AN ABSTRACT OF THE DISSERTATION OF

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Title: Concept Mapping and Enumerating Strategies to Increase Fat Acceptance in Fitness Centers

Abstract approved:_____
Vicki Ebbeck

According to most health organizations, "obesity" (defined as body mass index [BMI] greater than 30) is a world health problem of "epidemic" proportions. The underlying assumption is that weight is a proxy for health. However, obesity prevention and reduction interventions are designed to regulate body weight, rather than improve health. Weight-focused and medicalized approaches to "obesity" largely ignore two important factors. One is that health can be improved independently of weight loss. The second is that significant harms (e.g., stigma, discrimination, negative attitudes) are sanctioned toward larger individuals when weight is conflated with health. One way to address these issues is through interdisciplinary and translational research; another is to incorporate stakeholder voices into research.

The first manuscript in this dissertation introduces concept mapping (Kane & Trochim, 2007) to the field of kinesiology. The paper advocates that more researchers consider concept mapping, when appropriate to the research question(s), to incorporate the voices of stakeholders into research, with the goal of building the body of translational research. Concept mapping is described, followed by a brief review of

kinesiology-related studies, the potential for concept mapping to help build translational and interdisciplinary knowledge, and limitations of the method.

The second manuscript implements concept mapping to address a common problem: weight bias in physical activity contexts. Current and past members and employees of fitness centers (N =155) were recruited to brainstorm ideas that could increase positive attitudes toward larger members. Participants then sorted the ideas (n = 49) based on perceived similarity, and rated the ideas (n = 43) on importance, feasibility, and reach. One hundred ideas representing the five broad themes of programming, fitness culture, code of conduct, professional development, and physical environment/amenities emerged. As hypothesized, differences between stakeholder groups were evident. The results are applicable to practitioners in fitness centers and can also be used to design interventions aimed at increasing positive attitudes toward larger members in fitness centers that are positive and self-determined.

Overall, the dissertation adds to the field of kinesiology by introducing and discussing an underutilized methodology—concept mapping—that can help design interdisciplinary and translational research, and incorporate the perceptions of stakeholders. The dissertation also demonstrates how to use concept mapping to address a persistent problem in kinesiology. Addressing weight bias in fitness centers can help improve physical activity participation and enjoyment for members of all sizes and increase positive and self-determined attitudes toward larger people.

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Concept Mapping and Enumerating Strategies to Increase Fat Acceptance in Fitness Centers

by
Brian Jason Souza

A DISSERTATION

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Doctor of Philosophy dissertation of Brian Jason Souza presented on May 14, 2015.

APPROVED:

Major Professor, representing Exercise and Sport Science

Co-director of the School of Biological and Population Health Sciences

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Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Brian Jason Souza, Author

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CONTRIBUTION OF AUTHORS

Brian Jason Souza, MS was responsible for formulating the research projects, developing the conceptual paper, designing the empirical study, collecting data, analyzing and interpreting data, and writing the manuscripts for publication. He will serve as sole author on the conceptual paper (first manuscript) and lead author on the empirical paper (second manuscript).

Vicki Ebbeck, Ph.D., assisted with the empirical study design, interpreting data, and editing the manuscripts. She will serve as the second author on the empirical paper.

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DEDICATION

To my family.

Chapter 1: General Introduction

Concept Mapping and Enumerating Strategies to Increase Fat Acceptance in Fitness Centers

Many kinesiology professionals are challenged with the problem of translating scientific findings into practical and applied situations, which is evident from the dearth of translational research studies (Gill, 2007; Knudson, 2005; Park, 2011). The lack of translation is influenced by scientific paradigms that value discovery over application, funding over impact, and certain methods and designs (e.g., experiments) over others (e.g., participatory research; Gill, 2007). Research findings from well-controlled studies can be impressive, but can lack external validity, especially with complex phenomena. The relationships among diet, physical activity, and "obesity" are examples. For example, researchers can reliably induce weight loss in diverse settings over short periods of time using dietary and physical activity changes (Franz et al., 2007). In the real world however, less than 20% of individuals who achieve a weight loss of at least 10% will maintain the loss (Blomain, Dirhan, Valentino, Kim, & Waldman, 2013).

Focusing on lifestyle changes (i.e., diet and physical activity) as the causes and cures to "obesity-related" health problems is reductionist, in that the problem and solution are reduced to personal responsibility. This paradigm ignores myriad other factors that can affect body size and weight such as weight bias (Puhl & Brownell, 2003). The perception of personal responsibility for body weight/size is pervasive and can lead to situations and social norms where larger individuals are discriminated against, shamed, and blamed for their weight/size (Lewis et al., 2010; Puhl & Brownell, 2003; Puhl & Heuer, 2009). In addition, focusing on weight as an indicator of health obscures the fact that individuals can be healthy at nearly any weight/size (Barry et al., 2014).

The scientific community however, continues to focus on funding weight loss research to combat the "obesity epidemic" (Gard, 2004). Essentially, obesity is reduced to an energy balance problem and anyone who expends more calories than he or she consumes should achieve a "healthy" weight. It is clear that well-controlled studies that restrict caloric intake and/or increase caloric expenditure induce weight loss, but often do not generalize to population-wide improvements in health (Bacon & Aphramor, 2011; Tylka et al., 2014). In fact, there are potential harms (e.g., weight bias, discrimination, and stigma) associated with obesity prevention and reduction efforts (Bacon & Aphramor, 2011; Lewis et al., 2010; Lewis et al., 2011; ten Have, de Beaufort, Teixeira, Mackenbach, & van der Heide, 2011) that are rarely measured. Given this, and the fact that individuals can be healthy at nearly all sizes/weights (Barry et al., 2014; McAuley & Blair, 2011), new directions of inquiry are necessary to complement the existing body of literature on personal and population health.

Most research addressing weight bias has focused on identifying and measuring the problem of bias (Li & Rukavina, 2009; Puhl & Brownell, 2003, 2006), whereas more work identifying context-specific strategies that can reduce or eliminate weight bias is needed (Puhl & Heuer, 2009). One strategy to help build this type of knowledge is to ask individuals to inform researchers about factors that are necessary to improve physical and mental health in specific contexts (i.e., participatory research). An increase in participatory and applied research could add valuable information to the field of kinesiology and potentially move societal attitudes of larger individuals toward "fat-accepting" (Cooper, 2010).

Concept mapping (Kane & Trochim, 2007; Trochim, 1989) is a structured, participant-driven, mixed method research tool that can bridge gaps between research and practice by bringing a group or organization together to gather ideas on an issue that can be used for program planning and/or evaluation (Kane & Trochim, 2007). There are six steps to concept mapping that are guided by a facilitator: (1) preparation, (2) generation, (3) structuring, (4) representation, (5) interpretation, and (6) utilization. The method involves generating qualitative data that is then analyzed through quantitative procedures (e.g., multidimensional scaling and hierarchical cluster analysis). The results are several interpretable "maps" that display the collective thinking of the group and can guide the planning and/or evaluation of topical programs (Kane & Trochim, 2007). The first manuscript in this dissertation introduces concept mapping to the field of kinesiology. The method is first described in detail, followed by a review of physical activity-based research that implemented concept mapping. Next, the potential uses of concept mapping to enhance interdisciplinary and translational research are discussed, followed by limitations that must be considered.

The second manuscript is an empirical study that implemented concept mapping to identify strategies that could increase positive attitudes toward larger members in fitness facilities that are self-determined and shared throughout the fitness center. Exercise science students (Chambliss, Finley, & Blair, 2004) and fitness professionals (Robertson & Vohora, 2008) have reported negative attitudes toward larger individuals, and perceived weight bias is associated with avoidance of exercise, particularly in public spaces (Lewis et al., 2011; Vartanian & Novak, 2010). Fitness professionals working in

fitness facilities and individuals with experience attending fitness facilities were recruited to help identify changes that are required to increase positive attitudes toward larger members in fitness facilities. Ideas were rated on importance, feasibility, and reach. Results were compared overall and by subgroups (e.g., current members, past members, employees; individuals lower and higher in antifat attitudes).

In summary, the dissertation adds to the field of kinesiology in two important ways. First, the dissertation describes the underutilized methodology of concept mapping that can help bridge research and practice in kinesiology and incorporate stakeholder voices. Second, the dissertation demonstrates how to use concept mapping to generate practical solutions to a significant social problem through collaboration between researchers and participants.

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Chapter 2: Manuscript 1

Abstract

Addressing research-to-practice gaps in kinesiology is an important task (Knudson, 2005). Building a body of translational research will not only require more funding and research in general, but a greater diversity of research methods to address important questions. Concept mapping (Kane & Trochim, 2007; Trochim, 1989) is an applied and participatory mixed method that brings together diverse stakeholders to address real-world problems. The process involves preparation, generating ideas that answer a research question/problem, structuring and rating the ideas, analyzing and representing the ideas, interpreting the ideas, and deciding how to use the data for planning and/or evaluation. The results are visual depictions (i.e., "maps") of the participants' collective thinking. These maps can be used for planning and/or evaluating tailored interventions. In addition, concept mapping can be used in conjunction with existing research frameworks to build the body of translational research in kinesiology. The concept mapping method is first described, followed by a review of how concept mapping has been used in physical activity projects. Additional potential uses of concept mapping for kinesiology are discussed, as well as limitations of the method. Concept mapping can enable collaboration among the kinesiology sub-disciplines, and help generate real-world solutions to real-world problems.

Keywords: Interdisciplinary; Translational; Mixed Method; Participatory; Physical Activity

Bridging Research and Practice in Kinesiology: A Case for Concept Mapping

Translating research into practical strategies or policies that affect physical activity participation and public health is an important but common problem in kinesiology (Ainsworth, 2009; Dzewaltowski, Estabrooks, & Glasgow, 2004; Knudson, 2005). Several barriers to translational research in kinesiology have been discussed. Knudson discussed three problems: a lack of applied research, a lack of interdisciplinary research, and a lack of accessible and integrated research reviews. Not only is a lack of interdisciplinary research a problem but, as Gill (2007) argued, there is a lack of integration within kinesiology itself, and this no doubt hinders interdisciplinary and translational research.

Faculty members at many universities often have research agendas (or even entire departments) that focus in one area of kinesiology (Ainsworth, 2009; Gill, 2007). While these silos (Kretchmar, 2008) can have benefits for kinesiology, they also present several challenges to the field such as contributing to a lack of collaboration between researchers and practitioners in the field (Ainsworth, 2009). Collaboration between researchers and practitioners is crucial for translational research. In addition, Dzewaltowski et al. (2004) noted that researchers tend to focus more on internal validity (i.e., control) and less on external validity (i.e., generalizability) in research. This does not suggest that either internal or external validity is more or less important than the other, but a balance between the two should be achieved in the literature or translational research will be difficult to achieve. Moreover, Giacobbi, Buman, Romney, Klatt, and Stoddard (2012) found that kinesiology research funded by the National Institutes of Health (NIH) is, in

the words of Ainsworth (2009), more often "lab bench" research (i.e., biological and physiological processes) compared to "park bench" research (i.e., social and environmental processes), so it no wonder that researchers and departments focus on this type of research more than applied real-world research.

Various strategies and frameworks have been designed over the past decade to address translational research. The National Institutes of Health (NIH) have recognized the importance that applied and interdisciplinary research contribute to translational research by creating the NIH Roadmap (Zerhouni, 2003). The NIH Roadmap calls for increased interdisciplinary training and for the creation of interdisciplinary research centers. Dzewaltowski et al. (2004) advocated the use of the reach, efficacy/effectiveness, adoption, implementation, and maintenance (RE-AIM; Glasgow, Vogt, & Boles, 1999) framework to address personal and environmental variables that hinder translational research. In addition, the behavioral epidemiology framework (Sallis, Owen & Fotheringham, 2000) has been created as a typology for research in a given area with the goal of moving the research agenda from descriptive and correlation phases to intervention and translational phases.

Addressing translational research gaps in kinesiology indeed requires interdisciplinary research teams from diverse sub-disciplines (Freedson, 2009), and novel research frameworks that describe criteria to address when designing, conducting, and reporting research (e.g., RE-AIM). Less discussed however, is the need for—and acceptance of—novel research methodologies that can address some of the problems described by Knudson (2005), Gill (2007), Ainsworth (2009), and others. Concept

mapping (Kane & Trochim, 2007; Trochim, 1989) is an established research method that can help build the body of translational research in kinesiology. While concept mapping is a generic term used to describe many mapping techniques (e.g., logic models, mind mapping), it also applies specifically to a formal, applied, stakeholder-driven mixed method (Kane & Trochim, 2007; Trochim, 1989) that can enable translational research. Concept mapping provides an opportunity for collaboration between researchers, policy makers, practitioners, and community stakeholders to address complex, real-world problems.

Concept mapping is particularly useful for projects where immediate decision making, program planning and implementation, and/or the evaluation of program effectiveness are important. In other words, concept mapping is a valuable tool to consider when translational research is a priority. The purpose of this paper is to advocate that more researchers in kinesiology consider concept mapping—when appropriate—as a method to aid translational research efforts. The concept mapping methodology will be described, kinesiology-related concept mapping planning and evaluation projects will be reviewed, and approaches to integrating concept mapping with existing frameworks to strengthen knowledge in kinesiology will be presented. The paper will end with a call for more research that translates real-world solutions to real-world problems, and a consideration of concept mapping as one of many tools that can achieve that goal. Concept mapping cannot answer all research questions, nor should it be used in all research studies, and the limitations will be discussed. That said, researchers interested in conducting applied, interdisciplinary, and collaborative (e.g.,

community-based participatory) research, with results that can have immediate impacts, will find concept mapping a practical research tool.

Concept Mapping Methodology

There are six steps involved in concept mapping: (1) preparation, (2) generation of data, (3) structuring and rating the data, (4) analysis and representation of the data, (5) interpreting the data, and (6) utilization and decision-making (Figure 2.1; Kane & Trochim, 2007). The results of these steps are interpretable visual "maps" that show the collective thinking of the group(s) involved in the project, and are used to immediately inform program planning and/or evaluation (Kane & Trochim, 2007). Concept mapping is flexible and can be completed in a group setting, independently via the internet, and through postal services. In addition, the flexibility of concept mapping can reduce the burden of gathering interdisciplinary teams and/or community stakeholders together at a convenient time and location. The steps can be completed in a single day or over the course of several days or weeks. Furthermore, participants can complete only some of the steps without compromising the integrity of the research (Kane & Trochim, 2007; Rosas & Kane, 2012).

Preparation

The most important step in concept mapping is preparation (Kane & Trochim, 2007). Several factors need to be considered before beginning a project, starting with identifying the key objective(s), need(s), question(s), or issue(s) that will be addressed; the nature of participation (e.g., in-person or remotely); and the selection of a facilitator. The facilitator helps the participants complete the process but is not responsible for data

analyses or interpretations. Careful consideration of the facilitator is important, particularly when vulnerable populations are involved because the facilitator helps the research team identify key stakeholder groups that will be recruited. Some groups might be distrustful of researchers and in these cases having a trusted community advocate or other noteworthy facilitator will be useful and appropriate (Robinson & Trochim, 2007). In other cases a researcher-facilitator is appropriate. With remote participation, a facilitator can still be valuable in indentifying, recruiting, and instructing participants. The preparation step is similar to, but distinct from, needs assessments commonly applied in health promotion and other types of research. Indeed, a concept mapping project for planning interventions can be thought of as a form of needs assessment, and can help facilitate more comprehensive needs assessments (Bartholomew, Parcel, Kok, Gottlieb, & Fernandez, 2011). Concept mapping however, is a standardized method capable of answering an array of research questions beyond identifying needs.

The facilitator, in conjunction with the research team and/or stakeholders, can help determine the number of participants. The number of participants can vary and should be determined by the nature and scope of the project. Kane and Trochim (2007) recommend 10-40 as a target for in-person concept mapping projects, while the number can be considerably higher with remote participation. Ensuring all stakeholder groups are appropriately represented in the project is paramount. Once the stakeholder groups are adequately represented, a focus prompt can be developed.

