history with HD.

This awareness that they may contract HD within their lifetime helped to keep their heart health in mind early on in life. Adam's grandfather, for example, discussed how both of his parents died from heart related problems and has been on high blood pressure medication since the age of 25, so accepting his diagnosis early in life was key to managing their HD related symptoms. He mentioned that:

> Since I've been on my pills (and following a heart surgery), I don't have very many symptoms…I've had to cut way back on my drinking, but I feel pretty good…you should know (what kinds of medications family members take). That's probably more important than what I tell you! I wasn't good at taking care of it the first 20 years, and I've been better at it in the next 20.

While Adam's grandfather needed to accept his heart health from early on in his life, as he mentioned, at points he was not as mindful of taking care of his health as he should have been. His learning to take better care of his heart health, his acceptance of it, and passing this information along to Adam helps to show the importance of learning how to manage HD early in order to mitigate its effects and accepting it as an everyday part of life.

Disjointed reporting. Three grandparents in the sample gave their grandchild information relating to HD that was not in story form, but rather, was given as a report of events and how their or another family member's diagnosis came to be. The events given were not necessarily in order and did not have a typical story format (i.e. plot, characters, chronological order, etc.). These stories revolved around listing family members and their HD diagnoses in order to show the scope of HD's presence in the family, as well as grandparents answering follow-up questions from their grandchildren. For example,

Jessica's grandmother explained her own grandmother's heart attack and diagnosis as: "She just had a heart attack (out of the blue)…" Following this, Jessica proceeded to ask her grandmother follow-up questions to gather more information. These types of stories were not characterized as negative in nature and all reported important advice to share with their grandchild.

  Advice and lessons learned. Following the sharing of their story and discussing how HD runs in the family, grandparents in each interview offered advice to their grandchild about future health habits and ways to keep up with heart health. Grandparents' advice circled around diet, exercise, and smoking.

  First, grandparents offered advice and shared lessons that they learned about maintaining a healthy diet in order to negate potential side effects for heart health. Grandparents would frequently cite specific changes to their diet that they had to make, as suggested by a doctor, or ones that they thought their grandchild should take into consideration now rather than later in life. For example, Sara's grandmother described how harmful large amounts of salt can be to the body. She mentioned that:

> I eat hardly any salt, because that helps with the blood pressure. And after 6 months, I felt better than I had before and I think that was because of the blood pressure.

Additionally, grandparents frequently cited how certain types of fats should be considered in the diet. Saturated fats and "animal fats" were often discussed with warning and to be careful how much was consumed. For example, Miranda's grandfather explained how their grandchildren should not be eating things that would promote heart problems, given their family history. He explained that:

With the same diet two people can have totally different outcomes and our

family is very susceptible to developing clogged arteries and with a diet, before

they developed the drugs for lowering your cholesterol, mom and I had a pretty

low fat diet, which is one of the important things, is a low fat diet (staying away

from) saturated fats or animals fats.

This specific and detailed advice regarding diet from those who have needed to be

mindful of this for the duration of their lives, as well as from individuals who have had

HD related symptoms, may help to drive home the importance of preventative measures.

Having this advice/information shared from a family member shows to be more impactful

in the long run regarding knowledge and associations of risk overall.

Second, all grandparents noted the necessity to not smoke, especially with family

history of HD or other heart issues. Almost all grandparents mentioned or stressed to

their grandchild how they must not smoke and gave examples of those in the family with

HD that did smoke. For example, Miranda's grandfather described not only the lineage of

HD in the family, but cited how all those who died very young from heart attacks were

smokers. He mentioned that:

My grandfather died at the age of 52, and since then, I've had other members of

the family die from a heart attack. My father died at age 42 and his brothers, my

uncles, one died at 52 and the other died at 67 and one at age 40. All from a heart

attack…and the ones that died the earliest were all smokers. So one of the things

that you learn to do is never smoke…My experience with this is that I was old

enough to remember that after my father came back from the war, he would sit on

the edge of the bed in the morning and cough from smoking and then after, the

first thing he would do after his lungs cleared out was light up a cigarette.

This example, along with all grandparents that were interviewed mentioned to their

grandchildren to never smoke, demonstrates that being mindful of health choices early in

life is necessary. Picking up a harmful activity, such as smoking, from an early age can

have swift and severe repercussions for health later on, especially if information of family

health history was not discussed.

