

# **THE IMPORTANCE OF INTERDISCIPLINARITY: INSIGHTS IN THEORY APPLICATION AND DEVELOPMENT**

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## **ABSTRACT**

Throughout academia, there lacks an existence of commonly utilized interdisciplinary theories to aid in understanding the interconnectedness of our outside world. This paper provides a sample of the current state of interdisciplinarity in research and the need for interdisciplinary theory development. The health belief model (HBM) is provided as a theoretical framework that lacks interdisciplinary characteristics in comparison with the interdisciplinary nature of systems theory and game theory. Through the comparative analysis of the HBM, game theory and systems theory, guidelines to developing interdisciplinary theory are proposed for scholars to consider when crafting theory constructs and descriptors. These guidelines are applied to show that the HBM can be redefined to explain nonprofit volunteer behaviors, demonstrating the power and impact of interdisciplinarity.

## **INTRODUCTION**

In a world of increasing complexity, the importance of diversity in thoughts, opinions, and ideas is central to a well-functioning society. Over the past decade, the concept of interdisciplinarity has regained credibility, signaling the reinvention of novel approaches to issues that cannot simply be undertaken within the confines of traditional isolated disciplines (Ross, 2009). Defined by Engerer (2017), interdisciplinarity serves as a relationship in which ideas and concepts from one discipline are introduced into the basic ideas and models of the other. The movement of these ideas between individuals or groups, termed knowledge flows, are not only key components for the cohesion and connectivity of academic research communities (Rawlings, McFarland, Dahlander, & Wang, 2015), but also helps spur innovation relating to new ideas, tasks, and procedures. There currently exists an absence of a commonly utilized interdisciplinary approach to promote such flows, where science has tried to explain observable phenomena by reducing them to elementary units investigated independently of one another (Bertalanffy, 1969). As early as the mid-twentieth century, physics, chemistry, biology, economics, sociology and other disciplines, have been called to go beyond developing theories that have a single application in their own empirical segment (Boulding, 1956), but such insulation is still proposed to exist (Rogers, Rizzo, & Scaife, 2003).

If science continues to evolve into infinite sub-groups, the total growth of knowledge will be slowed by the loss of collective communication (Boulding, 1956). With integrated technology being used to exchange news, data, reports, equipment, instruments and other resources, dispersed collaborations are easier now than ever before (Hesse, Sproull, Kiesler, & Walsh, 1993). As academia and research look towards more collaborative approaches, the theories developed in

singular arenas must follow in progression to lay the foundation for interdisciplinary theory to assist in the knowledge sharing network. The question must be, then, how can researchers develop interdisciplinary theories that spark collaboration and knowledge-sharing across academic barriers?

## **Introduction to Interdisciplinary Theory**

To discuss the nature and importance of interdisciplinary theory, the role of theory itself must be understood. Theories have been described as generalizations that seek to explain the relationship certain phenomena have with others (Glazier & Grover, 2002). Further, a “theory” is known to be a multiple-level component of the research process, comprised of generalizations that move beyond descriptive keywords to a more explanatory level (Glazier & Grover, 2002). Glaser & Strauss (1967) add that distinct theories have certain qualities that make them valid and verifiable and are readily understandable to scientists, students, and laymen alike. In explaining phenomena, a theory should provide clear categories and hypotheses so that any conclusions are continually able to be verified in present and future research. A theory must be able to fit the situation being researched, meaning the categories are readily applicable and are relevant to the behavior under study (Glaser & Strauss, 1967), aiding into the debate about how generalized a theory can become to promote an interdisciplinary approach to answering questions. This paper argues that theory may contain various levels of explanatory description that can keep content applicable and valid for any situation it may describe.

Many theories have the potential to be applicable outside of a singular area, as studies have found that potential variations of the health belief model (HBM) on general behavior are consistent with applications of the theory to health-related actions (Lindsay & Strathman, 1997). Other theories have already embraced their interdisciplinary nature. When considering game theory, it was originally devised to simply study poker, chess, and other games, but was later adapted to explain markets, competition, and even animal behavior (Pool, 1995), offering evidence that the original construction of the theory does not have to stand as its only avenue of applicability. Additionally, systems theory proposes itself as a general science of wholeness that had previously not existed.

In general, boundaries to theories are determined more by method and conceptual framework than necessarily by subject matter (Klein, 1996). For interdisciplinary theory to exist, theory development must take on an evolved approach to increase the level of applicableness that such a theory contains. In attempting to develop guidelines to promote theory development that spans discipline-specific arenas, examples of both isolated and broadly used models are needed for comparison. In this analysis, the health belief model is examined as an example of a self-limiting theory that is published primarily in public health, whereas systems theory and game theory are recorded as having an increased diversification of citations. It is the hope that providing these theories as illustrations of differences in theory constructs and usage will lead to the discovery of the key components of an interdisciplinary theory.