The focus prompt is used to answer the research question/problem and can, but does not need to be, developed with feedback from the stakeholder groups. Feedback can

help ensure the groups similarly understand and interpret the prompt. However the prompt is developed, it should be clear, specific, and instructional. A worksite physical activity project for example, might have the prompt, "Suggest ideas that can increase the physical activity levels of our employees while they are at work." The focus prompt guides the generation of ideas that answer the purpose(s) of the project, so it is important to carefully construct the prompt.

Prompts for rating the ideas are developed next. Typically, rating prompts ask participants to rate each idea, relative to all the other ideas, on levels of importance and feasibility (Kane & Trochim, 2007). Other rating prompts (e.g., reach, priority, impact) can be developed depending on the purpose(s) of the project. In addition, selecting the measurement scale for the rating should be considered. At least a five-point scale (e.g., 1 = *least important*; 5 = *most important*) is recommended to enable meaningful comparisons (Kane & Trochim, 2007; Vaske, 2008).

Generation of Ideas

Generation of ideas refers to brainstorming ideas to the focus prompt. Participants are informed of the scope and nature of the project, encouraged to generate as many ideas as possible, and informed that there are no right or wrong answers. While there is no limit to the number of ideas that can be generated, Kane and Trochim (2007) recommend paring large lists down to 100 ideas or fewer by removing redundant and/or unclear ideas. Paring reduces the burden on participants in the subsequent steps. Two important aspects of idea generation are that the key stakeholder groups are represented

and that all ideas are validated (e.g., encouraged and supported). This helps ensure that diverse perspectives are applied to the problem.

Structuring and Rating

Structuring involves sorting the ideas into piles based on perceived similarity. Each participant is instructed to sort the ideas in a way that makes sense to her or him (Kane & Trochim, 2007). There are three conditions for the sorting activity: (1) there cannot be one single pile; (2) every idea cannot go into a separate pile, although some ideas can be grouped individually; and (3) an idea can go into only one pile. With remote participation, the participants can email a document containing their sorted data to the facilitator/researcher. For example, a spreadsheet where each column contains similar ideas would work well. In addition, some online survey software packages (e.g., Concept Systems, Ithaca, NY; Qualtrics, Provo, UT) allow for a grouping activity that can accomplish the sorting task.

After sorting, participants are instructed to rate each idea, *relative to all the other ideas*, on each rating prompt (e.g., importance, feasibility). Relativity is important because it is unlikely an idea would be generated if it was not topical. Relative rating can ensure the entire range of the measurement scale is used, making quantitative analyses more meaningful and interpretable. Not all the participants who completed the brainstorming need to participate in sorting and rating. There is not a formal number or percentage of individuals from each group that needs to sort and rate, but ensuring that each stakeholder group is represented in the sorting and rating is important. Ideas should be sorted based on perceived conceptual similarity (i.e., similar ideas grouped together),

not by ratings similarity (e.g., high importance items together), so sorting should be done before the rating (Kane & Trochim, 2007).

Analysis and Representation

The qualitative (i.e., brainstormed ideas) and quantitative (i.e., sorting/rating) data are analyzed using multidimensional scaling (MDS) and hierarchical cluster analysis (HCA) to produce several graphical displays of the participants' collective thinking (Kane & Trochim, 2007). Two steps must occur before the MDS and HCA. First, a binary square similarity matrix is created for each participant (Kane & Trochim, 2007). This is an *N* x *N* matrix where *N* is the total number of ideas. If items *i* and *j* were grouped together by a participant, a "1" is placed in cells X_{ij} and X_{ji}, otherwise a "0" is entered. Figure 2.1 illustrates an example of a binary square similarity matrix where an individual sorted five ideas.

[Insert Figure 2.1]

Notice the diagonal is "1s" because an idea is always grouped with itself. All the individual matrices are then summed to create a total square similarity matrix (Kane & Trochim, 2007). The diagonal of the total square similarity matrix will be equal to the number of sorters and the value of each cell will represent how many participants sorted the respective ideas together (Kane & Trochim, 2007; Trochim, 1989). Figure 2.2 shows hypothetical data for five ideas sorted by five individuals.

[Insert Figure 2.2]

Multidimensional scaling. The total square similarity matrix is analyzed using MDS, a technique that uses Euclidean distance to locate each data point relative to the

others based on aggregate similarity (Kane & Trochim, 2007; Kruskal & Wish, 1978). The ideas can be represented in anywhere from 1 to *N*-1 dimensions, where *N* is the number of ideas. Two dimensions are preferred in concept mapping as this creates an easily interpretable *x-y* "point map" (Kane & Trochim, 2007), where each point is an idea located by MDS. Ideas sorted together more often will be closer together than ideas sorted together less often. A stress value represents how well the two dimension solution represents the total square similarity matrix. Lower stress values indicate a better fit and stress values between .21 and .37 are typical for concept mapping projects (Kane & Trochim, 2007). Most statistical packages are capable of MDS and report stress values.

Hierarchical cluster analysis. The HCA data are the *x-y* coordinates calculated from the MDS. Hierarchical cluster analysis achieves the goal of grouping ideas, as represented from the MDS, into clusters (i.e., "concepts"). The process uses Ward's algorithm (Anderberg, 1973; Kane & Trochim, 2007) and is agglomerative, meaning that ideas begin as single clusters and are combined until all the ideas represent one cluster. Deciding the final number of clusters is subjective and requires examining the ideas represented in the possible cluster solutions. Ideas that are conceptually similar and closely located on the map should be considered a cluster. Some ideas might be located equidistant from two clusters. In this case the researcher, facilitator, and/or stakeholders should decide where the idea belongs. The point map can be divided by drawing lines surrounding the ideas within each cluster.

Supplemental analyses. There are several analyses that can produce additional visuals in concept mapping projects. These include point and cluster rating maps, ladder

maps, and go-zones (Kane & Trochim, 2007). The number of maps generated is dependent on the purpose(s) of the project and how the maps will be used for decision making (e.g., planning and/or evaluation).

Point and cluster rating map. Point and cluster rating maps combine the point map (i.e., results of MDS) and/or point-cluster map (i.e., results of HCA overlaid on the point map) with the rating data. Rather than two-dimensional, the map would be three dimensional where the third dimension is height, similar to a bar chart, and represents the rating for an idea/cluster. An idea/cluster with a rating of "3" for example, would be 3 units high, whereas an idea/cluster rated "1" would be one unit high. Cluster ratings are the mean value of the ideas represented in the cluster. This can help researchers and stakeholders visualize the relative rating of each idea/cluster without scouring and interpreting a table of numbers. Both the point and cluster rating maps can be determined for all rating scales and are invaluable for decision making.

Pattern Matching. Pattern matching produces ladder maps (Kane & Trochim, 2007), and are another way to represent the rating data for ideas, or more typically, clusters. Additionally, ladder maps can be used to compare the opinions of different stakeholder groups. Each idea/cluster is rank ordered on one or more vertical axes. A line is drawn from the idea/cluster on one axis to the same idea/cluster on the other axis. A horizontal line represents identical ratings. Steep lines represent discordance between for example, importance and feasibility, or that two groups do not agree on the rating of an idea/cluster. The correlation between two ratings or groups is represented by an *r*-value that ranges from -1 to 1. Ladder maps show where differences between ratings or

stakeholder perceptions exist, identify where to focus efforts, are more intuitive and interpretable than a statistical table, and immediately help to guide decision making. For example, a highly important but not feasible idea/cluster might be discarded for a less important but highly feasible idea/cluster when considering program design and resource allocation.

Go-zone map. A go-zone map (Kane & Trochim, 2007) is created by finding the mean rating for each idea on two rating scales. An *x*-*y* graph is produced where one rating scale (i.e., importance) is the *x*-axis and another rating scale (i.e., feasibility) is the *y*-axis. Each idea is placed on the map according to its mean on both rating scales. The overall mean on each rating scale for all the ideas can be drawn as vertical and horizontal lines, creating four quadrants. Ideas that are rated above average on both rating scales will be in the upper right quadrant, or go-zone. This can help researchers and stakeholders determine the most important and feasible ideas, which is particularly important when resources are limited.

Interpretation and Utilization

The researcher and/or facilitator shows all the results (i.e., idea list, maps) to the stakeholders and gives them an opportunity to interpret the data and offer insight as to what each cluster of ideas represents and/or should be named. The different maps are easier to interpret than statistical tables, *p*-values, and effect sizes. This can help identify ideas that might be most useful for planning purposes, resource allocation, and/or evaluation efforts. Selecting the specific ideas to target from the go-zone map should be a collaborative process. Taken together, the interpretation and utilization of the data can

help build a body of translational research in kinesiology by bringing together groups with diverse perspectives on a topic to address important questions or problems. Moreover, how the ideas will be implemented will be contextually and culturally appropriate when stakeholder voices are represented. The applied nature of concept mapping produces real-world solutions that can be immediately impactful.

Concept Mapping: An Applied Example

Trochim, Milstein, Wood, Jackson, and Pressler (2004) described a case of concept mapping applied to statewide health promotion. The state of Hawaii received unexpected funds from a national tobacco settlement and needed to rapidly identify the best use of the funds to affect population health. Public health professionals from Hawaii and experts from across the US were recruited to help answer the prompt, "Generate statements that describe specific community or systems factors that affect individuals' behaviors related to tobacco, nutrition, and physical activity" (Trochim et al., 2004, p. 12). While there is an extensive body of knowledge regarding individual, social, and environmental variables related to behavior change and tobacco, nutrition, and physical activity, in this case it was unclear as to the strategies that would maximize the use of resources.

A total of 496 ideas were generated and the list was pared down to 90 unique ideas. Figures 2.3, 2.4, and 2.5 are maps generated by Trochim et al. (2004). Figure 2.3 is a point-cluster map that shows that a seven cluster solution was selected based on the MDS and HCA analyses. Figure 2.4 shows a ladder map comparing the overall importance and feasibility of the clusters. Environment infrastructure was rated most

important but low on relative feasibility, whereas information/communication was rated lowest on importance and highest on feasibility. The correlation of .07 indicates that there was a general lack of agreement between importance and feasibility. Figure 2.5 shows the go-zone map of all 90 ideas located on *x*-*y* axes representing importance and feasibility. Ideas in the upper right quadrant were rated above average on importance and feasibility. In addition to the ladder map, the go-zone map can be used to guide program planning and resource allocation based on specific ideas that are important and feasible. For example, "focus on lifelong physical activity" (idea 84) was rated most important and feasible (Trochim et al., 2004, p. 15).

[Insert Figure 2.3]

[Insert Figure 2.4]

[Insert Figure 2.5]

Taken together, each map contributes unique and useful information to stakeholders who have the power to effect change. Trochim et al. (2004) is a case example of how concept mapping can bring together diverse professionals, researchers, and community members whose opinions may not always concur, to determine appropriate courses of action to promote positive health behaviors and improve population health.

Concept Mapping in Kinesiology

Kinesiology is a discipline that encompasses several sub-disciplines (Rikli, 2006). Kretchmar (2005) described the discipline as a river, and working at different areas of the riverbed are individuals from kinesiology sub-disciplines. He argued that kinesiologists

have important work to do at the riverbed, but they should not lose sight of the fact that all the sub-disciplines are working on the same water. The topics that kinesiologists investigate vary and include (but are not limited to) health behaviors, the built environment, metabolism, gait analysis, psychology, history, and sociology. Methods such as concept mapping can be helpful for improving the "kinesiology water," not just the water at one area on the riverbed. This section provides a review of physical activity planning and evaluation projects that implemented concept mapping.

Physical Activity Planning

Many individuals face several barriers to initiating and maintaining health promoting behaviors. Barriers can span levels of influence such as individual, social, institutional, community, and policy factors (Sallis, Owen, & Fisher, 2008). Concept mapping can bring stakeholders from each ecological level together to address physical activity problems. Moreover, a sample that includes community stakeholders is more likely to address regional and cultural issues that are critical to successful health behavior interventions (Heath et al., 2012).

The Physical Activity Policy Research Network (Brownson et al., 2008) utilized concept mapping to develop a research agenda for environmental and policy changes that could promote physical activity. Researchers and practitioners were recruited specifically because the perceptions of needs and priorities between these two groups can differ but are equally important for developing and implementing effective interventions. Participants were asked, "One research topic that will best inform policy or

environmental approaches to physical activity promotion is…" (Brownson et al., 2008, p. 490).

Nine concepts emerged that represented economy, transportation, incentives, measurement and methods, implementation, city and community design/planning, consideration of subgroups, and schools. Overall, a strong positive correlation existed between the relative importance and feasibility of each. Interestingly, a moderate negative correlation was found between practitioner-importance and researcher-feasibility, suggesting that a) what practitioners perceive as more important is perceived as less feasible by researchers, and/or b) what practitioners perceive as less important is perceived as more feasible by researchers. Practitioners are more likely attuned to real-world individual needs, whereas researchers are more likely to understand the difficulties inherent in funding and implementation. Understanding these data can help researchers and practitioners reach a consensus on the most effective and efficient ideas.

Lebel et al. (2011) used concept mapping to address physical activity and diet in the Quebec City region of Canada. Stakeholders were recruited from various contexts including education, medicine, administration, and community management. The prompt was, "In your milieu, an element that could influence physical activity and diet is…" (Lebel et al., 2011, p. 440). A total of 65 ideas were generated representing community mobilization, urban design for physical activity, access and supply of physical activity, food culture, food accessibility, urban design and proximity, socioeconomic situation of households, and life course.

Addressing all 65 items would be difficult and resource intensive. The go-zone map showed 18 ideas that were rated above average on importance and feasibility (Lebel et al., 2007). Most of the go-zone items represented physical activity urban design and physical activity access and facilities. Ideas representing food accessibility and food culture were perceived as less important and feasible, with the exception of addressing nutrition in schools. The findings suggested that interventions addressing physical activity design and accessibility (e.g., building bike paths) were likely to have a larger impact than addressing food accessibility (e.g., availability of fresh fruits and vegetables), with the exception of food distribution in schools. Therefore, concept mapping helped identify the most appropriate targets from each cluster.

Kelly, Baker, Brownson, and Schootman (2007) applied concept mapping with disadvantaged (e.g., lower income) and more privileged stakeholders to identify implementation strategies to increase physical activity in a Midwestern Black community. Population subgroup comparisons (e.g., men versus women, higher versus lower income) were also of interest. Six clusters emerged including: law enforcement, safety, access, individual issues, physical health barriers, and children. Separate analyses revealed that men and women rated physical health barriers as the most important factor inhibiting physical activity. Women however, rated neighborhood safety more important than men. Higher-income individuals rated law enforcement most important, whereas lower-income individuals rated physical health barriers most important.

The utilization step was employed to operationalize certain ideas. For example, the broad idea of law enforcement could be implemented specifically by “encouraging

people to get to know each other," "drawing on the influence of already existing organizations," and "using men's leagues to help community transition" (Kelly et al., 2007, p. 288). These results show how concept mapping can systematically gather perceptions from diverse stakeholders and help identify concrete strategies that can translate into practice, and how implementation might need to be tailored for specific population subgroups.

Physical Activity Evaluation

Concept mapping is also useful for program evaluation. Brennan, Brownson, Kelly, Ivey, and Leviton (2012) evaluated an Active Living by Design intervention with concept mapping. Participants (N = 43) from 25 communities and diverse fields were involved with the implementation of or affected by the Active Living by Design intervention. The focus prompt was, "One specific action or change that occurred in your community to support active living is…" (Brennan et al., 2012, p. S338).

