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Effect of a motor behavior course on kinesiology students' attitudes toward disability: A quasi-experimental study

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Abstract: This quasi-experimental study used a nonrandomized, control group pre-test post-test research design to determine the effect of a motor behavior course with a social justice perspective on undergraduate students' attitudes toward people with disabilities, alignment with the medical and social models of disability, and mobility beliefs. Undergraduate students enrolled at a public university (n=714) completed survey measures before and after participation in a 10-week course. Intervention group participants (n=357) were drawn from a required course for Kinesiology students that included social justice topics and video-based contact with people with disabilities. Control group participants (n=357) were drawn from a required course for all students that did not include social justice content. Separate one-way ANCOVAs were conducted to identify differences in outcomes between groups, controlling for baseline measures and demographic characteristics. Results indicate that participants in the intervention group reported more favorable attitudes toward people with disabilities, lower medical model scores, higher social model scores, and more favorable views toward self-directed mobility as a human right. Integrating social justice concepts into the classroom may be an important addition to undergraduate Kinesiology curriculums and a valuable intervention strategy to positively influence Kinesiology student attitudes.

Keywords: social justice; self-directed mobility; disability models; higher education

Introduction

People with disabilities are considered the largest minority group in the United States (Brault, 2012), with prevalence estimates showing that 61 million people report at least one disability (Okoro et al., 2018). To better understand and advance a positive social psychology of members of this group, attitudes toward people with disabilities have been an important focus of past and current literature (Antonak & Livneh, 2000; Bogart et al., 2019). Attitudes can inform social interactions, treatment, and inclusion of people with disabilities (Dunn, 2015; Hutzler et al., 2019). While favorable attitudes may lessen some obstacles that people with disabilities face, negative attitudes can create significant social barriers (Antonak & Livneh, 2000). In addition, attitudes may be further influenced by multiple factors such as previous experiences, contact (or lack thereof) with people with disabilities, and disability beliefs, and can be effectively intervened upon (Corrigan et al., 2012; Pettigrew & Tropp, 2006). Improving our understanding of disability attitudes among multiple groups of people has therefore been a consistent and valuable component of disability studies (Palad et al., 2016).

College Students' Attitudes toward People with Disabilities

College students, including those studying Physical Education (PE) and Kinesiology, have been an important target population for disability attitude intervention research (Bogart et al., 2022; Case et al., 2020). College students may have family members with disabilities, identify as disabled themselves, or interact with people with disabilities in daily life. There is also a high likelihood that Kinesiology students will work with people with disabilities in some capacity through their future career within physical activity and allied health fields. Previous studies indicate that college students who are female (Hergenrather & Rhodes, 2007), have higher socioeconomic status (Chan et al., 2009), have a disability themselves (Bogart et al., 2019), and experience contact with people with disabilities (Bogart et al., 2022; Morin et al., 2013) tend to report more favorable attitudes toward people with disabilities. Researchers also suggest that creating educational activities designed to introduce new knowledge and challenge disability stereotypes is a promising approach for further attitude change among the general college student population (Hunt & Hunt, 2004; Li et al., 2014). Unfortunately, negative attitudes among fitness professionals have been reported as a major barrier for people with disabilities and their access to a physically active lifestyle (Rimmer et al., 2004). As such, in addition to studying attitudes toward disability among this population, it has been important to prioritize and explore attitude intervention within the higher education setting.

Disability Attitudes Interventions among Physical Education and Kinesiology Students

Educational strategies that include in-person, face-to-face contact experiences with people with disabilities are effective, ideal practices for improving attitudes toward people with disabilities (Corrigan et al., 2012; Pettigrew & Tropp, 2006). Conditions in which contact is optimal—(1) equal status between groups, (2) common goals, (3) intergroup cooperation, and (4) supported by authority—may lead to more favorable attitudes and reduction in prejudice toward people with disabilities (Allport, 1954; Pettigrew & Tropp, 2006). Some Kinesiology disciplines utilize service-learning, experiential learning, practicum, and community engagement strategies to provide undergraduate students with contact with disability populations in physical activity settings (Case et al., 2020). For example, multiple studies have explored service-learning interventions in which preservice physical educators or other Kinesiology students support children and individuals with disabilities through physical activity, physical education, sport, or fitness activities (e.g., Hodge et al., 2002; Shields & Taylor, 2014). Though such service-learning experiences vary in program goals and characteristics, recent research demonstrates that these in-person, practical experiences elicit positive summary effects on college student attitudes toward people with disabilities (Case et al., 2020).