## METHODS

The following paper is structured to provide perspective and guidance to incorporating interdisciplinarity in theory development. Through this effort, the researcher utilizes the health belief model as a proposed framework that is limited in applicable scope due to its health-specific constructs. Contrastingly, systems theory and game theory were chosen for comparison for their proposed interdisciplinary nature.

To verify the hypothesis that the health belief model (HBM) is primarily isolated in its applicability to public health, a citation analysis was conducted to quantify the model's respective publishing in specific academic areas. In coming closest to the most authentic multidisciplinary database that provides the earliest origin of data, in comparison to *Scopus* and *Google Scholar* (Jacso, 2005), the *Web of Science* was the chosen database reference tool of choice for the paper. Searching the *Web of Science Core Collection*, the field was populated with "<THEORY NAME>" as the topic and limited to only peer-reviewed journal articles. Using the Web of Science's "analyze results" feature, article classification data was gathered in sorting by "research areas" to quantify the frequency of theory publication in specific disciplines. If an article was deemed to be interdisciplinary itself, each field comprising the study would be included in the calculation. A chi-squared analysis was performed between the resulting highest two research areas within which each respective theory was published to determine if at least one area was statistically significant and isolated in distribution. The two primary areas for each theory that underwent a chi-squared analysis are explicitly outlined and the remaining eight highest are listed for reference in the results.

From a quantitative perspective, analyzing the areas of publication of these theories and confirming the interdisciplinary nature of systems theory and game theory provided validation for further study. What are the elements of systems and game theory that make them more interdisciplinary, compared to the health belief model? To confront this question, a coding mechanism was utilized in the analysis of these theories to discover qualitative characteristics and traits that may be applicable to developing and defining theory constructs. To code the most influential literature for each respective theory within *Web of Science*, the ten most cited peer-reviewed articles that incorporated the theory name in the title were chosen. Such methodology was followed to permit a uniform coding process of selection for all three theories. It is significant to note that the ten articles did not always contain extensive descriptions of the theories' constructs but were believed to be effective in offering examples of the most-referenced studies that expose scholars to their respective ideas.

The researcher notes that when sorting for the ten most-cited articles for "systems theory" within *Web of Science*, certain results were omitted due to their irrelevance. Within the database, the capability does not exist to separate "systems theory" from "systems: theory" or "systems- theory." As a result, there were articles that populated that were considered false positives in not pertaining to general systems theory, such as "Interval type-2 fuzzy logic systems: theory and design." The top ten most-cited articles pertaining to general systems theory were coded for interdisciplinary trends and qualities, which are listed in Table 1.

**TABLE 1: LITERATURE CODED FOR ANALYSIS**

<b>Health Belief Model</b>	<i>Janz &amp; Becker, 1984</i> <i>Rosenstock et al., 1988</i> <i>Rosenstock, 1974a</i> <i>Rosenstock, 1974b</i> <i>Becker, Maiman, Kirscht, Haefner, &amp; Drachman, 1977</i> <i>Harrison, Mullen, &amp; Green, 1992</i> <i>Becker, 1974</i> <i>Austin, Ahmad, McNally, &amp; Stewart, 2002</i> <i>Carpenter, 2010</i> <i>Maiman &amp; Becker, 1974</i>
<b>Systems Theory</b>	<i>Boulding, 1956</i> <i>Schilling, 2000</i> <i>Bot, Lowie, &amp; Verspoor, 2007</i> <i>G. Chen &amp; Kanfer, 2006</i> <i>Walby, 2007</i> <i>Joshi, Speyer, &amp; Kim, 1997</i> <i>Orr, 1998</i> <i>Kast &amp; Rosenzweig, 1972</i> <i>Young, 1997</i> <i>Hendry &amp; Seidl, 2003</i>
<b>Game Theory</b>	<i>Rabin, 1993</i> <i>Brown, Laundré, &amp; Gurung, 1999</i> <i>Roth, 1984</i> <i>Saad et al., 2009</i> <i>Roth, 2002</i> <i>Hauert &amp; Szabó, 2005</i> <i>Wang et al., 2010</i> <i>Srivastava et al., 2005</i> <i>Elster, 1982</i> <i>Ferrero, Shahidehpour, &amp; Ramesh, 1997</i>

To pinpoint specific characteristics that differentiate systems and game theory as more interdisciplinary than the HBM, the theories were coded to analyze specific characteristics that may distinguish them following guidelines in grounded theory research listed by Corbin and Strauss (1990). Further, to understand interdisciplinary characteristics holistically, systems theory and game theory were coded collectively. In identifying common words or phrases present within published literature, the researcher gives such phenomena conceptual labels detailing the specific language utilized. Similar concepts and phrases that describe comparable phenomena were then grouped to form categories, such as “generalized verbiage.” Using the coding results, guidelines in developing interdisciplinary theory were proposed. These guidelines will require further study but are meant to offer a starting point in expanding previously isolated theories of the past. Due to a call for additional research on the HBM to test for never-before considered hypotheses (Lindsay & Strathman, 1997) and previous associations of volunteering as a public health intervention (Jenkinson et al., 2013), the proposed guidelines were applied to reframe the HBM as a potential explanation for the proposed problem.