Ten clusters emerged that represented: partnerships/collaboration, assessment/capacity building, publicity, bike programs, physical activity programs, accessibility/support, built/natural environment, land-use/transportation policy, advocacy/policy, and resources/institutionalization (Brennan et al., 2012). Three concepts were rated particularly important: (1) changes to the built and natural environment, (2) partnerships and collaboration, and (3) land use and transportation policy. Interestingly, lower-income individuals rated all ten clusters lower on importance than other subgroups. Effective strategies to increase physical activity among lower-income people in this area might be different than ideas generated in research that used

more privileged samples. Researchers can use the evaluation results to tailor future interventions in similar populations based on what was most important to enabling physical activity. This also highlights an area for kinesiology professionals interested in understanding and addressing the unique circumstances that differentially affect lower-income individuals' perceptions of physical activity in this Midwestern area.

Potential of Concept Mapping for Kinesiology

Beyond planning and evaluating physical activity interventions, concept mapping is useful for facilitating interdisciplinary research. In addition, concept mapping can be integrated with existing research frameworks/typologies to advance scholarship in kinesiology. Researchers interested in participatory and applied methods will find concept mapping useful.

Facilitating Interdisciplinary Research

Kinesiology theories and methods draw from many fields, making interdisciplinary research important. Problems such as sedentary behavior or knee injuries require more breadth than psychological theory or anatomy/biomechanics alone can provide. Schary and Cardinal (in press-b) reported that kinesiologists perceive several limitations to interdisciplinary research including collaboration problems, methodological weakness, superficial results, logistics, financial problems, lack of unified language, and career advancement/publishing difficulties. The perceived benefits of interdisciplinary research included novel perspectives, enhanced results, collaboration, better funding potential and methodology, increased publication possibilities, acknowledging the complexity of movement, and benefits to the field.

Concept mapping can address some of the perceived limitations while at the same time promote many of the perceived benefits of interdisciplinary research. For example, disagreements over the selection of the most appropriate research questions, methods, and logistics can be addressed through the collaborative and collective process of concept mapping. A prompt such as, "An issue to prioritize in our project is…" would allow for equitable input and objective rating of the relative importance of certain questions. In addition, concept mapping can make it easier for professionals from diverse fields to collaborate and conceive multidimensional solutions to complex physical activity problems. This can increase the funding potential of research, promote results that add novel perspectives and enhanced results to the body of knowledge regarding physical activity, and benefit professionals, practitioners, and the public.

Integration with Existing Frameworks

Behavioral epidemiology framework. The behavioral epidemiology framework (Sallis et al., 2000) specifies five phases of research that lead to evidence-based translational interventions. The phases are: (1) establish links between behaviors and health, (2) develop measures of the behavior, (3) identify influences of the behavior, (4) evaluate interventions designed to change the behavior, and (5) translational research. Concept mapping can be used in many phases to achieve the goal of "guid[ing]… the empirically-based development of behavior change interventions" (Sallis et al., 2000, p. 298).

Concept mapping is particularly useful in Phase 3 for "identifying characteristics of people who are most in need of intervention" and "validating applications of

theoretical models" (Sallis et al., 2000, p. 295). There is a large body of knowledge regarding behavior change, but it is often unclear how to tailor interventions for particular subgroups. Asking population subgroups to address the most important determinants of a behavior (e.g., Kelly et al., 2007) will help contextualize efforts, maintain cultural sensitivity, and possibly increase a researcher's or practitioner's cultural competence (Dawson, Cargo, Stewart, Chong, & Daniel, 2013; Gill, 2007).

Phases 4 and 5 involve evaluating interventions and translating research into practice, respectively (Sallis et al., 2000). An example of physical activity evaluation is the work of Brennan et al. (2012), who implemented concept mapping specifically "to develop group-level definitions of promising active living strategies and insights about the efforts across the 25 communities" (p. S338). In other words, they evaluated what worked well. Brennan et al. and other Active Living by Design projects bridged Phases 4 and 5 by examining pre- and post-intervention measures that were quantitative (e.g., physical activity levels) and qualitative (e.g., ideas from the concept mapping). This type of "triangulation" (Brennan et al., 2012) gave insight to the intervention's effectiveness and the most salient aspects that should be reproduced (i.e., translated) in practice and future research.

The RE-AIM framework. The reach, efficacy, adoption, implementation, and maintenance (RE-AIM; Glasgow et al., 1999) framework evaluates individual- and organizational-level criteria from behavior change interventions. One purpose is to evaluate how intervention results can translate to real-world contexts (i.e., external validity). Antikainen and Ellis (2011) concluded that many physical activity

interventions lack external validity and that more research is needed in less controlled contexts. Concept mapping can help plan research that considers RE-AIM criteria.

Reach involves ensuring the target population is represented in research samples (Glasgow et al., 1999), and community-based approaches such as concept mapping can help ensure representative samples. Measuring positive and negative outcomes is involved in efficacy (Glasgow et al., 1999), where concept mapping can be used to identify the key positive *and* negative outcomes that participants perceive and/or experience. Additionally, facilitators and barriers to adoption, as well as factors related to implementation and maintenance, the "AIM" of RE-AIM, can be gathered with concept mapping. Brennen et al. (2012), for example, identified the implementation strategies that best enabled the adoption of the Active Living by Design program. A prompt designed to assess maintenance might ask, "Factors that made this change permanent are…," and the feasibility ratings can be used for decision making regarding implementation. Concept mapping can—and should—be used in conjunction with, not rather than, traditional methods, measurements, and assessment tools.

Limitations

Concept mapping is not the answer to all of the problems associated with translational research in kinesiology. The use of concept mapping should be compatible with specific research questions and, like any research method, there are several limitations. Researchers might have no formal training in the multivariate statistical methods MDS and HCA. These can be learned of course, or the Concept Mapping Software (Concept Systems, Ithaca, NY) that conveniently handles all the steps of a

project can be purchased. Both of these options however, have associated time and/or financial costs. Time is also a consideration when identifying and recruiting important stakeholders for in-person and online projects. In-person projects require significant preparation and scheduling to ensure adequate participation. Online projects can remove scheduling conflicts, but lose the benefit of in-person collaboration during the project. Selecting appropriate stakeholders and achieving adequate representation can be challenging, and without an appropriate sample the results can be limited.

In addition, concept mapping results can reveal differences among the perceptions of different groups but these should not be interpreted as statistically or practically meaningful without appropriate inferential follow-up techniques. Follow-up sessions are often necessary to reveal why certain ideas were identified, how ideas can be operationalized and implemented (Robinson & Trochim, 2007), and to discuss the relationships among concepts (Burke et al., 2005). This increases the researcher and participant time burden. Research teams should attempt to reduce time burdens as much as possible without compromising the representation of any stakeholder group. Lastly, although concept mapping can bring diverse stakeholders together to answer a question or problem, there is not a guarantee that consensus on a topic will be achieved. However, the diverse stakeholders will have a clear representation of the different perceptions relating to the question or problem, and this is important to facilitate understanding, even if disagreements are not resolved.

Conclusion

Concept mapping is a unique research method that has applicability to the field of kinesiology. The steps involve preparing the project, gathering ideas from stakeholders, sorting and rating the ideas, using MDS and HCA to create visual maps that display the collective thinking of the group, and then interpreting and deciding how to best utilize the information. The applied and participatory nature of concept mapping makes it ideal to address research questions that are multidimensional and require the involvement of diverse stakeholders, such as creating and evaluating physical activity interventions in real-world contexts. The flexibility of concept mapping can facilitate collaboration among the kinesiology sub-disciplines and bring together disparate research teams that can strengthen kinesiology (Gill, 2007), meet the growing demand for interdisciplinary research (Freedson, 2009), and promote translational research that affects the health and well-being of populations.

Most physical activity research is in the mid to early stages of the behavioral epidemiology framework (Schary & Cardinal, in press-a). Concept mapping offers a methodology to plan and evaluate interventions that are appropriately tailored to population subgroups such as disadvantaged populations. To help build the body of translational research in kinesiology, more research and diverse research methods will be required that bring specialists from the many kinesiology sub-disciplines, and professionals from other fields, together to form interdisciplinary teams with multiple skills, perspectives, and approaches to human movement. In addition, methods that are applied and participatory in nature will help build the body of translational research. Concept mapping can address such issues, yet is currently underutilized in kinesiology.

Concept mapping is not an answer to all the research questions or problems in kinesiology; however, when finding real-world solutions to real-world problems is paramount, concept mapping can help facilitate discoveries.

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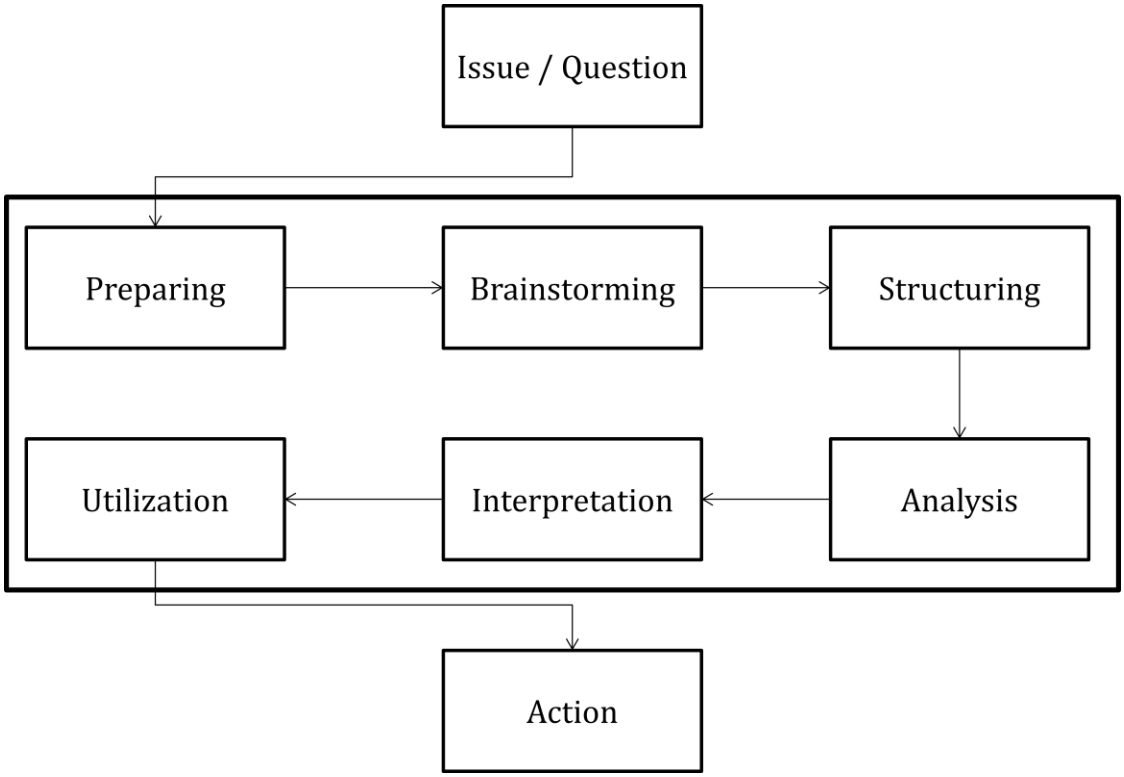
Figure 2.1. The Concept Mapping Process.



Note: Formal concept mapping steps are in the rectangle.

Figure 2.2. Hypothetical Binary Square Similarity Matrix: One Sorter and Five Ideas.

	1	**2**	**3**	**4**	**5**
1	1	0	1	0	0
2	0	1	0	1	1
3	1	0	1	0	0
4	0	1	0	1	1
5	0	1	0	1	1

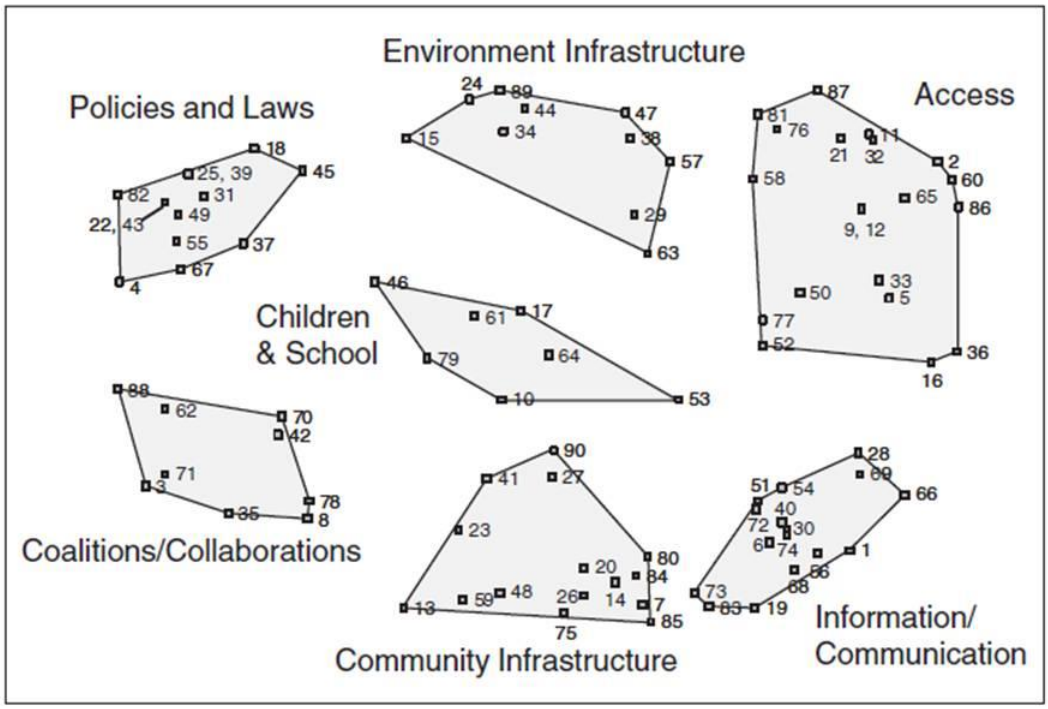
Note: In this example one person put ideas 1 and 3 in one pile and ideas 2, 4, and 5 in another pile.

Figure 2.3. Hypothetical Total Square Similarity Matrix: Five Sorters and Five Ideas.

	1	**2**	**3**	**4**	**5**
1	5	1	4	2	1
2	1	5	0	2	4
3	4	0	5	3	0
4	2	2	3	5	2
5	1	4	0	2	5

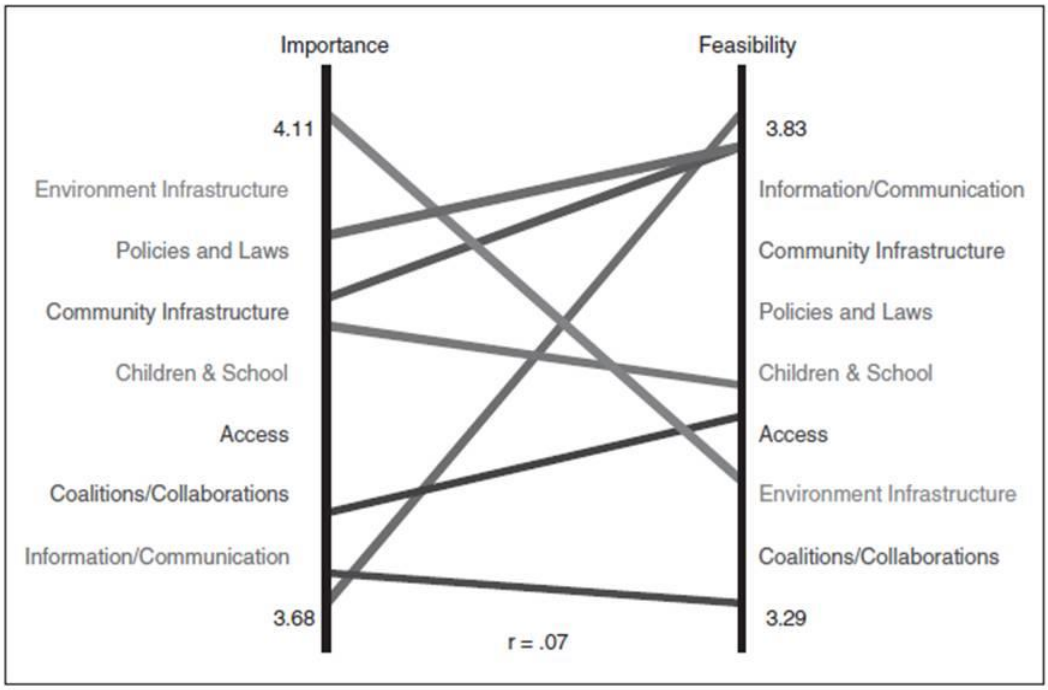
Note: Person 1: Pile 1 = 1, 3 and Pile 2 = 2, 4, 5
Person 2: Pile 1 = 2, 5 and Pile 2 = 1, 3, 4
Person 3: Pile 1 = 1, 3, 4 and Pile 2 = 2 and Pile 3 = 5
Person 4: Pile 1 = 1, 2, 5 and Pile 2 = 3, 4
Person 5: Pile 1 = 1, 3 and Pile 2 = 2, 4, 5

Figure 2.4. Point-cluster Map Generated for Public Health Spending.