Unfortunately, not all Kinesiology students are provided in-person contact with people with disabilities. Potential for in-person contact may depend on course level or type, teacher interests, availability, or self-identification of people with disabilities. In response, other practices such as video-based contact with people with disabilities, disability simulations in a physical activity environment, and infusion of disability concepts into the curriculum have been used as alternatives in situations where in-person contact is unavailable (Corrigan et al., 2012; Kwon, 2018; Logan & Bogart, 2022). However, increasing evidence shows that some alternative practices, such as disability simulations, may not effectively improve attitudes (Flower et al., 2007; Nario-Redmond et al., 2017). In fact, in some cases, disability simulations have failed to improve attitudes toward people with disabilities and instead may unintentionally promote negative feelings such as anxiety and emotional distress (Nario-Redmond et al., 2017). Therefore, examining effective methods for disability attitude

interventions when in-person contact is unavailable is valuable, especially for Kinesiology students who do not major in disability-focused disciplines (e.g., Adapted PE) but may still be expected to support people with disabilities in their future physical activity or health-related careers (e.g., PE, Sport Education, Physical Therapy).

Social Justice Topics in Higher Education

The current higher education system has embraced a social justice approach to delivering curriculum—which emphasizes full and equitable participation of all diverse groups within a society—to be inclusive of a variety of experiences and act as an agent of positive change for students (Osman et al., 2018). In addition, universities have been called to integrate social justice topics into undergraduate curriculum, through which courses create learning experiences for students to critically examine their personal beliefs and actions (Frank, 2018; Gordon et al., 2017). For example, the concept of disability models is one social justice topic that is commonly used to frame the way in which individuals define, experience and address disability (Dunn & Andrews, 2015). The medical model is a prominent disability model that presents disability as a biological matter that resides exclusively within the individual. Under this model, disability is viewed as a problem that limits the way individuals can function compared to others without disabilities (Mitra, 2006). Treatment for individuals with disabilities requires that the problem within the body is fixed or medically cured. In contrast, the social model of disability frames disability as a social construction that results from social, attitudinal, or environmental barriers (Dunn, 2015; Dunn & Andrews, 2015). Under this model, disability is viewed as a restriction of participation or involvement due to a society that does not account for individual differences. The responsibility to treat or minimize disability therefore lies at the societal rather than individual level. Importantly, understanding the different representations of disability models, among other social justice topics, may allow college students to increase their awareness of and evaluate their own beliefs toward disability and diversity (Grenier, 2011).

Disability Models within Kinesiology Education

Kinesiology scholars have offered practical recommendations for integrating disability model content into professional preparation and practice (Grenier, 2011; Haegele & Hodge, 2016). For example, Grenier (2011) called for faculty within PE teacher education to shift their focus to account for the social model of disability. Additionally, in their comprehensive critique of the medical and social models, Haegele and Hodge (2016) argue that both models have unique contributions to understanding the experiences that children with disabilities have within PE. McNamara et al. (2021) also advocate for faculty to ‘decenter’ the medical model approach when teaching Adapted PE content, as primarily teaching medicalized definitions and views of disability may create biased information or impressions against people with disabilities. Despite this work, there has been little focus on examining disability model orientation among Kinesiology students, very few studies that have measured individuals’ alignment with such models among general college students (Bogart et al., 2019; Logan et al., 2018), and even fewer studies that have attempted to change individual’s alignments with disability models (Bogart et al., 2022; Logan & Bogart, 2022). However, recent evidence demonstrates that lower medical model and stronger social model beliefs predict more favorable attitudes toward people with disabilities (Bogart et al., 2019), and suggests that disability model beliefs can be intervened upon to promote change among undergraduate Psychology students (Bogart et al., 2022). The connection between disability model beliefs and attitudes toward disability among college students may highlight an additional factor in preparing future Kinesiology professionals to work with and provide appropriate physical activity service to people with disabilities. As such, further investigation

of disability model beliefs is warranted as it relates to intervention among Kinesiology students.