## RESULTS

The quantitative citation distribution data is listed first followed by the qualitative coding results to determine the proposed interdisciplinary characteristics of theory. These results were then applied to propose the guidelines for interdisciplinary theory development.

### Citation Distribution

The quantitative results of each theory's citation distribution are outlined by the top ten research areas of publication specified in tables 2, 3 and 4.

**TABLE 2: HEALTH BELIEF MODEL PUBLISHED RESEARCH FIELDS**

<i>Research Area</i>	<i>Record Count</i>	<i>%</i>
Public Environmental Occupational Health	807	34.62%
Psychology	387	16.60%
Nursing	256	10.98%
Oncology	181	7.77%
Health Care Sciences Services	170	7.29%
General Internal Medicine	166	7.12%
Education Educational Research	142	6.09%
Social Sciences Other Topics	90	3.86%
Biomedical Social Sciences	88	3.78%
Psychiatry	71	3.05%
<i>Total</i>	2358	

\*  $p < .05$

**TABLE 3: GAME THEORY PUBLISHED RESEARCH FIELDS**

<i>Research Area</i>	<i>Record Count</i>	<i>%</i>
Engineering	5888	29.86%
Computer Science	5771	29.26%
Business Economics	4277	21.69%
Telecommunications	2529	12.82%
Operations Research Management Science	2485	12.60%
Mathematics	1956	9.92%
Automation Control Systems	1027	5.21%
Environmental Sciences Ecology	911	4.62%
Physics	630	3.20%
Mathematical Methods in Social Sciences	586	2.97%
<i>Total</i>	26060	

**TABLE 4: SYSTEMS THEORY PUBLISHED RESEARCH FIELDS**

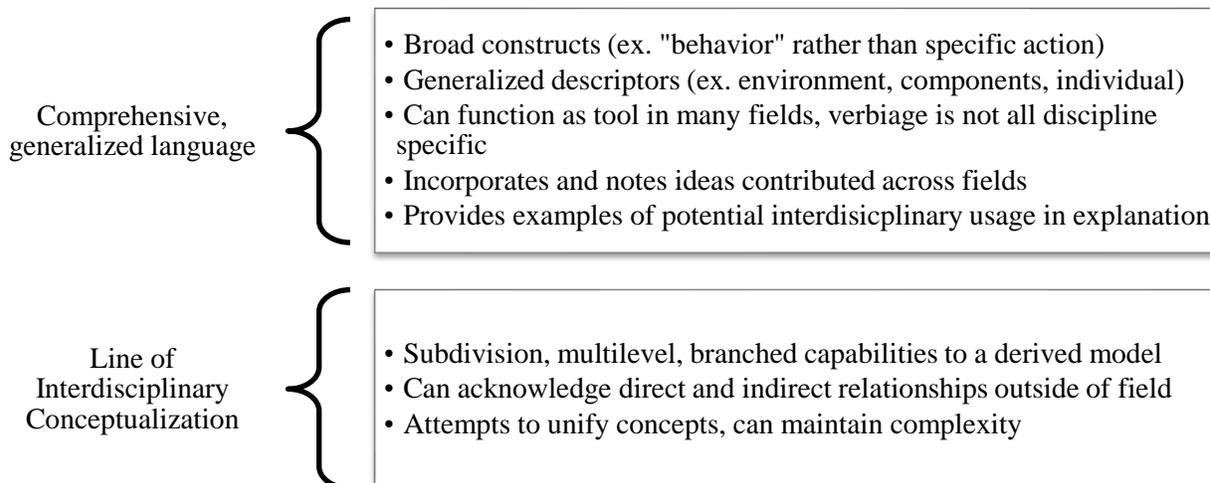
<i>Research Area</i>	<i>Record Count</i>	<i>%</i>
Computer Science	1596	16.72%
Engineering	1560	16.34%
Psychology	1206	12.63%
Physics	1145	11.99%
Business Economics	835	8.75%
Mechanics	803	8.41%
Mathematics	777	8.14%
Automation Control Systems	754	7.90%
Social Sciences Other Topics	479	5.02%
Education Educational Research	316	3.31%
<i>Total</i>	<i>9471</i>	

While the researcher acknowledges that there are potential flaws in methodology, the results above indicate the present issue of published isolation for the health belief model. The health belief model is significantly isolated in its usage in articles that are categorized as “public environmental occupational health” compared with others, namely the second-closest category of “psychology.” This is hypothesized to be a result of the constructs relating to health-specific behaviors and preventative health actions, rather than behaviors as a collective notion. It is understood that the HBM was developed as a specific model to explain health behaviors (Rosenstock, 1974b), however the question of the need for such specificity arises. If a model is applicable across the confines of disciplines, this can display the importance of knowledge sharing in using data to confront phenomena spanning the academic spectrum.