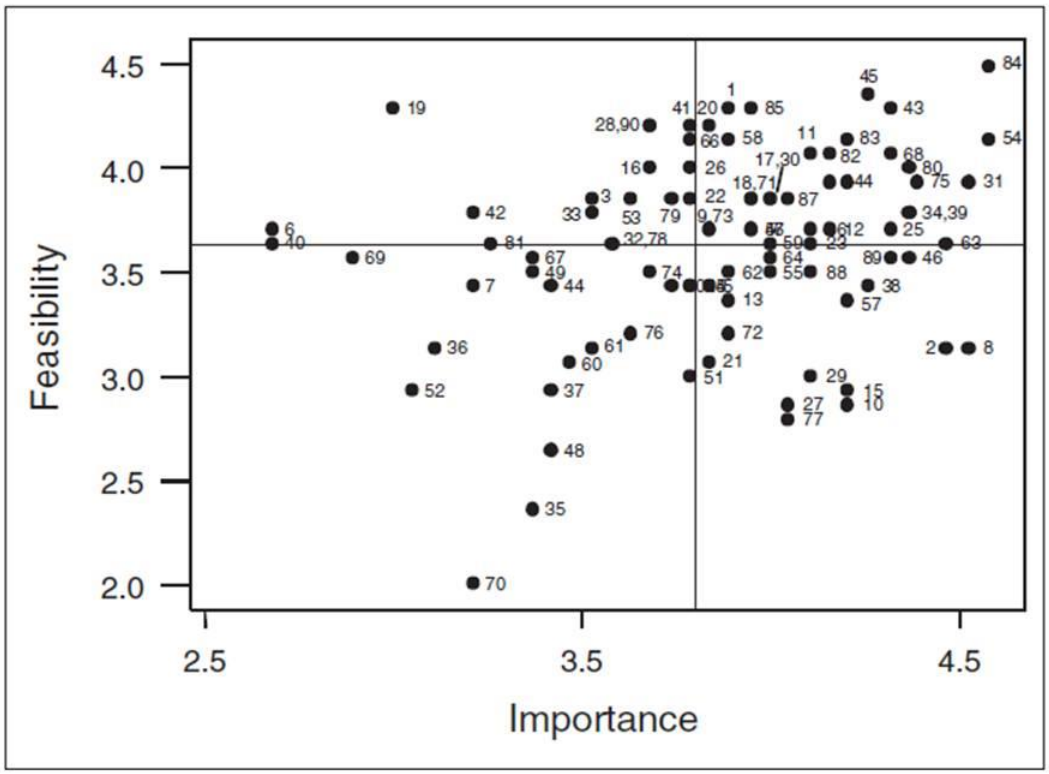
Note: Trochim et al., 2004. Setting objectives for community and systems change: An application of concept mapping for planning a statewide health improvement initiative, *Health Promotion Practice*, 2004, *5*(1), 8-19, Reprinted by permission of SAGE Publications

Figure 2.5. Ladder Map Comparing Cluster Importance and Feasibility.



Note: Trochim et al., 2004. Setting objectives for community and systems change: An application of concept mapping for planning a statewide health improvement initiative, *Health Promotion Practice,* 2004, *5*(1), 8-19, Reprinted by permission of SAGE Publications

Figure 2.6. Go-zone Map Showing Ideas Grouped by Importance and Feasibility.



Note: Trochim et al., 2004. Setting objectives for community and systems change: An application of concept mapping for planning a statewide health improvement initiative, *Health Promotion Practice*, 2004, *5*(1), 8-19, Reprinted by permission of SAGE Publications

Chapter 3: Manuscript 2

Abstract

Weight bias is an important public health and social justice issue (Kirkland, 2008; Tylka, et al., 2014), where one consequence in the physical domain is the avoidance of physical activity (Chambliss & Blair, 2005; Vartanian & Novak, 2011). Given that levels of physical activity and fitness moderate the risk for morbidity and mortality (Barry et al., 2014), creating bias-free workout environments that people will not avoid is essential. Guided by self-determination theory (Deci & Ryan, 2000; 2008), this research implemented concept mapping (Kane & Trochim, 2007) to ask current members, past members, and employees of fitness centers from 27 US states and six other countries (N = 155; M_{age} = 40.9, SD = 11.9) to identify strategies that can increase positive attitudes toward larger members. A total of 100 ideas were generated representing the five broad concepts of programming, fitness culture, code of conduct, professional development, and physical environment/amenities. Specific ideas within the concepts are in agreement with previous authors (e.g., Chambliss & Blair, 2005), but extend the literature with additional novel ideas to address weight bias in fitness centers. The results of the study can be used by practitioners in fitness centers and by researchers to plan and evaluate interventions aimed at increasing self-determined positive attitudes toward larger members in fitness centers. That is, attitudes that are held autonomously, are shared throughout the club, and promote an inclusive atmosphere.

Keywords: Weight Bias; Physical Activity; Exercise; Mixed Method; Concept Mapping

Perspectives on Increasing Positive Attitudes Toward Larger Members in Fitness Centers

"If you do find a way that will help this situation – that will not make the people who mock political correctness mock this topic – you will have achieved a very profound feat and I hope you do!" (research participant).

Weight-based stigma and discrimination are important social justice and public health issues (Kirkland, 2008; Morris, 2014; Puhl & Heuer, 2009). From 1995-1996 to 2004-2006 weight-based discrimination increased to levels similar to race- and age-based discrimination (Andreyeva, Puhl, & Brownell, 2008). Moreover, body size and body weight have been described as the last socially acceptable categories of difference to discriminate against (Kirkland, 2008; Lewis et al., 2011; Puhl & Heuer, 2009). Weight-based stigma and discrimination occur in many social contexts including family interactions, employment, health care, recreation, shopping, and physical activity (Chambliss & Blair, 2005; Pomeranz & Puhl, 2013; Puhl, Moss-Racusin, Schwartz, & Brownell, 2008). Weight bias results in psychological and physical harms such as self-blame, lowered self-esteem, negative body image, weight cycling, and the avoidance of health promoting behaviors such as physical activity (Bacon & Aphramor, 2011; Lewis et al., 2011; Puhl & Heuer, 2009; ten Have, de Beaufort, Teixeira, Mackenbach & van der Heide, 2011; Vartanian & Novak, 2011).

Many studies linking "overweight" and "obesity" (i.e., body mass index [BMI] of 25-29.9 and greater than or equal to 30, respectively) with chronic disease did not include critical variables such as physical activity and fitness levels, socioeconomic status, sleep, or psychosocial distress (Bacon & Aphramor, 2011). For example, individuals with "obese" BMI and moderate to high physical fitness have no greater risk for mortality than

"normal" BMI physically fit individuals (Barry et al., 2014; McAuley & Blair, 2011; Sawyer, Angadi, & Gaesser, 2014). In fact, "obese" fit individuals have a significantly lower risk of mortality than "normal" unfit individuals, and the BMI category with the lowest overall risk for mortality and morbidity is well-documented to be "overweight" (Barry et al., 2014; McAuley & Blair, 2011).

Public health messages however, continue to frame "overweight" and "obesity" as threats to global and personal health that must be avoided. The messages suggest further that weight loss, through individual responsibility and willpower, is the solution (Brownell et al., 2010). Given the fact that an individual can be healthy—or become healthier—at nearly any size, public health messages should instead focus on health promotion independent of weight loss. For example, an emerging paradigm known as the Health at Every Size® model, or HAES (HAES Principles, 2015), is a weight-inclusive approach to health and well-being (Tylka et al., 2014). The HAES model is recognized in the literature (Burgard, 2009; HAES Principles, 2015; Robison, 2014) for promoting the following features: weight inclusivity (defined as accepting and respecting the natural diversity of body weights/sizes and rejecting the pathologizing of specific weights/sizes), health enhancement (defined as polices that support equal access to health resources, and attention to all aspects of health, not just physical health), respectful care (defined as acknowledging one's own cognitive bias, working to end weight/size-based bias, stigma, and discrimination, understanding how various social identities impact and are impacted by healthcare, and working to address inequities), eating for well-being (defined as eating based on hunger, satiety, nutritional needs, and pleasure in opposition to eating for energy

balance and weight control), and life-enhancing movement (defined as physical activities that are enjoyable and flexible in that people of all sizes, abilities, and interests can participate). Importantly, the HAES model does not suggest that all individuals can be healthy at every size, but rather that all individuals, regardless of body size, can be empowered to improve their health independently of weight loss. Therefore, the model applies equally to all people.

Weight-inclusive models have demonstrated equal or superior effectiveness compared to traditional "weight-normative" (i.e., equating weight loss and energy [im]balance as "healthy" practices) approaches for improving and maintaining physical and psychosocial health (Bacon & Aphramor, 2011; Bacon, Stern, Van Loan, & Keim, 2005; Bombak, 2014; Clifford et al., 2015; Hsu, Buckworth, Focht, & O'Connell, 2013; Tylka et al., 2014; Watkins, Ebbeck, & Levy, 2014). Bacon et al. evaluated a 24-week intervention, with 1- and 2-year follow-up, comparing traditional diet to HAES-model groups on physiological, behavioral, and psychological outcomes. The diet group received traditional instructions such as restricting calories and fat, self-monitoring, weighing in, and exercising according to authority-established guidelines. The HAES group was asked to focus on body acceptance, eating and moving in enjoyable ways that enhanced well-being, and social justice (e.g., advocating for oneself and others). At 24-month follow-up, no significant differences were found on physiological variables; however, improvements in eating restraint, drive for thinness, body dissatisfaction, depression, and self-esteem were significantly different and favored the HAES group. Moreover, 42% of the diet group did not complete the intervention compared to just 8%

of the HAES group. These results indicate that weight-neutral approaches can be equally or more efficacious—and not worse—than traditional weight loss approaches.

Watkins et al. (2014) tested a 3-month HAES-based intervention in a physical activity context. The intervention was designed to focus on behavioral and health indicators (not weight loss), body acceptance, and social justice. The physical environment was modified to de-emphasize weight and body comparisons (e.g., removing mirrors and scales). Favorable effects on physical activity, depression, perceived body attractiveness, and disordered eating symptomology were found, despite no changes in weight or BMI. Informal debriefing indicated the participants found the intervention and facility to be enjoyable and satisfying.

While the emerging research on the efficacy of HAES-based programs is encouraging, exercise and physical activity settings are still social contexts where antifat bias is prevalent (Chambliss & Blair, 2005; Donaghue & Allen, in press; Lewis et al., 2011). Exercise science students, exercise professionals, and physically active individuals have reported implicit and explicit biases toward larger individuals (Chambliss, Finley, & Blair 2004; Fontana, Furtado, Marston, Mazzardo, & Gallagher, 2013; Robertson & Vohora, 2008). In line with public health messages (Brownell et al., 2010), these groups typically endorse the beliefs that fatness is personally controllable, individuals are responsible for their body size, and anyone can lose weight if they are dedicated and work hard enough. Despite knowing the benefits of physical activity, individuals report coping with physical activity-based weight bias by avoiding physical activity contexts (Lewis et al., 2011; Vartanian & Shaprow, 2008).

Weight bias reduction interventions include but are not limited to, education about the causes and controllability of body weight (Hague & White, 2005; Poustchi, Saks, Piasecki, Hahn, & Ferrante, 2013; Shelley, O'Hara, & Gregg, 2010), changing perceived consensus information, where perceived social norms are manipulated to try and reduce stereotypes and prejudice (Puhl, Schwartz, & Brownell, 2005), and service/experiential learning (e.g., empathy training; Rukavina, Li, & Rowell, 2008). The findings from these interventions are mixed, as some attitudes and beliefs are amenable to change while others are resistant. For example, Rukavina et al. reported that perceptions about the controllability of weight improved yet perceptions of larger individuals as lazy remained unchanged after an experiential education intervention, suggesting these programs might be insufficient to change many beliefs and attitudes towards larger individuals, even though providing these opportunities is important. Changes to social and built environments that can influence perceptions of larger individuals are also necessary (Holm, Nielsen, Sandøe, Ebbe, & Nielsen, 2013). In other words, an ecological, in addition to an individual, approach is necessary to address weight bias. Moreover, research guided by theory that implements diverse methodologies will be necessary to determine the most effective interventions (Puhl & Heuer, 2009; Rukavina et al., 2008; Tylka et al., 2014).

Self-determination theory (SDT; Deci & Ryan, 2000, 2008) offers a theoretical model for the study of weight bias. The theory proposes that supporting the basic needs of competence, autonomy, and relatedness will lead to better quality and quantity of motivation (i.e., self-determined motivation) for a particular behavior, and that self-

determined motivation will lead to optimal well-being (Deci & Ryan, 2000; 2008). A significant contribution of SDT is the conceptualization of motivation as more complex than an intrinsic-extrinsic dichotomy. According to SDT, intrinsic motivation is engaging in a behavior for the senses of enjoyment, accomplishment, or stimulation gained only through doing an activity itself (Deci & Ryan 2000; 2008). Extrinsic motivation is conceptualized as varying along a continuum of self-determination, moving toward intrinsic motivation. Social contexts that support the basic needs facilitate internalized and self-determined motivation, while contexts that thwart the basic needs lead to controlled motivation (e.g., engaging in a behavior because one "should"). Behaviors that stem from self-determined motivation are more likely to be integrated into one's sense of self and be personally valued rather than enacted for social approval or to avoid social sanctions (Deci & Ryan, 2000; 2008).

SDT in concerned with the regulation of motivated behaviors (Deci & Ryan, 2000), although aspects of SDT have been explored in relation to attitude regulation (Legault, Green-Demers, Grant, & Chung, 2007). Legault et al. found support that the regulation of non-prejudiced attitudes is congruent with the tenets of SDT. For example, self-determined motivation to be non-prejudiced was associated with authentic non-prejudicial attitudes, whereas less self-determined motivation was associated with controlled attitudes. Specifically, individuals who scored high on self-determined motivation to regulate prejudice also scored lower on measures of implicit and explicit racial bias. In other words, these individuals were genuinely non-prejudiced, whereas other individuals expressed non-prejudiced attitudes to avoid "looking prejudiced" or

feelings of guilt associated with holding prejudiced attitudes. Legault et al. argue for research examining attitude regulation in various social contexts using a SDT framework and add, “the identification of factors that give rise to self-determined egalitarianism will bring us closer to the application of motivational and regulatory strategies to reduce and eliminate prejudice” (p. 748).

SDT therefore offers a useful framework to guide the generation of practical strategies aimed at increasing positive attitudes toward larger members of fitness centers. From an attitude perspective, physical activity contexts can enhance physical and psychological well-being for individuals of all sizes by creating an inclusive atmosphere. Changing social norms and values can influence individual beliefs, attitudes, and values, but changes should be perceived as self-determined (i.e., adopted autonomously) to encourage the internalization of positive attitudes (Standage & Ryan, 2012). Furthermore, Standage and Ryan write that “relatedness plays a fundamental motivational basis for internalization” (p. 264) and "people are more likely to accept and internalize the values, norms, and guidelines espoused by socializing agents for whom they feel a sense of connection and belonging" (p. 264). Therefore, when considering attitude change from a SDT perspective, autonomy and relatedness are logical psychological needs to target.