Mobility Beliefs

Mobility beliefs is another, relatively new construct that embraces a social justice perspective and expresses that self-directed mobility is a fundamental human right (Feldner et al., 2016; Logan & Bogart, 2022). Self-directed mobility refers to mobility that is controlled by an individual and includes walking or assisted ambulation with powered or non-powered mobility technology (Logan et al., 2018). In addition, the option for self-directed mobility, particularly for children and people with disabilities, is essential for development and overall participation in life tasks, including mobility and physical activity. As initial exploration, Logan and colleagues (2018) examined college students' views toward self-directed mobility as a fundamental human right in relation to other factors including contact, attitudes toward disability, and alignment with medical or social models of disability among 1,545 college students. Results indicated that female gender, more favorable attitudes toward disability, and stronger alignment with the social model were each predictors of views toward self-directed mobility as a fundamental human right. These results were extended by recent findings that college students' views toward self-directed mobility were positively impacted by participation in a 10-week, disability-related Honors College course, highlighting the potential for effective intervention (Logan & Bogart, 2022). Mobility beliefs research is minimal, however, with only two known studies that have examined views toward self-directed mobility (Logan et al., 2018; Logan & Bogart, 2022). Further research is needed to better understand the effects of intervention on views toward self-directed mobility as well as how they may relate to disability attitudes.

Given this evidence, the integration of social justice topics into the classroom may be an important option to explore for disability attitude intervention while also aligning with higher education initiatives. In addition, incorporating social justice into required Kinesiology courses is an optimal way to reach a large Kinesiology student base. The purpose of this quasi-experimental study was to determine the effect of a Kinesiology course with a social justice perspective on kinesiology undergraduate students' attitudes toward people with disabilities, alignment with the medical and social models of disability, and mobility beliefs. We hypothesized that participants in the intervention group would demonstrate (1) more favorable attitudes toward people with disabilities, (2) decreased alignment with the medical model of disability, (3) increased alignment with the social model of disability, and (4) more favorable views toward self-directed mobility compared to the control group, after controlling for baseline scores.

Materials and Methods

Participants

A nonrandomized, control group pre-test post-test research design was used in this study. A convenience sample was drawn from a public university in the Pacific Northwest ($n = 897$). Participants were 18 years or older and enrolled as undergraduate students. Only participants who completed both the pre-test and post-test were included in analyses. Participants ($n = 368$; mean (M) age = 21.31, standard deviation (SD) = 2.36) in the intervention group were enrolled in a 4-credit Kinesiology course titled *Motor Behavior*. See procedure for more information. Participants were a majority female (53%), white (87%), and did not identify as an individual with a disability (91%). The most common academic major reported was Kinesiology ($n=357$), with some participants majoring in Biohealth Science ($n=9$) and Psychology ($n=2$). Based on course enrollment for each section, the response rate for survey completion was 80%. Participants ($n = 529$; M age = 18.78, $SD =$

1.73) in the control group were enrolled in a 2-credit health and wellness course titled *Lifetime Fitness for Health*. See procedure for more information. Participants were a majority female (52%), white (89%), and did not identify as an individual with a disability (84%). A variety of majors were reported, with participants most frequently majoring in Computer Science (n=43), Mechanical Engineering (n=37), Business (n=31), Biology (n=27), Civil Engineering (n=23), and Kinesiology (n=22). Based on course enrollment for each section, the response rate for survey completion was 72%.

The sample was refined to address students' majors and unequal sample sizes between the two groups. First, all Kinesiology majors (n=22) in the control group and all non-Kinesiology majors (n=11) in the intervention group were removed from the dataset. This resulted in a control group sample size of n = 507 (female = 265, male = 242) and intervention group sample size of n = 357 (female = 187, male = 270). *Lifetime Fitness for Health* (control group) is a required course for all university students and is typically completed during students' first or second years of study. *Motor Behavior* (intervention group) is a required course for Kinesiology majors and is typically completed during students' third or fourth years of study. The removal of non-Kinesiology majors from the intervention group was appropriate to achieve the purpose of the study to understand the effect of a Kinesiology course on kinesiology undergraduate students' attitudes toward people with disabilities, disability models, and mobility beliefs. The *Motor Behavior* course is typically only taken by Kinesiology majors. While all Kinesiology majors must take *Motor Behavior*, other students within the College of Public Health and Human Sciences with the *Human Anatomy and Human Physiology* prerequisite may take the course. However, the *Motor Behavior* course is specifically designed for Kinesiology majors. The removal of Kinesiology majors from the control group ensured that students were not enrolled in both the intervention and control courses at the same time since data were collected in the same terms for one of the two academic years of the study period. Although unlikely to occur, enrollment in both courses at the same time was possible. Furthermore, it is important to note that all Kinesiology majors in the *Motor Behavior* course (i.e. intervention group) had already taken the *Lifetime Fitness for Health* course (i.e. control group).

Then, based on literature that suggests that females have more favorable attitudes toward people with disabilities (e.g., Hergenrather & Rhodes, 2007), the number of females and males in the control and intervention groups were matched using a random number generator (Hair et al., 2018). This resulted in a final sample of N = 714, with 357 participants and the same number of females (n = 187) and males (n = 270) in each group.