From the distributions quantified above, it is apparent that both game and systems theory have an increased dispersal in publication areas. Each has a nonsignificant differentiation between their publishing in engineering and computer science. It is noted that these disciplines have similarities but are still representative of differentiated schools of knowledge. In addition to just the top two categories of computer science and engineering, the diversity of disciplines present in the top ten areas showcases the interdisciplinary nature and usage of these two theories. Analyzing what elements have led to such a nature are the topic of interest below.

**Analysis of Qualitative Interdisciplinary Components of Theories**

Following a holistic review of the literature relating to game theory and systems theory, in comparison to the health belief model, distinct phenomena were noticed that alludes to their constructs’ applicability and relevance across disciplines. Specific concepts have been identified, followed by two proposed categories that compile these concepts into collective ideas. The resulting categories of interest are comprehensive, generalized construct language and the line of interdisciplinary contextualization, described in the section below (see Figure 1).



**FIGURE 1: INTERDISCIPLINARY COMPONENTS OF THEORIES**

*Comprehensive, Generalized Language*

Specific keywords and phrases were often incorporated into the text describing the theory constructs of systems theory and game theory, samples of which are noted in Table 5.

**TABLE 5: EXAMPLES OF THEORY DESCRIPTORS**

<b>Broad-Construct Language</b> <i>(systems and game theory)</i>	<b>Discipline-Specific Language</b> <i>(health belief model)</i>
<p><i>Boulding, 1956</i>  “Highly generalized constructions”  “Framework of general theory”  “General relationships of the empirical world”</p> <p><i>Bot et al., 2007</i>  “General principles”  “Complete interconnectedness: all variables are interrelated”</p> <p><i>Kast &amp; Rosenzweig, 1972</i>  “unification of science”</p> <p><i>Rabin, 1993</i>  “applied generally”  “multiple applications”</p> <p><i>Hauert &amp; Szabó, 2005</i>  “interdisciplinary links”  “link between unrelated disciplines”</p>	<p><i>Janz &amp; Becker, 1984</i>  “preventative health behaviors”  “health-related actions”</p> <p><i>Rosenstock et al., 1988</i>  “health-related actions”  “patient”  “perceived susceptibility to and severity of illness”</p> <p><i>Rosenstock, 1974a</i>  “prevention of disease”  “to avoid a disease”  “possibility of a disease occurrence”</p> <p><i>Harrison et al., 1992</i>  “value-expectancy model to explain health actions”</p> <p><i>Becker, 1974</i>  “medical model”  “health and illness behavior”</p>

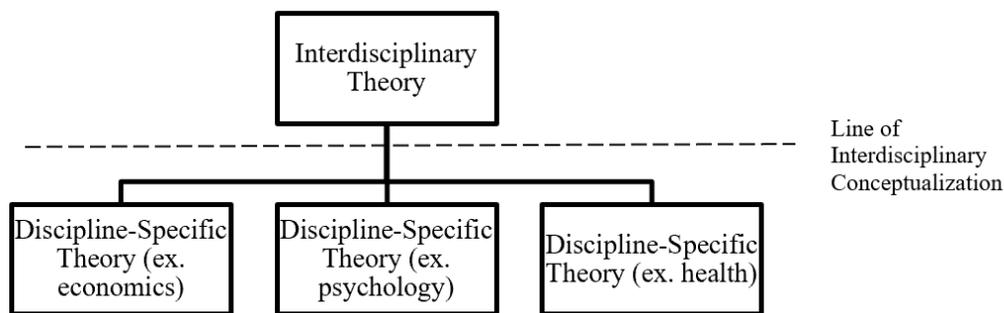
A significant occurrence in the description of the game or systems theory constructs were words such as ‘broad’ (G. Chen & Kanfer, 2006; Rabin, 1993; Saad et al., 2009) and ‘generalized’ (Boulding, 1956; Brown et al., 1999; Rabin, 1993; Schilling, 2000; Walby, 2007). It is proposed that these descriptors lay a foundation for researchers of various disciplines to take notice of its potential usage in describing phenomena of interest. This usage of taking a theory with broad descriptors and applying it to a specific situation was observed by Joshi et al. (1997) as a systems theory approach was utilized to describe the physics concept of Poiseuille flow. With this article being quantified as one of the top ten articles cited in the *Web of Science* relating to systems theory, it is apparent that the research team’s methods provided an example of interdisciplinary theory utilization. The same can be considered in Roth’s (1984) analysis of the labor market for medical interns by applying game theory concepts, or even Srivastava et. al’s (2005) study in using game theory to analyze wireless ad hoc networks.