This research was exploratory in nature and designed to identify strategies that can increase positive attitudes toward larger members of fitness centers. Importantly, we sought ideas that would be adopted autonomously and shared throughout the center. In particular, we wanted to know what current and past members and employees of fitness

centers identify as important, feasible, and far reaching strategies. We expected these groups to collectively generate ideas that targeted individual, social, and environmental changes. The question of who generated an idea was of less interest than how the ideas were perceived. We postulated that personally experienced weight bias might partly explain past members' status, therefore, past members were expected to perceive certain ideas as more or less important, feasible, and reaching than current members and employees. Furthermore, personal responsibility for, and controllability of, weight are common antifat attitudes. Based on this, we expected individuals higher in antifat attitudes to rate ideas differently than individuals lower in antifat attitudes. Concept mapping (CM; Kane & Trochim, 2007) was employed, which is a participant-driven mixed method that results in visual "maps" that can be used to guide program planning.

Methods

Participants

A purposive sample of 120 female, 31 male, and 4 "other" gender participants (N = 155, M_{age} = 40.9, SD = 11.9) representing 27 US states and six other countries was recruited for the study. The most important detail in CM is to select participants "whose knowledge or experience is relevant to the [research] question" (Kane & Trochim, 2007, p. 10). We targeted current and past members as well as employees of fitness centers because they are important inputs to the social climate in fitness centers. Participants identified as either a current member (n = 55; 35.5%), past member (n = 25; 16.1%), or professional employed in a fitness center (n = 75; 48.4%). Current members reported between 1 month and 40 years as the time they had been a member of a fitness center.

Past members reported between 2 months and 30 years as the time since being a member of a fitness center, and between 1 month and 25.5 years as the time they were a member of a fitness center before leaving. Professionals reported being employed in a fitness center between 1 and 37.5 years. Seventy-two professionals (96%) reported having some type of exercise-related degree and/or certification. Finally the sample reported a range of familiarity with the HAES principles from, at the extremes, never having heard of this approach (34.9%) to identifying as an active participant (19.3%).

Table 3.1 contains additional demographic information about the sample, and Table 3.2 contains information about the types of clubs individuals were members of or employed in. Table 3.3 contains cross tabulations for the number of individuals who were current members, past members, and employees in each antifat attitude tertile and body mass index (BMI) category. The formula weight(lb)/height(in)^2 x 703 was used to calculate BMI (Centers for Disease Control and Prevention [CDC], 2015). BMI categories were consistent with the CDC criteria for defining adult BMI with 18.5-24.9 as "normal," 25-29.9 as "overweight," and greater than 30 as "obese."

[Insert Table 3.1]

[Insert Table 3.2]

[Insert Table 3.3]

Procedure

Institutional Review Board approval for research involving human subjects was obtained and an explanation of the research study shared with participants served as informed consent. A total of 2,397 individuals and 6 organizations from a variety of

online sources including fitness centers, "size-acceptance" groups, and professionals with freely accessible contact information were solicited through an email briefly describing the research study and inviting participation. In the case of organizations, we asked that the recruitment email be forwarded to the membership via listservs. Participants who completed the research were asked to forward the recruitment letter to anyone they knew who met the eligibility criteria and might have been interested in participating.

Potential participants were directed to a secure online survey site (Qualtrics, Provo, UT). After reading the explanation of the research study that included the nature of the research and potential time commitments, participants had the option to continue or opt out of the study. Those who continued next completed a series of demographic questions. Individuals selecting "none of the above" (n = 7) when asked about being a current/past member or employee were thanked for their willingness to participate and directed out of the study site. Following the demographics, the Antifat Attitudes Test (AFAT; Lewis et al., 1997) was completed and participants were asked to begin the CM process.

Concept mapping. CM involves six steps: preparing, brainstorming, structuring, analyzing, interpreting, and utilizing (Kane & Trochim, 2007). Preparing involves identifying the methods, goals, and objectives of the study (Kane & Trochim, 2007). The key stakeholders and research questions are first identified. Once a plan for the research is complete and participants are identified, brainstorming can commence. Different results could be obtained depending on the brainstorming process. Focus group sessions might stimulate more or fewer ideas due to group dynamics. For example, individuals

might be more or less inclined to participate depending on whether their views are consistent with the majority. Similarly, online brainstorming could result in more ideas because individuals are anonymous, or results could be limited because there is no collaboration.

Brainstorming. Participants were asked to read the following passage and brainstorm ideas to the prompt.

> People can hold positive attitudes toward others for more or less genuine reasons. For example, some people genuinely enjoy learning about and accepting other people and some people are accepting because it is part of who they are. Some people, however, accept others just because they think it is the right thing to do, would feel guilty if they did not act like they accepted others, or fear looking like a biased person. In other cases, people simply do not see any reason to be accepting of others.
>
> We are requesting your help in creating strategies that can increase peoples' genuine accepting attitudes toward larger people in fitness centers. It is important that people choose to become more accepting for themselves and are not made to feel pressured, guilty, or afraid of looking bad if they are not accepting. Also, the strategies should help everyone recognize that other people hold the same accepting values and supportive beliefs toward larger people.
>
> When answering the prompt below there are no right or wrong responses and please identify as many strategies that you can think of. Strategies can be specific or broad (e.g., changes to a fitness center policy, individual behaviors, staff development, media campaigns/messages, changes to physical structures/equipment, etc…).
>
> PROMPT: *Actions that will create an environment in fitness centers where individuals freely choose to accept larger members and people know that others share the same accepting attitudes are...* (please list as many strategies as possible).

After completing the brainstorming, participants were thanked and asked to provide an email if they were interested in completing additional steps of the research. When

brainstorming was complete (after approximately 2 months), we examined the list of ideas to remove redundant and/or unclear ideas.

Structuring. Participants who provided an email address (n = 127, 78.4%) were invited back to Qualtrics to sort and rate the final idea list (Kane & Trochim, 2007). For sorting, participants were asked to group ideas into piles "in a way that makes sense to you." Sorting is achieved in Qualtrics by clicking and dragging ideas into boxes. The idea list was randomized to minimize grouping bias (Kane & Trochim, 2007). Participants were informed that: (1) all ideas cannot be sorted into one pile (e.g., N piles = 1), (2) all ideas cannot be grouped into their own individual piles (e.g., N piles = N ideas), and (3) an idea can be placed in only one pile (Kane & Trochim, 2007). With CM, not all participants who brainstorm need to sort the ideas, but each group of stakeholders should be represented in the sorting process (Kane & Trochim, 2007). Seventeen professionals, 14 current and 9 past members, and 9 uncategorized participants (i.e., group membership was not identified) sorted the ideas (n = 49, 38.6% of contacted individuals). Reliable maps are generated when there are at least 20 sorters (Kane & Trochim, 2007; Rosas & Kane, 2012).

For rating, participants were asked to rate each idea on levels of importance, feasibility, and reach. Forty-three participants rated the ideas on at least one variable with 36 participants rating importance, 38 rating feasibility, and 40 rating reach. Ideas were rated after the sorting process to avoid the rating acting as a type of "pre-sorting" (Kane & Trochim, 2007). Participants were informed, "Before doing your rating, please look at all the statements. When rating, please use the full range of rating values (1 to 5)

by ranking statements *relative* to other statements." To assess importance we asked, "Please rate each idea on the level of importance to increase the acceptance of larger individuals in fitness centers with 1 being *relatively unimportant* and 5 being *extremely important*." To assess feasibility we asked, "Please rate each statement on its feasibility to implement with 1 being *relatively infeasible* and 5 being *extremely feasible*." To assess reach we asked, "Please rate each statement on level of reach (e.g., number of people impacted) with 1 being *extremely limited reach* and 5 being *extremely widespread reach*." The three ratings statements and the order of ideas within each rating were randomly presented across participants.

Measures

Antifat attitudes test (AFAT). The AFAT (Lewis et al., 1997) is a 47-item self-report instrument that measures negative attitudes toward fat individuals. The AFAT contains three subscales that include social/character disparagement (SCD), physical/romantic unattractiveness (PRU), and weight control/blame (WCB). Items are scored on a 5-point scale from 1 (*strongly disagree*) to 5 (*strongly agree*) with higher scores indicating more antifat attitudes. A composite score can be calculated by averaging items. The AFAT has good internal consistency and discriminant validity (Lewis et al., 1997). Internal consistencies in this study were .77, .74, .77, and .87 for the SCD, PRU, WCB, and composite scores, respectively.

Data Analyses

The sorted and rated data were analyzed through multidimensional scaling (MDS) and hierarchical cluster analysis (HCA). The analyses grouped single ideas into clusters

that represented the perceptions of the participants (Kane & Trochim, 2007). The first author, who has more than 10 years of professional fitness experience, reviewed and named the clusters in collaboration with the second author. An email was then sent to the original participant list (n = 127) asking them to review the cluster names and provide any feedback. Forty-five participants (35.4% of contacted individuals) returned to the site and provided feedback, and as a result two cluster names were modified. *Club culture* was changed to *fitness culture* as one participant noted that a YMCA "was not a club," and c*ode of conduct for staff* was changed to *code of conduct* because participants noted the code should apply equally to both staff and members.

Multidimensional scaling (MDS). Non-metric MDS is a technique that attempts to reproduce a matrix of (dis)similarity data in anywhere from one to *N*-1 dimensions, where *N* is the number of variables (i.e., ideas). For concept mapping, two dimensions (i.e., *x*-*y*) are preferred for the ease of visual interpretation. In addition, two dimensions generally reproduce sorting data well (Kane & Trochim, 2007; Rosas & Kane, 2012).

The sorting data from each participant were used to create individual binary square similarity matrices (BSM). The BSM are *N* x *N* matrices where *N* is the number of ideas. If ideas *i* and *j* were sorted together, then a "1" is input into cells X_{ij} and X_{ji}, whereas a "0" is input when items are not grouped together. The individual matrices are then summed to create a total square similarity matrix (TSM). The number in each cell is the total number of individuals who sorted the respective ideas together. Higher numbers in cells indicate more perceived similarity between the two ideas.

The TSM was converted to a dissimilarity matrix (Cox & Cox, 2001; Kruskal & Wish, 1978) for MDS using SPSS version 22 (IBM, Armonk, NY). The results of the MDS were a list of *x*-*y* coordinates that identified the location of each idea in relation to all the other ideas and a graphical display called a "point map" in CM projects (Kane & Trochim, 2007). Items grouped together more often are located closer on the map, suggesting a higher degree of perceived similarity.

Hierarchical cluster analysis (HCA). The coordinates from the MDS were then analyzed with HCA using Ward's algorithm (Anderberg, 1973; Kane & Trochim, 2007). The process is agglomerative where each idea is an individual cluster and the algorithm is applied until all the ideas represent one cluster. Selecting the number of clusters was aided by a dendrogram and determined based on the representative ideas within successive clusters (Kane & Trochim, 2007).

Supplemental analyses. Additional interpretive analyses in this study included pattern matching and the creation of a "go-zone map" (Kane & Trochim, 2007). Pattern matching—or "ladder maps"—visually compare the clusters based on rating scales or participant sub-groups (Kane & Trochim, 2007). Mean cluster rating values were obtained by averaging the item ratings (i.e., importance, feasibility, or reach) in a cluster. A ladder map was used to visualize differences between current members, past members, and employees, and also participants scoring higher and lower in antifat attitudes. The go-zone is an *x*-*y* scatterplot that shows each idea placed on the *x*-axis according to its mean importance and on the *y*-axis according to its mean feasibility. Vertical (importance) and horizontal (feasibility) lines were drawn at the grand mean of all items,

creating four quadrants. The top-right quadrant, or go-zone, contains ideas that were rated above average on importance and feasibility.

Results

A total of 462 ideas were generated during brainstorming. Kane and Trochim (2007) recommend that in consideration of time constraints, brainstorming results in 100 or fewer statements. We were able to pare down the list to 100 by removing redundant ideas. For example, multiple ideas referred specifically to HAES-related education and posting images of "people of all sizes." The complete list of ideas is available from the first author (Appendix A).

Point-cluster map. The MDS and HCA resulted in a map with five clusters named programming, fitness culture, code of conduct, professional development, and physical environment/amenities (Figure 3.1). Ideas that bordered two clusters were examined individually to assess what concept best represented the idea. Table 3.4 contains the three most important ideas within each cluster. Each point in Figure 3.1 represents a brainstormed idea, placed according to MDS. The stress value, an indicator of how well the two-dimensional MDS represented the TSM, was .12. Concept mapping generally produces stress values in the range of .21 to .37, with an average of .29 (Kane & Trochim, 2007), where lower stress values indicate better representation of the TSM.

[Insert Figure 3.1]

[Insert Table 3.4]

Pattern matching. Pattern matching was used to visually display cluster ratings based on the entire sample (Figure 3.2). The rank order for each cluster was the same for

importance, feasibility, and reach. Moreover, the high correlations between importance and feasibility (r = .96), importance and reach (r = .98), and feasibility and reach (r = .90) indicate these rankings were deemed equivalent overall by the participants.

[Insert Figure 3.2]

Current members, past members, and employees reported a high degree of similarity on each rating scale. Descriptive statistics of scores on each rating scale by group are presented in Table 3.5. Correlations among the three groups ranged from .76-.92 on importance, .81-.93 on feasibility, and .52-.87 on reach. Rankings from most to least important were professional development, code of conduct, fitness culture, programming, and physical environment/amenities for current members; professional development, code of conduct, fitness culture, physical environment/amenities, programming for past members; and professional development, programming, fitness culture, code of conduct, and physical environment/amenities for professionals (Figure 3.3). Follow up one-way ANOVAs with Bonferroni adjustments for multiple comparisons revealed that past members rated code of conduct-importance $F(2, 33) = 3.65$, $p = .037$, $\eta^2 = .18$, code of conduct-reach $F(2, 37) = 5.92$, $p = .006$, $\eta^2 = .24$, physical environment/amenities-importance $F(2, 33) = 4.08$, $p = .026$, $\eta^2 = .20$, and physical environment/amenities-feasibility $F(2, 35) = 5.66$, $p = .007$, $\eta^2 = .24$ significantly higher than professionals. All other pairwise comparisons were not significantly different.

[Insert Table 3.5]

[Insert Figure 3.3]

Pattern matching was also applied to participants scoring lower and higher in antifat attitudes. Descriptive statistics of scores on each rating scale by antifat attitude group are presented in Table 3.6. The correlations were .61 for importance, .65 for feasibility, and .47 for reach, indicating moderate agreement between the groups across each variable (Figure 3.4). Along with the relative agreement being moderate, the rank order of the clusters was different. Individuals in the lower tertile ranked professional development, code of conduct, fitness culture, physical environment/amenities, and programming as most to least important. Individuals in the higher tertile ranked professional development, programming, fitness culture, code of conduct, and physical environment/amenities as most to least important. Follow-up independent groups *t*-tests revealed that the lower tertile rated code of conduct-importance $t(19) = 2.40$, $p = .027$, $d = 1.10$, code of conduct-reach $t(24) = 2.95$, $p = .007$, $d = 1.20$, and physical environment/amenities-feasibility $t(22) = 3.14$, $p = .005$, $d = 1.34$ significantly higher than the higher tertile.

[Insert Table 3.6]

[Insert Figure 3.4]

Go-zone. For the entire idea list, a total of 45 ideas emerged in the go-zone, or the quadrant above the mean on importance and feasibility (Figure 3.5). The total numbers of items within each cluster represented in the go-zone are 3, 8, 9, 11, and 14 for physical environment/amenities, programming, fitness culture, code of conduct, and professional development, respectively. Two ideas stand out from the other ideas in the go-zone, "promote/display the benefits of physical activity that are not weight-related

(i.e., sleep, blood pressure, stress management, flexibility)" (idea 49) and "policy that staff respect all members and refrain from personal comments (i.e., telling a larger member how much s/he NEEDS to be at the gym)" (idea 33), suggesting these would be logical first strategies to implement.