Third, grandparents also mentioned the need to discuss heart health early with

their doctor and how this is especially important for younger generations (i.e. their

grandchildren). Grandparents frequently expressed shock or concern that their grandchild

had not heard these stories of family health history with HD and explained why it was

important for them to not only know this for themselves, but to discuss with their doctor

as well. For example, Adam's grandfather, when discussing his grandchild's parents'

health and symptoms of HD, mentioned that:

> Well the next time you talk to them, you should ask them about that. I mean,
>
> they should tell you what they take (for heart medication). And that's probably
>
> more important than what I tell you!

Adam's grandfather's advice in seeking out this additional HD information from

immediate family is important to consider, especially since his grandfather mentioned

that "he can only speak for one side of the family." Going about finding this other

pertinent history from the other side of the family, as well as the suggestion to talk to

more immediate family in order to solidify more HD knowledge, is necessary guidance

from grandchildren to gain as much information as possible and to be able to discuss HD early.

Additionally, grandparents discussed with their grandchildren the importance of having their family's health history in order to discuss this with their doctor. For example, Samantha's grandfather discussed how important it is to make your doctor aware of family health history, especially in relation to HD and other family members who have suffered from it. He mentioned that:

> The ony thing I learned was that I had 5 brothers and 1 sister that all had heart problems. Right then was when we noticed that it was in the family…since you're in a family with a history with heart problems, take that into consideration and let your doctor know and be checked out at a younger age.

Having this information to discuss with doctors early is pertinent to prevention of HD related symptoms and risks. However, in order to share this information with their doctor, one must first have it. From this, it is important to see why having these discussions of health history early is important to make those potentially at risk knowledgable as early as possible.

Finally, grandparents would tell their grandchildren about the need to exercise and stay physically fit. Grandparents would frequently cite their current examples of how they (the grandparent) was working on staying in shape, but also stressed the importance for their grandchild to start this habit early. However, while this advice was given, this was usually not elaborated on in more detail than expressing the need to exercise. For example, Megan's grandmother mentioned, as they were discussing the other aforementioned advice points, the need to exercise. She said that: "My weight is a bit

above average, but I am fairly active…Be active and exercise." While other examples of advice were more detailed, the amount of exercise or what type of exercise that should be done was never discussed.

Overall, the themes apparent in these stories help to show what is important to know about overall family health, as well as the importance of knowing in general. Attitudes towards HD from all participants and their grandparents echo that it affects all family members and that knowing about prevention, or advice on prevention, is necessary to know as well. With all grandchildren citing that they "didn't know this health information before," the interviews also shows the lack of conversation had about this, but that there is a need to be having these conversations in the family. In order to prevent, one first must be aware.

Hypothesis 1 and 2

The first and second hypotheses were tested using split plot repeated measures ANOVA with condition (treatment vs. control) as the between subjects variable and time as the within subjects variable. Hypothesis 1 stated that grandchildren who hear stories about HD from their grandparents will report higher perceptions of risk over time when compared to grandchildren who heard about everyday events. As mentioned previously, of the three sub-categories given, only risk and dread risk were tested, due to lack of reliability in unknown risk; I also tested the PRHDS overall sum. For the total PRHDS sum, there was no significant main effect for time (F (2,13) = .472, p = .634) , nor a significant interaction effect between time and condition (F (2,13) = 1.087, p = .366). Regardless of condition, right after speaking with their grandparent, all participants showed higher reports of dread risk (M = 18.00, SD = 2.422). This was also shown at

Time 3 (M = 15.25, SD = 2.955). Additionally, after running proper paired sample tests, Time 2 is significantly different than Time 3 (t(15)= 2.72, p = .016).

However, there was no significant interaction between group and time (F (2,13) = .831, p = .457). Additionally, there was no significant main effect for the risk subscale for time (F (2,13) = .620, p = .553), nor the interaction between condition and time (F (2,13) = .855, p = .448). H1 was not supported, since condition did not distinguish changes in risk; however, results show that grandchildren's dread risk about HD increased over the course of the study regardless of condition.