As expected, an observation when analyzing the literature pertaining to the health belief model was the immense usage of the word ‘health’. In each article, the HBM was described as originating to provide an understanding of preventative health behaviors. As such, the descriptors of the model reference its applicability in health specifically and the use of these constructs has followed suit, alluding to its constructs’ lack of interdisciplinary characteristics. For reference, Becker (1974) terms the HBM as a ‘medical’ model of behavior, Austin et al. (2002) state its use to develop health interventions, and Janz & Becker (1984) consider the dimensions of the model to be used for health education programming. Harrison et al. (1992) performed a metaanalysis of the effectiveness of the HBM and required the study to pertain to health to be considered. The constructs of perceived susceptibility and perceived severity were primarily presented in public health terms (Austin et al., 2002; Becker, 1974; Carpenter, 2010; Harrison et al., 1992; Janz & Becker, 1984; Maiman & Becker, 1974; Rosenstock, 1974a), rather than a general psychosocial approach, using terms like health behavior, perceived severity of disease, and illness. Often, subjects were listed as patients rather than individuals (Becker, 1974; Rosenstock et al., 1988), and topics of interest were relating to smoking, alcohol and substance abuse, physical activity, and dietary habits (Rosenstock et al., 1988), subconsciously limiting its scope to health-related situations.

### ***Line of Interdisciplinary Conceptualization***

Most significantly, in explicitly stating their usage as a tool for widespread analysis in different fields (Hauert & Szabó, 2005; Srivastava et al., 2005; Wang et al., 2010), game and systems theory have subdivisional capabilities in describing specific situations. Further, the overarching generalized theory is manipulated in describing a certain phenomenon, but it still represents the application of the overall model, such as the Nash equilibrium model being a defined subset of game theory or growth model being a subset of systems theory. This ability is termed by various phrases, such as multilevel (G. Chen & Kanfer, 2006), having subdivisions (Boulding, 1956), branches (Wang et al., 2010), even subsystems (Kast & Rosenzweig, 1972; Orr, 1998). To offer an example, Schilling (2000) notes how general systems theory can be applied to interfirm product modularity and derives a model that demonstrates how this general theory can be applied to a certain system. The importance of this characteristic, however, is the connection the specific theory

makes in its utilization throughout different disciplines. It offers a unification of science (Kast & Rosenzweig, 1972) that is needed in promoting knowledge sharing throughout our academic world. From this observation, the researcher proposes a term called “line of interdisciplinary conceptualization” for generating interdisciplinary theory. Theories that are above this line can be considered interdisciplinary and those that are below describe a specific phenomenon of interest. In theory development, researchers should ensure that there is no higher classification in describing the constructs through proper verbiage and descriptors (Figure 2).



**FIGURE 2: LINE OF INTERDISCIPLINARY CONCEPTUALIZATION**

A common observation in this qualitative analysis was the promotion of system and game theory’s ability to connect ideas into a holistic model. Brown et al. (1999), Hauert & Szabó (2005), Rabin (1993), Roth (2002), Saad et al. (2009), Srivastava et al. (2005) and Kast & Rosenzweig (1972) all allude to the importance of the interconnectedness of ideas that game theory and systems theory provide. The keywords used vary, as words such as connecting, interconnectedness, incorporation, cooperation and unifying were all present to distinguish the relationship between constructs and therefore, should be present above the line of interdisciplinary conceptualization. These concepts further the idea that an interdisciplinary theory is more than just broad and generalized, rather it emphasizes the potential for models to be explanatory of phenomena observed in different academic arenas.

In the literature, there was often criticism regarding the ability to measure the variables listed in the health belief model. Rosenstock (1974b) called into question the lack of standardized questions to measure health perceptions. Carpenter (2010) discredited many studies relating to the HBM for having unreliable measures of the variables in question and a lack of understanding of outside influences within the model. The additional discussion of motivation and self-efficacy in the HBM resulted in a revised model being generated in 1975 (Harrison et al., 1992). Resultantly, this shows that the model was too narrowly defined, and under the line of interdisciplinary conceptualization, leading other researchers to have to make additional constructs to apply it to the phenomena in question. By initially developing a theory above this conceptual line, researchers can be more efficient in theory creation.