[Insert Figure 3.5]

Discussion

Self-determination theory (Deci & Ryan, 2000; 2008) offered a theoretical framework to answer our research questions that included identifying ideas that fitness center stakeholders collectively think are important, feasible, and far reaching to increase positive attitudes toward larger members; and how different subgroups would perceive the relative importance, feasibility, and reach of the ideas. Consistent with our expectations, the ideas ranged from the individual level (e.g., "compliment patrons by commenting on increased function, not weight loss") to the environmental level (e.g., "ensure facilities [i.e., showers, toilets] are large enough for all bodies"). The overall scores and the rank order of the clusters were the same for importance, feasibility, and reach, with professional development, code of conduct, fitness culture, programming, and physical environment/amenities rated highest to lowest, respectively.

Much of the literature addressing ways to reduce weight bias has focused on cognitive factors such as attribution re-training, empathy development, and education about stigma and the controllability of body weight (Puhl & Heuer, 2009). The two most important clusters in this study focus mostly on behavioral factors. For example, using non-shaming language (e.g., "do this for how it feels not for how many calories it burns

off") and not only education about the HAES principles, but also how to model the principles. Clear social norms (i.e., voiced or modeled) can influence attitudes (Zitek & Hebl, 2007) and pro-fat language and behaviors are likely to promote shared positive attitudes (i.e, relatedness). Moreover, the fitness culture cluster suggested creating a variety of inclusive and weight-neutral promotional materials that could also influence the perceived norms of the fitness center. A key message from the cluster ranking was that participants perceived education as necessary—but not sufficient—to fully address attitude change in fitness centers. This highlights the continued need for research that examines the attitudes of fitness center staff and members, and the cognitive, behavioral, social, and environmental influences that (re)shape those attitudes.

In addition to the cluster-level data, the go-zone map helps interpret the idea-level data. All five clusters contained ideas in the go-zone that can be selectively applied in different contexts. The number of ideas represented by each cluster followed the ranking data, where professional development, code of conduct, fitness culture, programming, and physical environment/amenities, had the most to least ideas in the go-zone, respectively. Surprisingly, many of the most important and feasible ideas concerned staff behaviors such as "Take fat peoples' feedback seriously," "Ensure staff demonstrate warm regard and sincere concern for all members," and "Customer service training for all staff." Surely there are fitness staff and members who demonstrate warm regard, have superb customer service skills, and listen seriously to fat members. However, the fact that the overall sample rated these (and similar ideas) higher in relative importance and feasibility suggests that weight bias reduction efforts must include strategies that build

caring climates. Noddings (2005), for example, describes a caring climate as one where instructors engage individuals in dialogue, listen to individuals, and learn about individual needs. Moreover, caring fitness climates are associated with commitment to future exercise, prosocial behaviors, and life satisfaction (Brown & Fry, 2014).

Our expectation that the perceptions of past members would be different than current members and professionals was supported. Past members rated clusters higher on most scales, with four scales rated significantly different from employees. This could be related to negative experiences in fitness centers. Seventy-nine percent of the past members were categorized as "obese," so it is likely that weight bias, among several other possibilities, could have contributed to discontinuing their membership. For example, when brainstorming ideas, several participants included personal stories that described experiences such as the following:

> It takes months to get my courage up to go to [fitness class]. I will attend two or three classes and then one of the teachers, whom I have known forever, will lecture me on how much I NEED to be there. And that's all it takes to send me back into my shell for another few months, paying the membership but denying myself the benefits. I have written to the [fitness center] requesting some of the changes I mentioned above. No one has replied.

Those and other weight-related comments such as "complimentary weightism," defined by Tylka et al. (2014) as "appearance-related compliments" (p.5), can unintentionally (or intentionally) perpetuate weight stigma and highlights an important professional

development opportunity, as well as an area for future research examining weight bias and physical activity adherence and maintenance.

Professional development should also explicitly address antifat attitudes. Qualitative work by Donaghue and Allen (in press) highlighted that personal trainers perceive weight loss as possible for nearly everyone, and those who do not lose weight "are not willing to make a change" (p. 7). Common antifat attitudes endorsed by fitness professionals, that are resistant to change, are that larger people are lazy, unmotivated, and lack willpower (Chambliss et al., 2004; Robertson & Vohora, 2008). These stereotypes can affect a fitness professional's effectiveness, where fitness professionals expect poor results based on appearance-related stereotypes, provide poorer quality of service to the client, the client does not experience success (i.e., weight loss), and the fitness professional's expectations are confirmed (i.e., the client was the problem). This is consistent with the proposition of Cardinal, Whitney, Narimatsu, Hubert, and Souza (2014) that the expectancy process could affect larger members' experiences and results in fitness centers. In addition, this could explain why code of conduct was rated significantly higher by past members compared to professionals in this study. Professionals might be unaware of how their well-intentioned words and actions (i.e., complimentary weightism) and also their implicit biases affect their expectations and treatment of larger members (Tylka et al., 2014).

Participants in our study also noted that professional development should introduce body size as a category of diversity. Highlighting the genetic influences on body weight has successfully helped modify some antifat attitudes such as the

controllability of weight, but not attitudes that larger people are lazy (Rukavina et al., 2008). Donaghue and Allen (in press) pointed out that personal trainers consider genetics as secondary to psychological characteristics regarding failures to lose weight. In this sense, genetics is used to explain why weight loss does not occur, rather than highlight body size as an area of human difference that should be celebrated, honored, and respected (HAES Principles, 2015), akin to race, ethnicity, and other social identities; people are not one size any more than they are one color. When introducing weight bias, interventions should detail the causes and consequences of the problem, but also detail the ways sizism mirrors negative attitudes that are not socially sanctioned (e.g., racism).

Diversity and inclusion-related ideas were also contained in the fitness culture and programming clusters. The focus on weight loss and slimness in society in general, and in fitness centers specifically, privileges certain individuals (Maguire, 2008). For example, more muscular personal trainers are more successful and perceived as more credible than larger fitness professionals (Maguire, 2008). Specific ideas about inclusion in the current study were to portray larger exercisers in a positive light (e.g., enjoying exercise) in advertising materials, include individuals of various sizes on posters and decorations inside the club, and hire staff of all sizes. Enacting these ideas might help to reduce body privilege (Kwan, 2010), and contribute to positive attitudes toward larger bodies. More research on the impact of inclusive and fat-positive material in fitness centers is needed (Watkins et al., 2014).

As expected, individuals lower and higher in antifat attitudes also differed in their perspectives. Of those individuals who completed the sorting and rating, employees

comprised 64.2% and 67.6% of the higher antifat and "normal" BMI groups, respectively. Past members comprised 40% and 43.2% of the lower antifat and "obese" groups, respectively. Furthermore, 80.5% of the higher antifat group were categorized with "normal" BMI, while 87.2% of the lower antifat group were considered "obese." Essentially, lower antifat attitudes paralleled being a past member or labeled "obese," and higher antifat attitudes paralleled being a professional or labeled "normal" weight. Antifat attitudes in the higher tertile were consistent with previous fitness-related research (Chambliss et al., 2004; Dimmock et al., 2009), although no subgroup in the present investigation demonstrated antifat bias, defined by a mean score above 3 on any subscale or the composite score. The AFAT however, is an explicit measure of antifat attitudes and a response bias due to social desirability is possible. Given the over-representation of employees in the higher antifat attitude tertile, researchers should continue exploring antifat attitudes, BMI, and the interaction between the two, particularly among fitness center staff.

In addition to the unique opportunities and strategies that were identified in this study, several other ideas have been reported in previous literature. Education on the unique biomechanics of larger individuals, scaling activities, and developing empathy skills have been discussed and implemented, albeit in limited fitness contexts. Many participants identified environmental strategies previously reported such as equipment that can handle larger bodies and adequate spacing between equipment. On reflection, it is concerning that many of the ideas written about a decade ago are still identified today as important and necessary changes. We suggest two reasons (and acknowledge there

could be many more) for the continuation of this persistent social problem in fitness centers. One could be a translational research issue where research findings are commonly shared among academics but not with practitioners. A second, and related issue, is that much of the research examining weight bias has not incorporated the voices of stakeholders, which can yield unique, important, interesting, and informative data. Our research addressed these issues by incorporating stakeholder perceptions of important, feasible, and far reaching ideas to promote positive attitudes toward larger members that can inform future research and are directly applicable to practitioners.

Limitations

There are limitations to this study that must be considered. There was a significant time burden placed on participants who completed all the phases of the research. Sorting 100 ideas and rating each idea on three scales was time consuming and participants could have become overwhelmed, and this could have affected the results. For example, it is possible that some participants sorted ideas without considering the perceived similarity among the ideas, where they just clicked and dragged ideas into boxes without regard to the instructions. One strategy to reduce patterns of response bias that we utilized however, was to randomize the order of ideas and rating statements during the sorting and rating steps.

The results of CM projects are often not generalizable outside the research context, because only certain stakeholders are targeted. To address this, we recruited participants from different types of centers, countries, states, communities, roles, and backgrounds (e.g., knowledge of the HAES principles). Therefore, the results from our

study might apply well to a variety of fitness centers. However, the list of ideas generated in this study is extensive and fitness centers looking to improve attitudes toward larger members will need to selectively apply certain strategies. Moreover, 2,397 individuals were actively solicited to participate in the study and an unknown number of individuals received the recruitment materials via listservs. Thus, a small percentage (less than 7%) of contacted individuals participated in the study (the majority of whom were female), and even fewer completed the sorting and rating steps, so there is the possibility that the data are a result of selection bias, making generalizability potentially even more difficult. There was however, an appropriate representation of the three stakeholder groups in the sorting and rating steps as prescribed with the CM method. Furthermore, the greater representation of women aligns with the fact that women are affected by weight bias more than men (Puhl, Andreyeva, & Brownell, 2008).

Another limitation relates to self-determination theory (Deci & Ryan, 2000; 2008). Participants were asked to generate ideas that would be held autonomously and shared throughout the club. There is the possibility that ideas were generated without this in mind. Code of conduct, for example, was rated significantly less important by professionals and individuals higher in antifat attitudes compared to past members and those individuals lower in antifat attitudes, respectively. Implementing code of conduct ideas that are perceived as less important by some subgroups might lead to controlled as opposed to self-determined attitude regulation. It is unclear the extent to which any of the ideas generated in this study will facilitate self-determined attitudes toward larger members and future research is necessary to answer that important question.

Conclusion

Weight bias is an important societal and fitness-related social justice issue. Importantly, individuals who experience weight bias in fitness-related contexts are likely to avoid physical activity (Chambliss & Blair, 2005; Vartanian & Novak, 2011), yet physical activity and physical fitness are important contributors to quality of life for all people, regardless of body transformations or weight loss. For this reason, identifying strategies that can promote positive attitudes toward larger individuals that are held autonomously and shared throughout a fitness center is a public health and social justice imperative. This research asked current and past members and employees of fitness centers to brainstorm, sort, and rate ideas that could increase positive attitudes toward larger members. The most important ideas, as rated by the participants, involved professional development and appropriate behavioral standards inside fitness centers. This suggests that weight bias reduction efforts need to move beyond raising awareness of the problem, and incorporate legislative guidelines that show a firm commitment to ensuring a safe and accessible atmosphere for all members, regardless of size. Improving attitudes toward not only larger individuals, but all stigmatized groups, could have profound social implications such as reducing prejudice. The participants in this study provided ideas; now future researchers and practitioners, ideally working collaboratively, can determine the practicality and effectiveness of the ideas.

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Table 3.1

Demographic Information.

	n	*M*	*SD*	Range	Percent
Age	155	40.90	11.73	22 - 67	
Body Mass Index	152[a]	29.25	10.49	18.56 – 76.26	
Gender					
Male	31				20%
Female	120				77.4%
Other	4				2.6%
Ethnicity					
White	136				87.7%
Black	8				5.2%
Hispanic	4				2.6%
Asian	3				1.9%
Other	4				2.6%
Education					
HS/GED	2				1.3%
Some college	12				7.7%
2-year degree	3				1.9%
4-year degree	63				40.6%
Masters	63				40.6%
Doctoral	9				5.8%
Professional	3				1.9%
Income					
Under $20,000	9				5.4%
$20,000 - $49,999	36				21.7%
$50,000 - $99,999	61				36.7%
$100,000 - $249,999	44				26.5%
$250,000 or more	5				3%
Club status					
Current member[b]	55	9.69	9.89	1mo – 40	35.5%
Past member[c]	25	4.75	6.21	4mo – 30	15.1%
Employee[d]	75	10.18	9.11	1 – 37.5	48.4%
Antifat attitudes					
Composite	154	1.75	.59	1 – 3.94	
Social/character disparagement	154	1.39	.45	1 – 3.20	
Physical/romantic unattractiveness	154	2.14	.79	1 – 4.50	
Weight control/blame	154	2.10	.82	1 – 4.33	

Table 3.1. *Demographic Information*. (continued)

	n	*M*	*SD*	Range	Percent
Familiarity with HAES ®					
Never heard of it	58 (16)[e]				37.4% (40%)
Heard of it, but don't know anything about it	26 (5)				16.8% (12.5%)
Aware of and its mission	17 (1)				11% (2.5%)
Visited websites	22 (6)				14.2% (15%)
Active participant	32 (12)				20.6% (30%)
Country of residence					
Australia	2				1.3%
Canada	3				1.9%
Germany	1				.01%
New Zealand	1				.01%
Russian Federation	1				.01%
United Kingdom	4				2.6%
United States	143				92.3%

a. Three participants did not provide weight and/or height.
b. *n* is the number of current members; *M* is the mean years as a member and *SD* is the standard deviation of years.
c. *n* is the number of past members; *M* is the mean years since being a member of a fitness center and *SD* is the standard deviation of years.
d. *n* is the number of employees; *M* is the mean years as an employee and *SD* is the standard deviation of years.
e. Number in parentheses indicates the number/percentage in each group completing the sorting and rating.

Table 3.2

Club Status Represented in Club Types.

	Large commercial chain	Small commercial chain	Family owned/ private	Nonprofit (YMCA, JCC, etc.)	College/ university	Personal training studio	Group exercise studio	Total
Club status								
Current member	22 (33.3%; 46.8%)[a]	10 (15.2%; 40%)	7 (10.6%; 17.1%)	12 (18.2%; 30%)	6 (9.1%; 17.6%)	5 (7.6%; 25%)	4 (6.1%; 20%)	66 (29.1%)
Past member	19 (28.4%; 40.4%)	8 (11.9%; 32%)	9 (13.4%; 22%)	8 (11.9%; 20%)	11 (16.4%; 32.4%)	3 (4.5%; 15%)	9 (13.4%; 45%)	67 (29.5%)
Employee	6 (6.4%; 12.8%)	7 (7.4%; 28%)	25 (26.6%; 61%)	20 (21.3%; 50%)	17 (18.1%; 50%)	12 (12.8%; 60%)	7 (7.4%; 35%)	94 (41.4%)
Total	47 (20.7%)	25 (11%)	41 (18.1%)	40 (17.6%)	34 (15%)	20 (8.8%)	20 (8.8%)	227[b]

a. The first number in parentheses represents a cell's row percentage; the second number represents the cells column percentage.

b. Participants were allowed to select more than one type of fitness center if they were a member, previous member, or employee of different types of fitness centers.

Table 3.3.

Cross Tabulation of Fitness Center Status, Antifat Attitude Tertile, and BMI.