Additionally, hypothesis 2 stated that grandchildren who hear stories about HD from their grandparents will report higher knowledge of HD over time when compared to grandchildren who heard about everyday events. For the HDKQ scale, there was a trend toward an interaction effect between condition and time (F (2,13) = 3.052, p = .082). Examination of the profile plot demonstrated a pattern by which the control group knowledge increases after the interaction, but decreases by Time 3, whereas the treatment group reports significant increase in knowledge over the course of the study (see Figure 2). Those at Time 1 in the comparison group (M = 21.11, SD = 2.934) reported increased HD knowledge at Time 2 (M = 22.22, SD = 1.787) and decreased at Time 3 (M = 20.787, SD = 2.819). Those in the treatment group, despite a slight decrease in HD knowledge between Time 1 (M = 20.57, SD = 1.272) and Time 2 (M = 20.43, SD = 2.573), showed an increase in HD knowledge at Time 3 (M = 22.29, SD = 3.149). In other words, participants in the treatment group were significantly more likely to report an increase in their knowledge than those in the comparison group. There was no main effect for only time over the 3 testings periods (F (2,13) = .257, p = .777). The findings for Hypotheses

1 and 2 signify that there were trends in the data, but reported due to small sample size and risk of committing type II error.

Hypothesis 3

Hypothesis 3 stated that grandchildren who hear stories about HD from their grandparents will report higher levels of relational satisfaction with their grandparent when compared to grandchildren who heard about everyday events. Results of a repeated measures ANOVA with time as the within subjects variable and condition as the between subjects variable showed no significant main effect differences in relational satisfaction over time ($p = .637$), and no significant interaction effect between condition and time treatment ($p = .594$; Time 1: $M = 4.87$, $SD = .180$, Time 2: $M = 4.64$, $SD = .74$, Time 3: $M = 4.82$, $SD = 2.5$) and control (Time 1 : $M = 4.60$, $SD = .68$, Time 2: $M = 4.60$, $SD = .71$, Time 3: $M = 4.67$, $SD = .70$) Thus, H_3 was not supported.

Discussion

This study, grounded in CNSM theory, assessed the effects of grandchildren listening to stories about family health history of HD from their grandparents and how perceptions of risk to develop heart disease, knowledge surrounding HD, and relational satisfaction changed over time. This study also investigated what values, attitudes, and beliefs were expressed within the stories told by grandparents. My analyses revealed that grandparents' stories of HD in the family surrounding discussions of the family tree and and stories focused around shock/confusion and acceptance. Additionally, consistent with CNSM theory, grandparents provided intergenerational beliefs and attitudes on what their grandchildren show know about heart health and monitoring their health for the future. Results also showed that there was a small trend in heart disease knowledge increasing

over time for those in the treatment group, as well as dread risk improving over time, regardless of what grandchildren discussed with their grandparent. As knowledge increased and stayed at an increased level from Time 2 to Time 3 for grandchildren in the treatment group, participants may have either continued conversations about HD in the family or sought out their own information. The results adds to the literature surrounding CNSM, family discussions of health history, and the grandparent-grandchild relationship in multiple ways.

First, to my knowledge, this is the first study of its kind of test how stories shared may influence perceptions of risk and knowledge surrounding HD in the family. Addtionally, to my knowledge, this is the first study of its kind to test how health stories from a grandparent may affect health knowledge and risk perception of a grandchild. Because of this, this study provides exploratory evidence into how family stories may predict health perceptions and knowledge over time in the grandparent-grandchild relationship.

Second, this study helps to build support for CNSM theory's (Koenig Kellas, 2018) propositions surrounding the effects of story-sharing on health and well-being outcomes. This study provides evidence that retrospective stories can influence feelings surrounding health and knowledge, such as HD, and supplements other studies that are examining the link between family storytelling and perceptions of health (e.g., Flood-Grady & Koenig Kellas, 2018; Holman & Koenig Kellas, 2018). As Proposition 1 of CNSM states, "the content of retrospective storytelling reveals individual, relational, and intergenerational meaning-making, values, and beliefs" (Koenig Kellas, 2018, p. 64). This was apparent in the data through the analysis of story themes in confusion/shock and

acceptance of HD diagnosis and health, as grandparents explained what grandchildren should know for the future for their own health. Some grandparents only reported on HD in the family rather than present the information in story form. These presentations of information allowed for grandchildren to learn about HD in the family, but did not provide additional content that might have been important for grandchild to understand, such as how their grandparent or other family members came to work through/with their HD or the diagnosis story itself (Frank, 1997).