## **DISCUSSION**

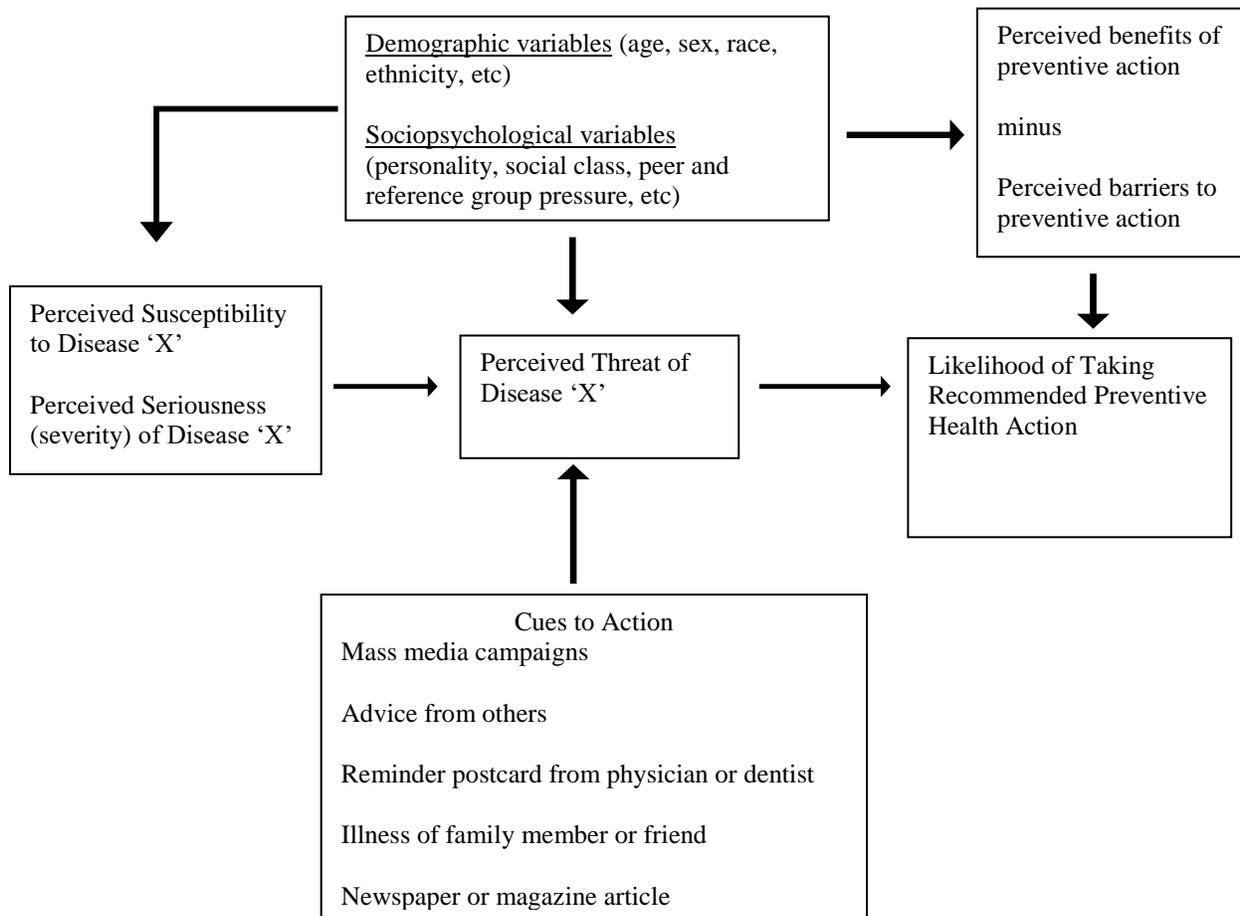
### **Guidelines for Interdisciplinary Theory Development**

Utilizing the characteristics discussed above, guidelines in theory development are proposed below. The theory should also be able to exist in both an extensive, or rigidly structured, and strategic, or generalized, form, similar to game theory described by Myerson (1991). There should be a clear distinction present that can allow for the model to have interdisciplinary nature above the line, as well as specific derivatives under the line of interdisciplinary conceptualization. Although the HBM has connections with the social cognitive theory and theory of reasoned action, there exists no clear relationship between the models themselves (Carpenter, 2010). There have been six different parallel models of decision making similar to the HBM (Maiman & Becker, 1974), proving the notion that knowledge is consistently isolated to explaining specific situations rather than attempting to understand the interconnected world. Interdisciplinary models must maintain a complexity in describing situations, but also understand the potential interconnectedness of phenomena. The following guidelines were generated by the researcher as a suggestion in developing such interdisciplinary theory.

1. Be cognizant to avoid field-specific verbiage when developing name and constructs, ensuring that they maintain generalizability and the appropriate broadness.
2. Ensure that the theory can be placed above the line of interdisciplinary conceptualization through its ability to directly lead to subdivisions, or branched derivatives, to explain the desired phenomena of choice, warranting there would not effectively exist a more-generalized model.
  - If applicable:
    - a. Offer specific theory branches that could describe certain discipline-specific environments
    - b. Confirm that the theory can fit with varying descriptors if above the line