	Lower AFAT	Higher AFAT	"Normal" BMI	"Overweight" BMI	"Obese" BMI
Current member	20 (40%)[a]	18 (34%)	24 (32.4%)	12 (35.2%)	18 (40.9%)
Past member	20 (40%)	1 (1.9%)	0 (0%)	5 (14.7%)	19 (43.2%)
Employee	10 (20%)	34 (64.2%)	50 (67.6%)	17 (50%)	7 (15.9%)
Lower AFAT[b]	---	---	8 (19.5%)	6 (30%)	34 (87.2%)
Higher AFAT	---	---	33 (80.5%)	14 (70%)	5 (12.8%)

a. Represents the percentage of the column category.
b. Antifat attitudes were assessed with the Antifat Attitudes Test (AFAT; Lewis et al., 1997).

Table 3.4.

Representative Ideas in Clusters and Mean (M) Importance.

	M
Programming	
49. Promote/display the benefits of physical activity that are not weight-related (i.e., sleep, blood pressure, stress management, flexibility)	4.19
8. Create fitness programs geared toward healthy living without a focus on weight	4.11
25. Provide activities that are fun and interactive (i.e., Zumba!)	4.03
Fitness Culture	
35. Recognize all individuals' achievements, regardless of size and weight	4.14
96. Take fat peoples' feedback seriously	4.08
27. Attempt to attract a diverse membership (i.e., ages, colors, sizes, etc.)	4.03
Code of Conduct	
39. Use non-shaming language throughout the fitness center (i.e., do this for how it feels not for how many calories it burns off)	4.14
2. Implement and enforce a zero tolerance for harmful language from staff and members	4.11
3. Emphasize health and fitness, not weight, body composition, or BMI	4.08
Professional Development	
33. Policy that staff respect all members and refrain from personal comments (i.e., telling a larger member how much s/he NEEDs to be at the gym)	4.33
42. Education/professional development for fitness staff in the biomechanics of larger people and how to scale activities	4.28
87. Ensure staff demonstrate warm regard and sincere concern for all members	4.25
Physical Environment/Amenities	
28. Offer a wide variety of fitness opportunities (machines, free weights, classes, pool)	4.22
6. Provide equipment for a variety of body sizes and fitness levels	4.22
44. Ensure facilities (i.e., showers, toilets) are large enough for all bodies	4.00

Table 3.5.

Mean Ratings for Clusters by Club Status.

	Current Member			Past Member			Professional		
	Importance	Feasibility	Reach	Importance	Feasibility	Reach	Importance	Feasibility	Reach
Programming	3.12 (4)	3.38 (4)	3.23 (4)	3.17 (5)	3.52 (5)	3.28 (5)	3.16 (2)	3.35 (4)	3.16 (2)
Fitness Culture	3.29 (3)	3.45 (2)	3.34 (3)	3.65 (3)	3.86 (3)	3.62 (3)	3.14 (3)	3.60 (3)	3.04 (4)
Professional Development	3.60 (1)	3.55 (1)	3.54 (1)	4.21 (1)	4.05 (1)	3.94 (1)	3.92 (1)	3.93 (1)	3.65 (1)
Code of Conduct	3.43 (2)	3.42 (3)	3.36 (2)	3.93 (2)	4.04 (2)	3.86 (2)	3.12 (4)	3.60 (2)	3.10 (3)
Physical Environment & Amenities	2.88 (5)	3.32 (5)	3.08 (5)	3.27 (4)	3.53 (4)	3.56 (4)	2.55 (5)	2.74 (5)	2.88 (5)

Note. Number in parentheses is the rank order of the cluster for the respective rating variable.

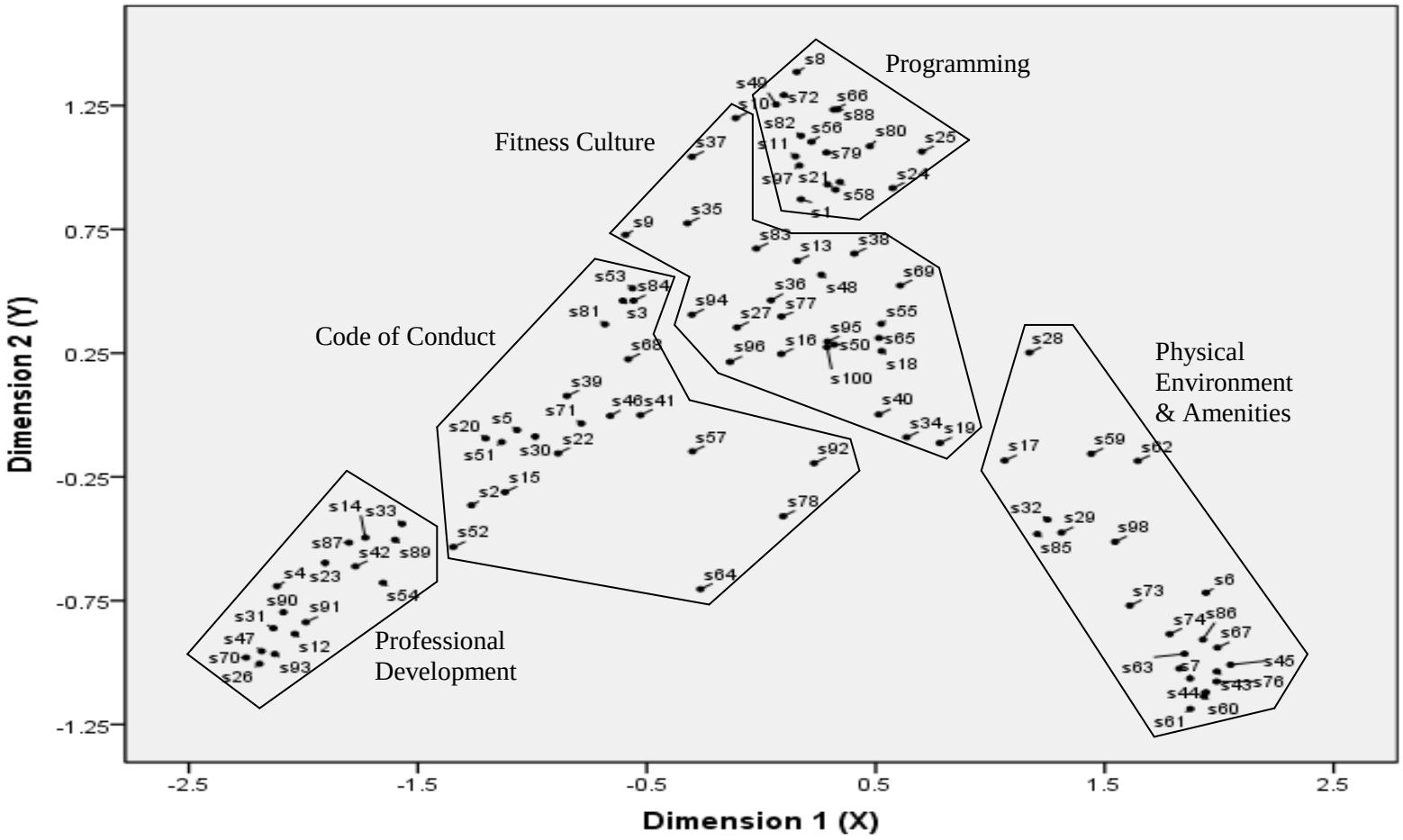
Table 3.6

Mean Ratings for Clusters by Antifat Attitude Tertile.

	Importance		Feasibility		Reach	
	Lower Tertile	Higher Tertile	Lower Tertile	Higher Tertile	Lower Tertile	Higher Tertile
Programming	2.90 (5)	3.17 (2)	3.67 (3)	3.27 (4)	3.18 (4)	3.08 (2)
Fitness Culture	3.35 (3)	3.16 (3)	3.65 (4)	3.42 (2)	3.47 (3)	3.06 (3)
Professional Development	3.84 (1)	3.73 (1)	3.68 (2)	3.74 (1)	3.65 (1)	3.55 (1)
Code of Conduct	3.67 (2)	2.98 (4)	3.77 (1)	3.33 (3)	3.63 (2)	2.99 (4)
Physical Environment & Amenities	3.01 (4)	2.74 (5)	3.54 (5)	2.74 (5)	3.34 (5)	2.96 (5)

Note. Number in parentheses is the rank order of the cluster for the respective rating variable.

Figure 3.1. Point-cluster Map.



Note. Each point represents an idea located through MDS. Clusters were drawn based on HCA.

Figure 3.2. Ladder Map Comparing Overall Importance, Feasibility, and Reach.

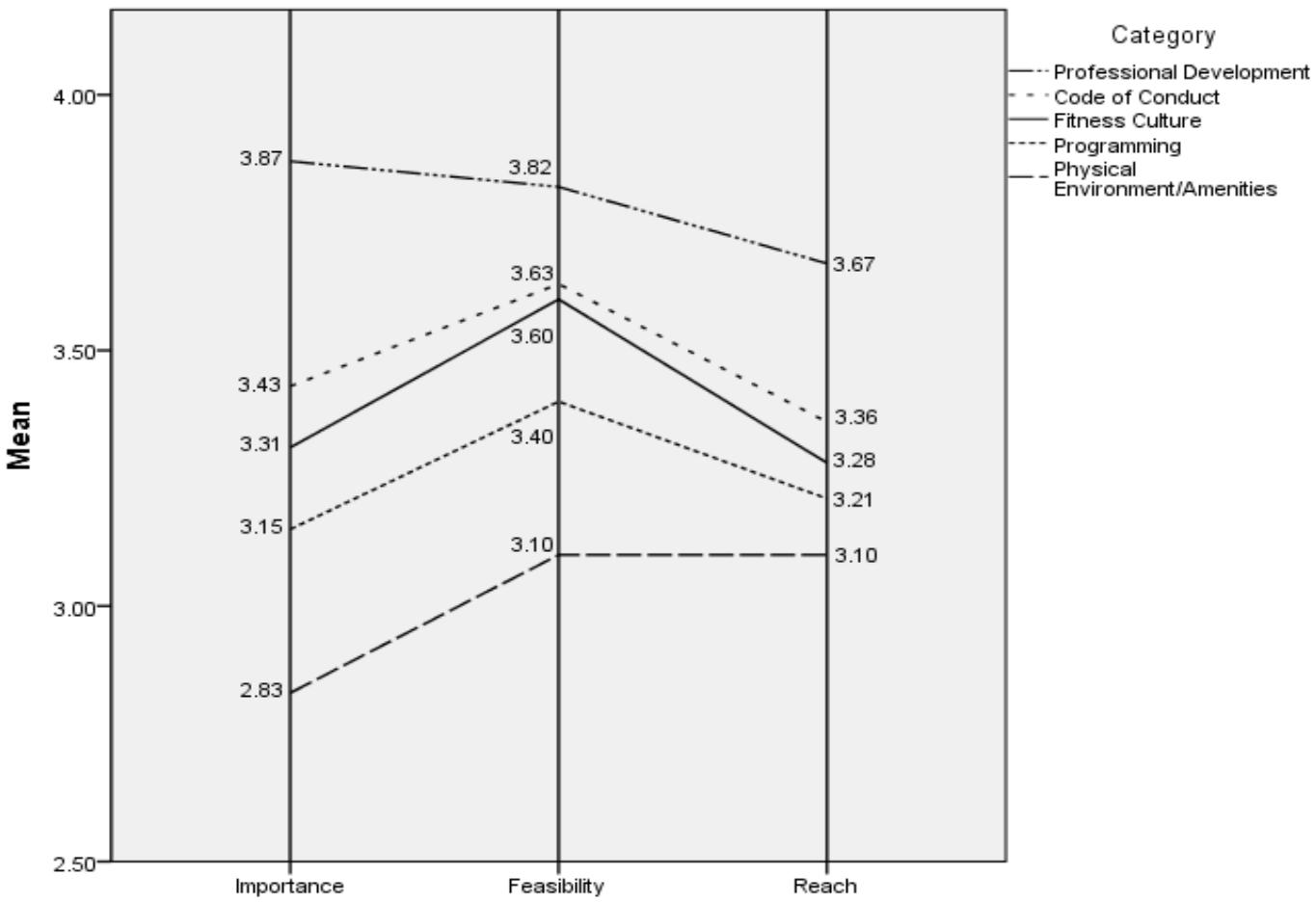


Figure 3.3. Ladder Map Comparing Current Members, Past Members, and Employees.

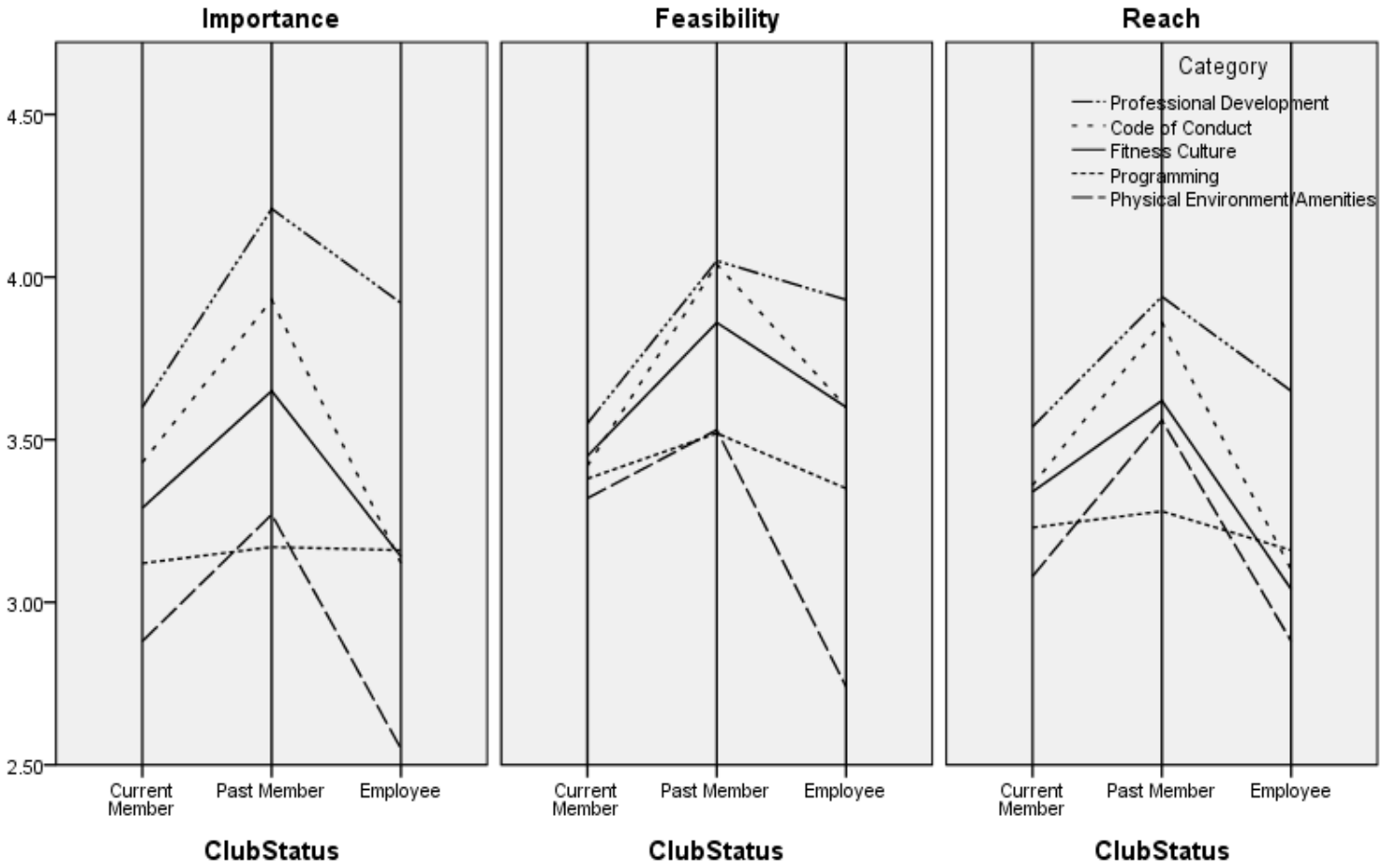


Figure 3.4. Ladder Map Comparing Low and High Antifat Attitude Tertiles.