While this theory has been previously tested in parent-child and marital relationships (Koenig Kellas, Carr, Horstman, & DiLillo, 2017; Horstman, Maliski, Hays, Cox, Enderle, & Nelson, 2016), this study helps to expand CNSM into other extended family relationships, such as the grandparent-grandchild relationship. Additionally, this study lends to help shed light on one of CNSM's other heuristics, translational storytelling. Translational storytelling looks at how "narrative methods can can create interventions and that these interventions can predict health and well-being among participants across a variety of contexts" (Koenig Kellas, 2018, p. 67). As Holman and Koenig Kellas (2018) demonstrate in their parent-adolescent discussions of sex, translational interventions can be formed based on the retrospective stories shared. From the stories shared from grandparents to grandchildren, family members can be taught how and why they should be discussing family health history with younger generations early in their life in order to mitigate potential of developing hereditary illnesses.

Third, this study helps to build literature surrounding the grandparent-grandchild relationship, as this study is one of the first, to my knowledge, to see how grandparents and grandchildren interact with family health history information. Additionally, this adds

to current research surrounding relational satisfaction between grandparents and grandchildren. While there were insignificant results for relational satisfaction changing over time, there are various implications present. Grandchildren were allowed to pick whichever grandparent they wished to talk with from their living family. One explanation for this insignificant finding could be that grandchildren chose the grandparent they were already the most comfortable with, thus lending to the lack of change in satisfaction over time. Further, this study aimed to explore what attitudes, values, and beliefs were communicated from grandparents to grandchildren in the family stories they shared, as well as their advice for what the grandchild should know about their family health history. Being able to take advice from their grandparents, based on personal experience or family history, helped grandchildren to learn more about their family health, as well as history about their family in general. Gaining this advice and knowledge from the grandparent may serve as a jumping off point for grandchildren to talk about family health history with other members of the family, such as their parents or siblings.

Learning of family health events is vital to preventative choices, especially for those health concerns that run in the family, such as HD. Being aware of family history of this, as well as being monitored early for related symptoms or heart complications, is vital for younger generations to understand and be made aware of their risk. If individuals do not know of their risk, that they will not work to decrease that risk (Ton, Fogg, Fong, John, Li, Marshall, & Pearson, 2011). Discussions of this in the family are not only important for family members to learn about health concerns that they should be aware of, but will also serve to be beneficial for future medical appointments as well. For example, if grandchildren are knowledgable that they are more susceptible to developing

heart problems, they can discuss this with their doctor to start preventative care or being tested early in their life, rather than waiting until symptoms begin to display. With this, it is important for families to have these discussions of health history, as many young adults either do not initiate or do not know how to start these conversations (Xu, Jacobs, Odum, Melton, Holland, & Johnson, 2017). Socializing children about health is vital to begin these conversations surrounding family health history (Whitbeck, 1999).

Further, after hearing stories from their grandparents and based on the advice that they were given, grandchildren may move to change some of their current health behaviors in order to prevent developing heart related health problems. Further research should investigate how stories shared may influence a higher intent to seek health information after speaking with family members about family health history.

Limitations

Despite its contributions to the current literature, this study is not without limitations. First, inferences made and discussions of power were limited by sample size. With only 17 participants used in the analysis, this restricts the applicability of power and how much of an effect is being had on participants by the treatment or control group assignment and prompts. Additional recruitment of participants is needed for future research in order to see how impactful these stories are for the general population.

Second, interviews were conducted without the researcher present, and because of this, were relatively short in length. The design of this procedure was set up to allow grandparents and grandchildren to have an organic, free-flowing conversation as discussing family health history may be a stress-provoking topic. Having a researcher present may have influenced the discussion and would not have been as natural.

However, while this was the case, since participants were given their prompt and were allowed to ask any follow-up questions that they wanted, many participants did not ask questions other than the prompt, thereby limiting the data that was able to be collected and the length of the interview itself. Because of this exploratory research design, future research should take into account whether or not the researcher should be leading the interview between the grandparent and grandchild or if a more detailed interview protocol should be established for grandchildren to use.

Third, this sample was comprised of all White college-aged students. While this was the sample available, future research should work to expand outside of this sample and should sample from the general population to gain a better understanding of HD influence and discussion in the family. Additionally, future research should examine how different ages, as well as different races, discuss family health history and how HD may affect different ethnicities. As HD is considered to be a health disparity for some ethnicities, future research should also investigate how, if at all, health information about the family is being shared in order for prevention (Holland, Carthron, Duren-Winfield, & Lawrence, 2014). As high blood pressure is higher in African American populations in comparison to other ethnicities (American Heart Association, 2017), learning more about the family dynamic in varying ethnicities is vital in order to begin these discussions. This is especially important to consider in order to educate and shed light on various health disparities, as different ethnicities choose to communicate about health differently than others (Hovick, Yamasaki, Burton-Chase, & Peterson, 2015).