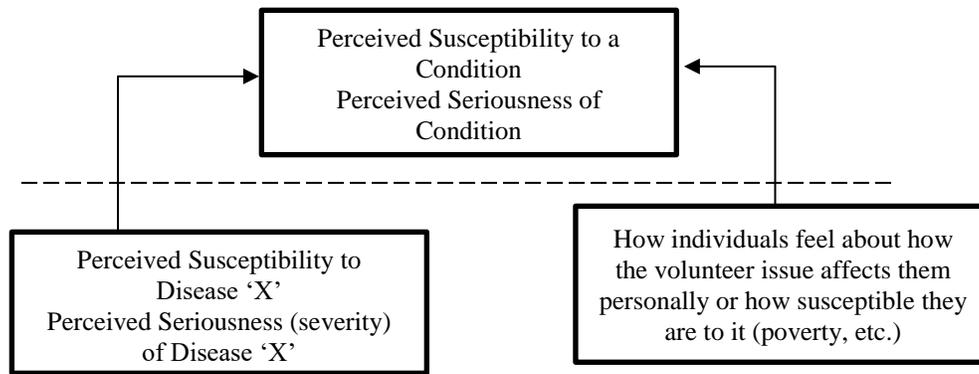
### **The Health Belief Model – A New Context**

In applying these interdisciplinary guidelines and characteristics, the health belief model is proposed to have an ability to be broadened to elevate it above the line of interdisciplinary contextualization. It is of note that the researcher believes that name ‘health belief model’ would additionally need changing, but for explanatory purposes, it will remain in this discussion. The following diagrams propose changes in the terminology relating to the HBM’s constructs to promote its applicability in areas outside of public health and above the interdisciplinary line. The comparison is illustrated in Figure 3 which describes some of the HBM constructs from Becker et al. (1977).



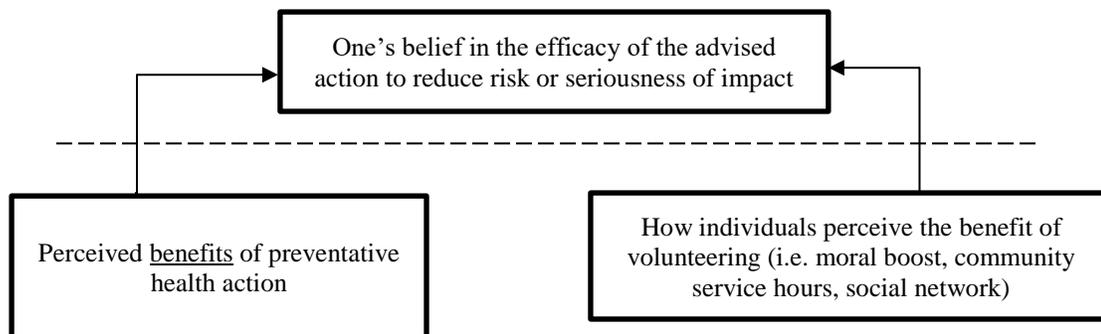
**FIGURE 3: THE HBM AS DESCRIBED BY BECKER ET AL. (1977)**

In exemplifying the second guideline in interdisciplinary theory development above, a redefined HBM will be proposed above the line of interdisciplinary contextualization, as well as derived theory below the line will be proposed. The HBM is proposed for this argument as being applicable in the information science field due to links between non-profit volunteering and health observed in the literature. Below, the line of interdisciplinary conceptualization is displayed utilizing each construct of the health belief model in its current form alongside proposed interdisciplinary and volunteer-specific forms (Figure 4).



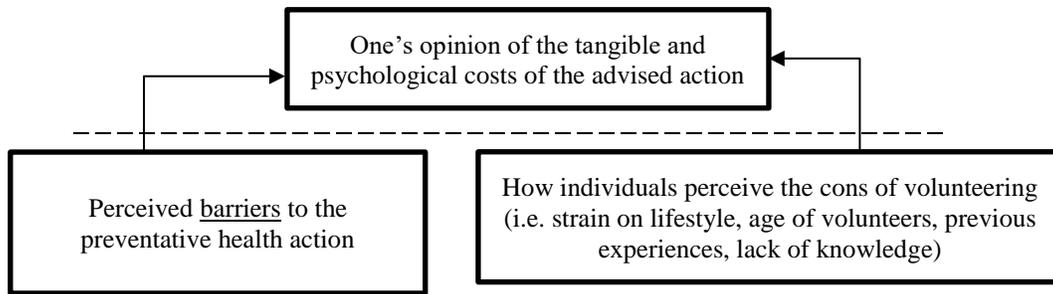
**FIGURE 4: HBM CONSTRUCT – PERCEIVED SUSCEPTIBILITY/SERIOUSNESS**

Altering the text from ‘disease’ to ‘condition’ in the generalized model offers researchers more flexibility into the phenomena of interest, as well as the ability to go below the line to mid-range theory. Condition may take on roles in the social sciences which contrast that of biological or environmental science. The word ‘disease’ is proposed to limit the HBM in only referencing health-relating behaviors. In volunteering, perceived susceptibility would be centered on how the specific volunteer issue affects them personally. Using the proposed guidelines of developing an interdisciplinary theory, the construct was broadened and generalized, but also exhibited capabilities of describing specific situations, like disease or volunteering if necessary (Figure 4).