Materials

Attitudes toward people with disabilities were measured via the Attitudes Toward Disabled Persons (ATDP) scale. Scholars have commonly used the ATDP to assess people's broad attitudes toward people with disabilities (Antonak & Livneh, 1988; Bogart et al., 2019; Bogart et al., 2022; Logan et al., 2018; Logan & Bogart, 2022). We used the 30-item form A rather than form B or O due to its higher test-retest reliability ($r = .78$; Antonak & Livneh, 1988). The ATDP includes a 6-point Likert scale (I disagree very much, I disagree pretty much, I disagree a little, I agree a little, I agree pretty much, I agree very much). We used the person-first language version (Dunn & Andrews, 2015). Example statements include: "People with disabilities are often unfriendly"; "People with disabilities show as much enthusiasm as other people". Responses to items were averaged with lower scores interpreted as more favorable attitudes toward people with disabilities. The ATDP was selected for this study for multiple reasons. First, it is easy to administer, score and interpret, which is of value with large samples. In addition, the ATDP has low potential for social desirability (Palad et al., 2016) and has been used in other disability attitude research among

college students (e.g., Duchane et al., 2008). The ATDP was also chosen because the content of the intervention course did not focus on a specific aspect of disability that is the focus of non-general attitude measures of disability, such as specific disabilities (i.e., mental health, communication, etc.) or contexts such as community living or healthcare (Palad et al., 2016).

The 8-item Medical Model and 7-item Social Model subscales of Darling and Heckert's Questionnaire on Disability Identity and Opportunity were used to measure participants' beliefs about the Medical and Social Models of disability (Darling & Heckert, 2010). The items in these subscales were developed based on qualitative interviews with people with disabilities that aimed to explore different orientations toward disability. Exploratory factor analysis with varimax rotation supported the structural validity of these subscales (Darling, 2013). The Medical Model and Social Model subscales include a 5-point Likert scale (disagree strongly, disagree, neither agree nor disagree, agree, strongly agree) (Darling & Heckert, 2010). Example statements for the Medical Model subscale include: "I wish someone would find a cure for all disabilities"; "Doctors and other medical professionals know what is best for people with disabilities". Example statements for the Social Model subscale include: "Lack of accessibility and discrimination by employers are the main reasons why people with disabilities are unemployed"; "The biggest problem faced by people with disabilities is the attitudes of other people". Scores were averaged separately for the Social and Medical Model subscales. Higher scores indicate a stronger alignment with each model. The Medical Model and Social model subscales were chosen because the content of the intervention course includes the presentation of these disability models and the video-based contact component of the course was discussed in the context of these models.

Mobility beliefs were measured via a 9-item scale and includes a 5-point Likert scale (strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree). Example topics from the scale include the concept of mobility as a human right, whether research supports access to mobility for children, and mobility access through powered mobility devices. Logan and colleagues (2022) described the item development, internal consistency, and known-groups validity of the scale. This scale was chosen because the content of the intervention course includes presentation and discussion about aspects of mobility that aligns with scale items.

Procedures

The university Institutional Review Board approved all study procedures and participants provided written informed consent prior to data collection. A researcher invited students to complete a survey containing the measures described above at the beginning and end of the 10-week term. Participation was voluntary and students who chose not to participate were provided with an alternative assignment.

Motor Behavior (intervention group) met for 110 minutes, twice per week for 10 consecutive weeks. The course description reads as follows: "Underlying mechanisms and factors affecting movement function, skill acquisition, and changes in movement behavioral across the lifespan." Course topics included perspectives in motor behavior, stages of skill acquisition, locomotion and mobility, methodological considerations, development of fundamental motor skills, classification of motor skills, functional constraints, and pediatric rehabilitation. Although primarily focused on motor behavior of typically developing individuals, about 20% of the course content was infused with a social justice perspective and disability lens. For example, 12 lectures were delivered throughout the course and two lectures (locomotion and mobility; pediatric rehabilitation) were centered on the perspective that mobility is a fundamental human right. Other lectures were not necessarily focused on disability but examples of motor behavior involving children and people with disabilities were included when possible. The course content also involved five podcasts that students

listened to, completed an online discussion-post on, and discussed in class. Four out of five of the podcasts were focused on disability. Lastly, a social justice perspective and disability lens was emphasized through students viewing and discussing of a documentary titled 'Normal For Us: The Miller Twins' about a set of twins diagnosed with spinal muscular atrophy and who gained access to a motorized wheelchair as young children (distributed by Oregon Public Broadcasting and released in 2002). The documentary is 56 minutes and 45 seconds and chronicles the family's experience with mobility in the late 1980's through the 1990's. Topics include the importance of mobility, stigma, disability, and environmental access. This component of the course was considered video-based contact, as indirect contact with people with disabilities was provided through videotape (Corrigan et al., 2012). The syllabus is available upon request. Data were collected during 4 sections across the 2016-2017 and 2017-2018 academic years.