Lastly, dread risk went up over time, regardless of condition for participants. As discussing family health can be stressful, the thought of or actual discussion of HD may

have contributed to this. Additionally, the fact that all participants knew that this study was about HD may have contributed to this, and thus, participants may have discussed HD regardless of condition. Future research should control for prior knowledge of study or prompt topic in order to further test how risk is influenced by hearing stories about HD in the family.

Conclusion

Overall, the results presented provide a first look into how family stories shared about family health from a grandparent to a grandparent may influence perceptions, relational satisfaction, and knowledge over time. Because of this, the results provided help to extend understanding of CNSM, as well as how health information may, if at all be communicated in families. Conclusions from this thesis allow for understanding as to how health diagnoses in the family may not only affect the patient, but the family as well, especially in regards to health history. Beginning these discussions of health history in the family, especially in regards to HD, is pivotal in order to not only be knowledgable, but for preventative purposes as well.

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Table 1

Descriptive Statistics for Satisfaction, Knowledge, and Risk Variable Across Time

Measure Item	Time	*M*	*SD*	*α*
Relational Satisfaction	1	4.73	.46	.842
	2	4.69	.60	.874
	3	4.77	.47	.80
Perc. Risk Sum	1	51.21	6.94	.871
	2	49.74	4.37	.630
	3	50.96	5.38	.733
Sub-Scale Risk	1	13.42	2.75	.793
	2	14.26	2.22	.577
	3	13.54	2.77	.577
Sub-Scale Dread Risk	1	15.92	3.06	.813
	2	18.67	2.99	.814
	3	15.7	2.72	.77
HD Knowledge	1	21.23	2.6	
	2	21	3.23	
	3	21.38	2.92	

Note: *M* is for mean, *SD* for standard deviation, and *α* for alpha of reliabilty of scale or sub-scale.