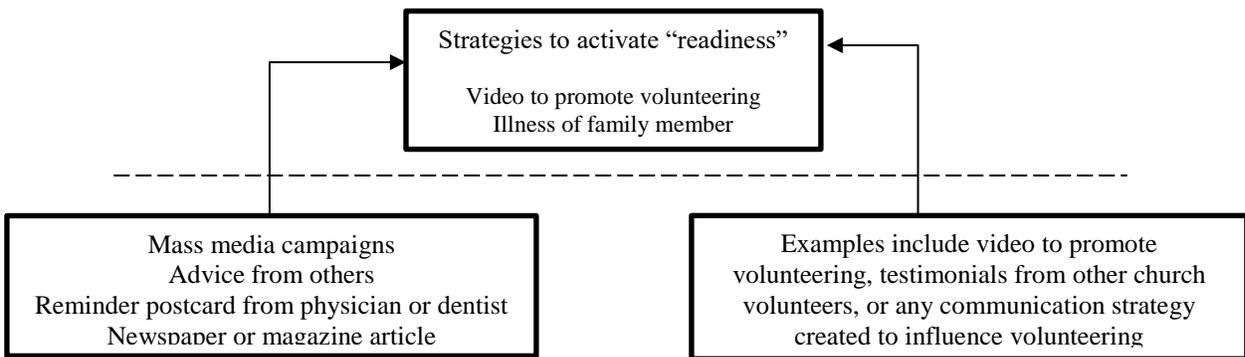
**FIGURE 5: HBM CONSTRUCT – PERCEIVED BENEFITS**

To broaden the language in accordance with the guidelines, the term ‘preventative health’ was eliminated to increase its interdisciplinarity. The process of performing an act to prevent disease can be related to ‘impact’, which is seen inserted. Further, ‘patient’ is commonly seen in article descriptors of the HBM, so explicitly using ‘one’s’ was included. With volunteering, the perceived benefits would be how the individual perceives the benefit of volunteering, whether that is a moral boast, community service hours, or even the increase in social network (Figure 5).



**FIGURE 6: HBM CONSTRUCT – PERCEIVED BARRIERS**

Like perceived benefits, eliminating ‘preventive health’ will produce a more interdisciplinary theory. Describing the construct using only ‘action’ is also meant to broaden the verbiage used. In volunteering, these perceived barriers can be the strain on one’s lifestyle, lack of knowledge of the responsibilities, stigmas surrounding the age of volunteers, amongst other factors (Figure 6).



**FIGURE 7: HBM CONSTRUCT – CUES TO ACTION**

Cues to action has the most significant proposed transformation of all constructs. For the HBM to take on a uniquely interdisciplinary approach, the theory must be open for researchers to apply general concepts. In accordance with the interdisciplinary theory guidelines, offering examples of multiple applications of the generalized model is observed using health and volunteering (Figure 7).

## CONCLUSION

From this study, the researcher has attempted to provide context to the ongoing trend of interdisciplinarity in academia and the need for theory to follow suit. Many models and theories, namely the health belief model in this discussion, are proposed to be limited in their usage due to the description of the constructs from their original development and publishing. Such a limitation on the sharing of models can lead to isolation of knowledge, decreased collaboration, and most significantly, less efficiency in understanding the world around us. Future research is needed for

further analysis as to the specific components of interdisciplinary theory. It is meant that this paper serves as a call-to-action for the scholarly community to recognize the possible systematic link between fields.

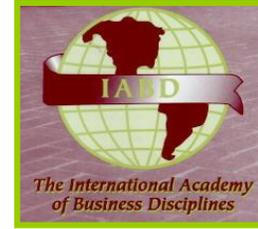
Although referenced in a multitude of research, interdisciplinary theory is not extensively defined as its own entity in great depth. The discussion of characteristics of the language and terminology used in a theory being categorized as interdisciplinary is minimal. The best processes in interdisciplinary theory development are largely lacking. Resultantly, there must be a new era of research that can contribute to answering some of these questions. With trends showcasing the increase in collaboration among research teams, the academic community must begin to examine the impact of interdisciplinarity theory in continuing this upward trend. It is not a simple call for new theories to be produced that explain phenomena from a grandiose scale, rather an analysis of previous theories and their lack of interdisciplinary characteristics can lay a foundation for future work and development. Through an interdisciplinary approach in understanding the interplay of distinct phenomena, scholars can begin to demonstrate the power and impact of knowledge sharing in solving some of society's greatest questions.

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# INTERNATIONAL JOURNAL OF INTERDISCIPLINARY RESEARCH

VOLUME 7, NUMBER 2, December 2018

ISSN 2165-3232



**A PUBLICATION OF EASTERN WASHINGTON UNIVERSITY AND THE  
INTERNATIONAL ACADEMY OF BUSINESS DISCIPLINES**

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