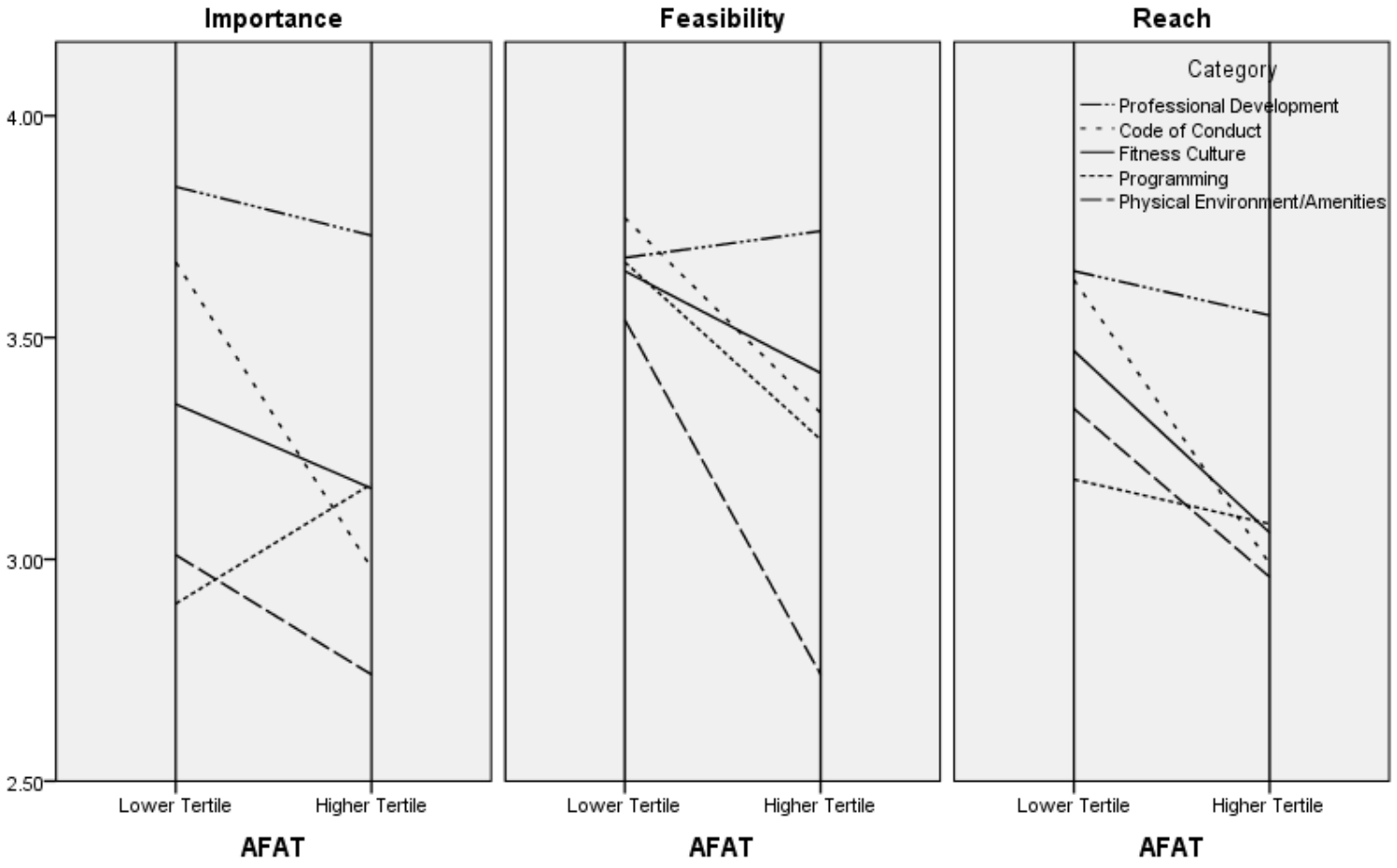
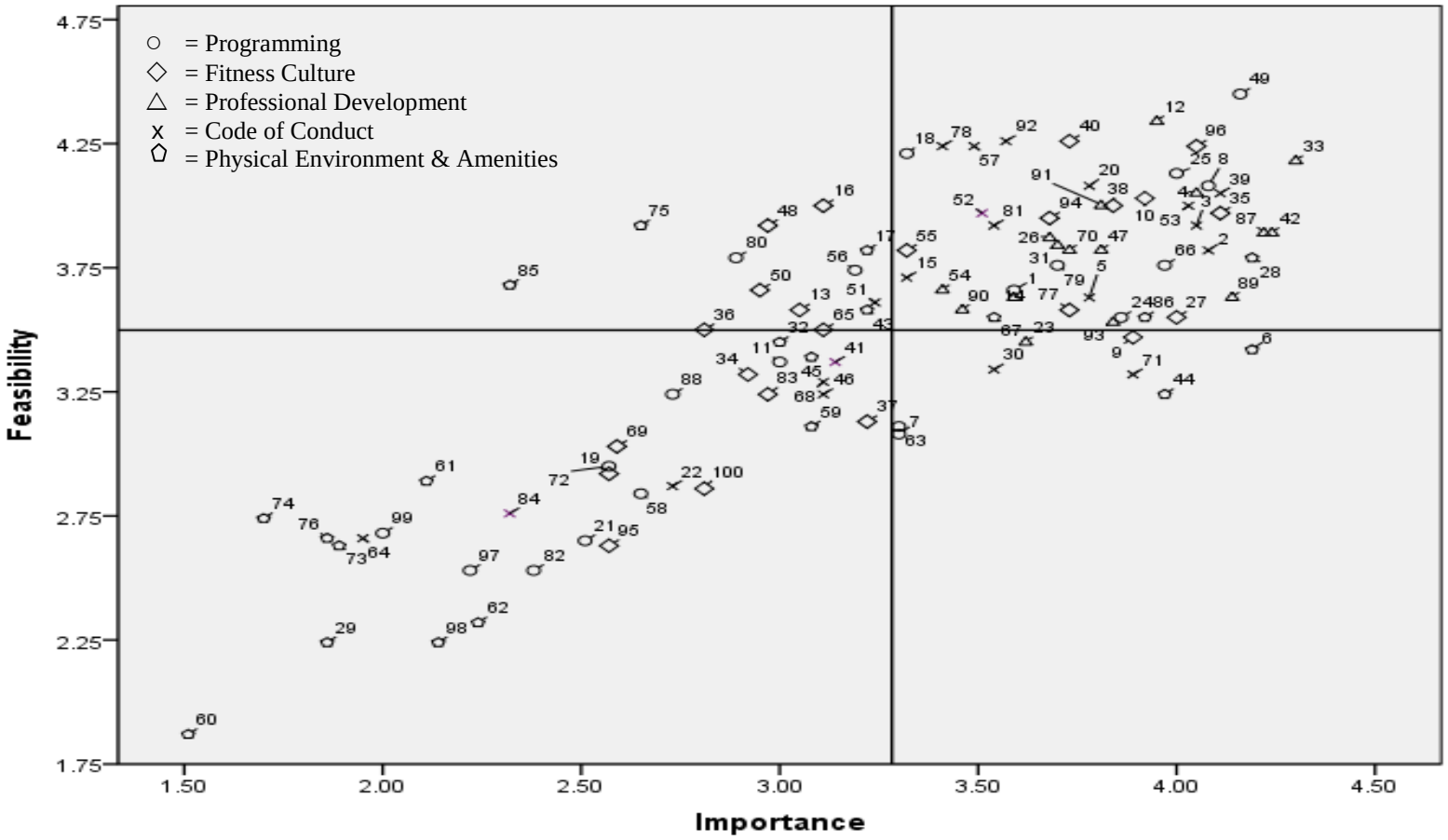


Figure 3.5. Go-zone Map: All Ideas by Importance and Feasibility.



Note: Each number represents a brainstormed idea. Vertical and horizontal lines are drawn at the mean overall rating for all ideas on importance and feasibility.

Chapter 4: General Conclusion

General Conclusion

This dissertation adds to the field of kinesiology in important ways. Interdisciplinary and translational research are still underdeveloped in kinesiology and more research is necessary that can bridge research and practice. The first manuscript in this dissertation addressed this issue by describing concept mapping, a participatory mixed method that can be used to plan and/or evaluate intervention research with important stakeholder feedback. Specifically, kinesiology professionals can implement concept mapping to design and/or evaluate context-specific and culturally sensitive health behavior interventions that address problems such as weight bias. Moreover, these interventions can be integrated with existing research frameworks to enhance the utility of the research. Concept mapping can also help eliminate barriers to interdisciplinary research such as difficulties bringing diverse groups of researchers together. The method is not the answer to all the research problems in kinesiology, but searching for answers to common problems requires diverse methods and skills, and concept mapping offers an opportunity for creatively answering problems. Future researchers and practitioners should consider implementing concept mapping as one of the many tools that can help build the body of translational knowledge in kinesiology.

The empirical investigation conducted as part of this dissertation implemented concept mapping to address creating a climate of accepting attitudes toward larger members of fitness centers. The findings demonstrated that stakeholder groups were willing to invest time and effort in generating ideas, and that the ideas could be logically organized to be of practical utility. Some differences in the ranking of the ideas emerged

between past members, current members, and employees, as well as between individuals lower and higher in antifat attitudes. Identifying these stakeholder differences is important to help inform what ideas might be more or less well received in fitness centers with differing demographics. Overall, the research demonstrates how concept mapping can be used to address salient social problems in the field of kinesiology.

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APPENDIX

Appendix A

IDEAS WITHIN CLUSTERS

Cluster 1: Programming

66. Make the exercise fun

88. Programs for social interaction and not only physical activity

49. Promote/display the benefits of physical activity that are not weight-related (i.e., sleep, blood pressure, stress management, flexibility

72. Creating fitness teams that set weekly goals as a group and consist of people of all sizes

8. Create fitness programs geared toward healthy living without a focus on weight

24. Scalable classes that people of all sizes and abilities can take together

25. Provide activities that are fun and interactive (i.e., Zumba!)

80. Post a bulletin board where people can find a workout partner or create a workout group

11. Implement incentive/rewards programs for everyone based on consistent attendance

97. Provide incentive for experienced members of various demographics to spend time with new members of various demographics

56. Feature and highlight stories and achievements of larger members (i.e., completed a marathon, triathlon)

82. Create a "newcomers" plan where veteran members of all demographics introduce new members of all demographics

79. Create promotional materials using an intersectional approach (i.e., people of different sizes, ethnicities, abilities, genders, sexualities, etc.) so people who are larger and also identify with other identities feel included

21. Worksite wellness programs

58. "Love your body" classes for all members

99. Text all members healthy hints and support not based on weight loss

1. Discourage weight loss challenges or competitions

Cluster 2: Fitness Culture

19. Set specific hours for new members to become familiar with the facility and equipment
34. Design and display a symbol that means “everyone is welcome here"
40. Do not sell weight-loss supplements
95. Offer classes just for fat people that do not sound stigmatizing
100. Provide resources on weight loss that works
50. Edit class names to remove terms such as ripped, calorie burn, hardcore, etc instead use challenge, moderate, strenuous, gentle
18. Post inspirational messages that apply to all people
65. If there is a nutritional component (i.e., juice bar) make sure the focus is on healthy eating and not weight loss
55. Provide promotional materials, ads, and magazines that include a range of body sizes
38. Provide positive visual images of people of all sizes enjoying physical activity
69. Have visual images of, and opportunities for, fat members helping thin members
10. Provide performance-based measurements (i.e., increased stamina, etc.)
37. Create a team environment where everyone helps and encourages each other (i.e., buddy program)
9. Encourage clientele to develop a relationship with fitness and not comparing bodies
35. Recognize all individuals’ achievements, regardless of size and weight
13. Provide promotional materials to members about Health at Every Size ®
48. Post the Health at Every Size ® principles in the fitness center
83. Campaigns discouraging elitist attitudes toward fitness
36. Give members literature on weight bias, fat-talk, etc., and the associated harm
77. Make clear at sign-up that the gym is body-positive and body shaming, fat talk, etc are not tolerated
16. Do not provide materials focused/joking on “beach season” or “holiday eating”
27. Attempt to attract a diverse membership (i.e., ages, colors, sizes, etc.)
94. Do not valorize celebrity weight loss (i.e., Biggest Loser)
96. Take fat peoples’ feedback seriously

Cluster 3: Professional Development

33. Policy that staff respect all members and refrain from personal comments (i.e., telling a larger member how much s/he NEEDs to be at the gym)
89. Ensure members and staff applaud and do not mock members' efforts
14. Education/professional development for staff on the Health at Every Size ® principles and how to model the principles
87. Ensure staff demonstrate warm regard and sincere concern for all members
42. Education/professional development for fitness staff in the biomechanics of larger people and how to scale activities
23. Make sure staff have the same expectations for individuals of all sizes
54. Have a policy that front desk staff must look every member in the eye, regardless of their personal beliefs about fatness
26. Education/professional development for staff on body language and not being intimidating
47. Education/professional development for staff on the dangers of promoting restrictive eating for people of all sizes
93. Education/professional development that allows staff to identify their own bias/attitudes
70. Education/professional development for staff on re-framing weight-loss goals to other goals in a non-shaming way
12. Customer service training for all staff
91. Education for staff and members about the multiple components of health and caring for them all
31. Education/professional development on empathy skills
90. Staff training/discussions and classes about body diversity
4. Education/professional development for trainers and staff about inclusive practices and attitudes and the merits of physical activity for everyone

Cluster 4: Code of Conduct

2. Implement and enforce a zero tolerance for harmful language from staff and members
15. Discourage fitness staff from promoting/applauding weight loss
52. Ask fitness staff to mention appropriate modifications even when no larger people are present
20. Encouragement from all staff for all members to focus on doing their best
51. Encourage staff to use fat people as examples of doing it right in a class
5. Staff and members encouraged not to promote any type of dieting
30. Hire staff of all sizes
22. Hiring staff that have been inactive in the past and faced other struggles (i.e., body image) and can model body acceptance
78. Post a Code of Conduct
92. Do not weigh members at intake
57. Include in the center mission statement that all body types are accepted and welcome, have employees and members sign it
64. Staff that wear modest/baggie clothing
39. Use non-shaming language throughout the fitness center (i.e., do this for how it feels not for how many calories it burns off)
71. Discourage unsolicited "advice" and people making "projects" out of larger members
41. Avoid using the medical terms "obese" and "overweight"
46. Employ fitness instructors who are larger in size
3. Emphasize health and fitness, not weight, body composition, or BMI
84. Make sure class instructors and participants are introduced to each other and talk about their struggles
53. Use statements in classes that help people engage rather than punish their bodies (i.e., "feel the benefit" vs. "work off that cookie")
68. Hold "attitude shift" workshops that focus on changing negativity (i.e., body hate)
81. Compliment patrons by commenting on increased function not weight loss

Cluster 5: Physical Environment/Amenities

67. Provide support railings in locker rooms and showers
86. Provide adequate spacing between equipment
43. Ensure towels, if offered, are large enough for all individuals
44. Ensure facilities (i.e., showers, toilets) are large enough for all bodies
45. Provide armless chairs throughout the fitness center
76. Gentle and dim lighting for comfort
6. Provide equipment for a variety of body sizes and fitness levels
60. Remove mirrors from the facility
61. Reduce the number of mirrors and strategically place them
7. Provide private changing and shower areas
75. Put scales in private areas
63. Remove all scales from the fitness center
74. Provide a mix of communal and individual dressing areas
32. Sell fitness clothes and gear for plus sizes
85. Remove fashion magazines and other materials with airbrushed images
29. Limit the size of membership
73. Do not offer television programming
98. 24/7 operating hours
59. Create an environment that is soothing to the senses and can draw people to movement
62. Make the physical environment more like a playground than a gym
17. Display body-positive decorations
28. Offer a wide variety of fitness opportunities (machines, free weights, classes, pool)