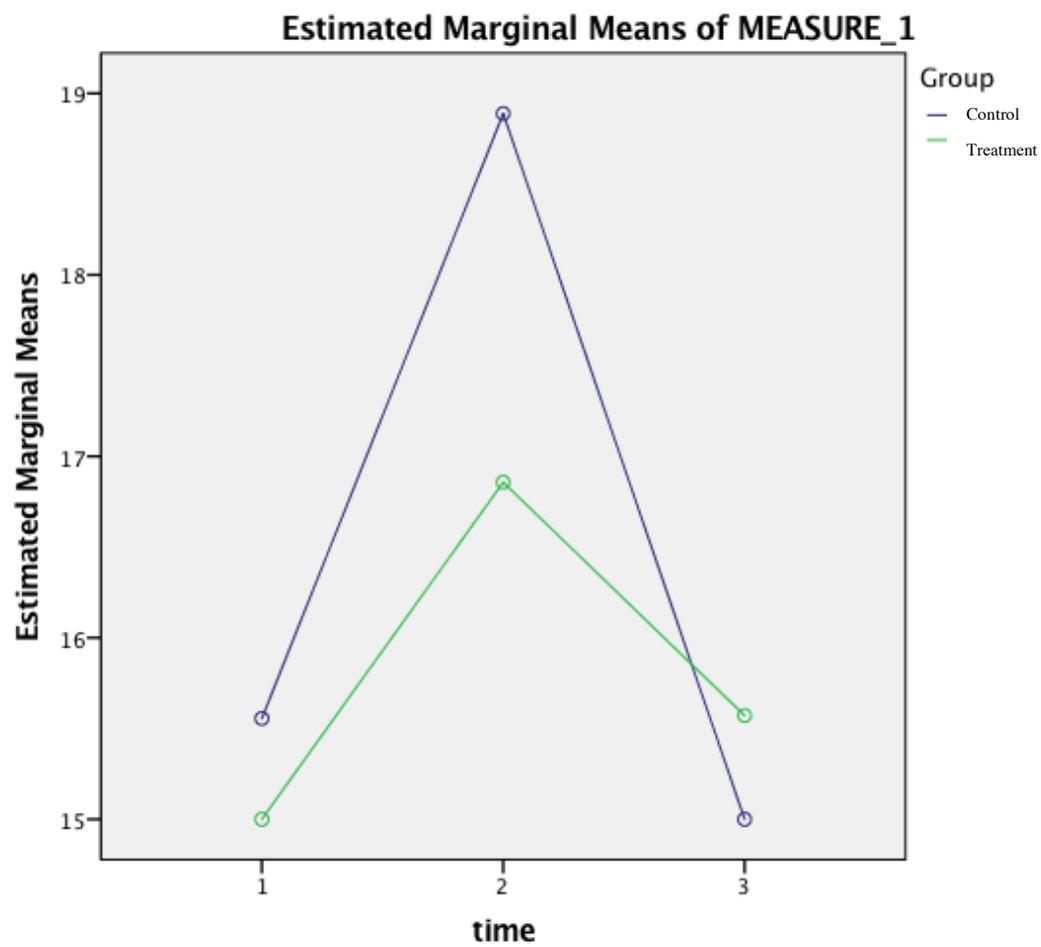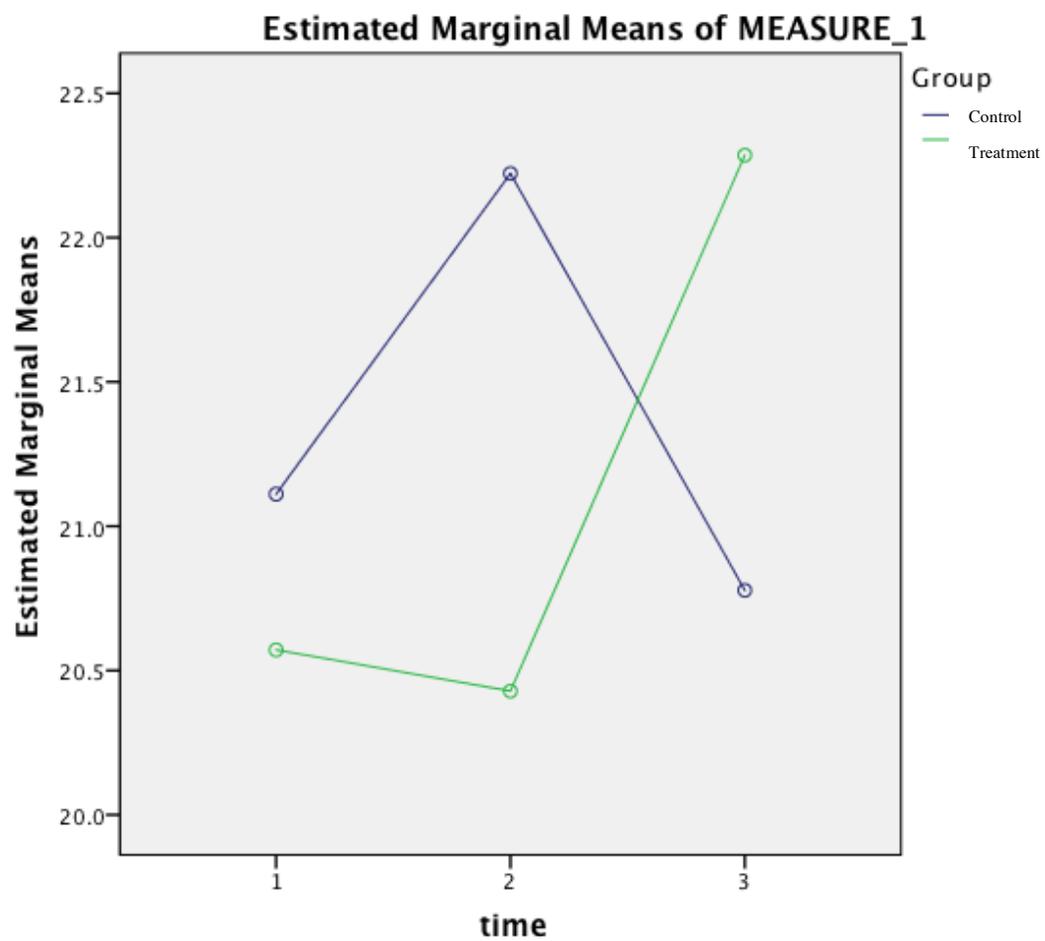*Figure 1.* Perception of risk of heart disease scale dread risk over time.

Figure 2. Heart disease knowledge over time.

APPENDIX A: Perception of Risk for Heart Disease Scale

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. There is a possibility that I have heart disease.	1	2	3	4
2. There is a good chance that I will get heart disease during the next 10 years.	1	2	3	4
3. A person who gets heart disease has no chance of being cured.	1	2	3	4
4. I have a high chance of getting heart disease because of my past behaviors.	1	2	3	4
5. I feel sure that I will get heart disease.	1	2	3	4
6. Healthy lifestyle habits are unattainable.	1	2	3	4
7. It is likely that I will get heart disease.	1	2	3	4
8. I am at risk for getting heart disease.	1	2	3	4
9. It is possible that I will get heart disease.	1	2	3	4
10. I am not doing anything now that is unhealthy to my heart.	1	2	3	4
11. I am too young to have heart disease.	1	2	3	4
12. People like me do not get heart disease.	1	2	3	4

	Strongly Disagree	Disagree	Agree	Strongly Agree
13. I am very healthy so my body can fight off heart disease.	1	2	3	4
14. I am not worried that I might get heart disease.	1	2	3	4
15. People my age are too young to get heart disease.	1	2	3	4
16. People my age do not get heart disease.	1	2	3	4
17. My lifestyle habits do not put me at risk for heart disease.	1	2	3	4
18. No matter what I do, if I am going to get heart disease, I will get it.	1	2	3	4
19. People who don't get heart disease are just plain lucky.	1	2	3	4
20. The causes of heart disease are unknown.	1	2	3	4

APPENDIX B: Heart Disease Knowledge Questionnaire

	True	**False**
1. Polyunsaturated fats are healthier for the heart than saturated fats.	T	F
2. Women are less likely to get heart disease after menopause than before.	T	F
3. Having had chicken pox increases the risk of getting heart disease.	T	F
4. Eating a lot of red meat increases heart disease risk.	T	F
5. Most people can tell whether or not they have high blood pressure.	T	F
6. Trans-fats are healthier for the heart than most other kinds of fats.	T	F
7. The most important cause of heart attacks is stress.	T	F
8. Walking and gardening are considered types of exercise that can lower heart disease risk.	T	F
9. Most of the cholesterol in an egg is in the white part of the egg.	T	F

10. Smokers are more likely to die of lung cancer than heart disease. T   F

11. Taking an aspirin each day decreases the risk of getting heart disease. T   F

12. Dietary fiber lowers blood cholesterol. T   F

13. Heart disease is the leading cause of death in the United States. T   F

14. The healthiest exercise for the heart involves rapid breathing for a sustained period of time. T   F

15. Turning pale or gray is a symptom of having a heart attack. T   F

16. A healthy person's pulse should return to normal within 15 minutes after exercise. T   F

17. Sudden trouble seeing in one eye is a common symptom of having a heart attack. T   F

18. Cardiopulmonary resuscitation (CPR) helps to clear clogged blood vessels. T   F

19. HDL refers to "good" cholesterol, and LDL refers to "bad" cholesterol. T   F

20. Atrial defibrillation is a procedure
where hardened arteries are opened to increase
blood flow.   T   F

21. Feeling weak, lightheaded, or faint is a   T   F
common symptom of having a heart attack.

22. Taller people are more at risk for getting heart disease.   T   F

23. "High" blood pressure is defined as 110/80   T   F
(systolic/diastolic) or higher.

24. Most women are more likely to die from   T   F
breast cancer than heart disease.

25. Margarine with liquid safflower oil is healthier   T   F
than margarine with hydrogenated soy oil.

26. People who have diabetes are at higher   T   F
 risk of getting heart disease.

27. Men and women experience many of the   T   F
same symptoms of a heart attack.

28. Eating a high fiber diet increases the risk   T   F
of getting heart disease.

APPENDIX C: Relationship Assessment Scale

Please mark on the answer sheet the letter for each item which best answers that item for you.

How well does your grandparent meet your needs?

A	B	C	D	E
Poorly		Average		Extremely well

In general, how satisfied are you with your relationship?

A	B	C	D	E
Unsatisfied		Average		Extremely satisfied

How good is your relationship compared to most?

A	B	C	D	E
Poor		Average		Excellent

How often do you wish you hadn't had this relationship?

A	B	C	D	E
Never		Average		Very often

To what extent has your relationship met your original expectations:

A	B	C	D	E
Hardly at all		Average		Completely

How much do you love your grandparent?

A	B	C	D	E
Not much		Average		Very much

How many problems are there in your relationship?

A	B	C	D	E
Very few		Average		Very many