Lifetime Fitness for Health (control group) met for 50 minutes, twice per week for 10 consecutive weeks. The course description reads as follows: "This course is designed to present up-to-date and relevant health and wellness information including practical strategies to implement positive behavior change in physical activity, nutrition, and stress managements throughout college and the lifespan". Course topics included wellness/wellbeing, behavior change, goal setting, science of nutrition, physical activity promotion, cardiovascular and muscular fitness, stress management, eating patterns and physical activity environments, body composition, energy balance, and body image. A disability perspective was not directly incorporated into course content. The syllabus is available upon request. Data were collected during 2 sections across the 2016-2017 academic year.

Our justification for including a control group was to ensure as best as possible that any of the observed effects were due to students' participation in the intervention and not due to other factors or experiences associated with attending a public university. One of these factors or experiences that may influence students' views toward disability or mobility may include participation in the Lifetime Fitness for Health course because topics were broadly related to Kinesiology. It was unknown whether general exposure to Kinesiology topics covered in the Lifetime Fitness for Health course would affect views toward disability or mobility compared to a Kinesiology course that specifically addressed these topics. Therefore, we specifically included the Lifetime Fitness for Health as the control course.

Data Analysis

First, in order to determine whether the intervention and control groups differed significantly in demographics, chi square tests were conducted on age, gender, ethnicity, race, disability status, and pre-test and post-test contact with people with disabilities (dichotomized into infrequent contact defined as two to three times per month and frequent contact defined as at least once per week), given evidence that these factors may influence attitudes toward people with disabilities (Bogart et al., 2019; Chen et al., 2002; Hergenrather & Rhodes, 2007; Morin et al., 2013; Seo & Chen, 2009). Any significant demographic differences found will be controlled for in all analyses.

Second, independent samples t-tests were calculated to determine whether the intervention and control groups differed significantly in pre-test scores of the dependent variables (ATDP, medical model, social model, mobility beliefs). Any significant differences of pre-test scores will be controlled for in analyses.

Third, four one-way ANCOVAs were calculated to determine if participants in the intervention group demonstrated more favorable attitudes toward people with disability, lower medical model scores, higher social model scores, and higher mobility beliefs scores compared to participants in the control group, controlling for baseline measures. Partial eta-

squared (η_p^2) effect sizes were reported, and values of .01, .059, and .138 correspond to small, medium, and large effects, respectively (Cohen, 1992; Kirk, 1996).

Results

Participant demographics of the final sample used for analysis are displayed in Table 1.

Table 1. Participant demographics across groups

	Control (n = 357)	Intervention (n = 357)
Age		
18-20	338	149
21-25	13	190
26-30	5	14
31-35	1	1
36+	0	3
Gender		
Female	187	170
Male	187	170
Ethnicity		
Hispanic or Latino	31	39
Not Hispanic or Latino	326	318
Race		
Black	8	5
Indian	5	8
Asian	53	54
Pacific Islander	4	12
White	296	283
Other	12	10
Disability Status		
Disability	61	32
No Disability	296	325
Pre-test Contact with People with Disabilities		
Frequent	96	120
Infrequent	259	232
Post-test Contact with People with Disabilities		
Frequent	91	141
Infrequent	262	214

Note. Demographics represent participants included in the final sample used for analysis.

Based on Chi square tests, no significant demographic differences existed between the intervention and control groups for ethnicity, $\chi^2(1) = 1.0$, $p = .31$, or racial identities including Black, $\chi^2(1) = .70$, $p = .40$, Indian, $\chi^2(1) = .72$, $p = .40$, Asian, $\chi^2(1) = .02$, $p = .90$, White, $\chi^2(1) = 1.42$, $p = .23$, and Other, $\chi^2(1) = .18$, $p = .67$.

Based on Chi square tests, significant demographic differences existed between the intervention and control groups on age, $\chi^2(16) = 509.10$, $p < .001$, Pacific Islander, $\chi^2(1) = 4.12$, $p = .04$, disability status, $\chi^2(1) = 10.40$, $p = .001$, pre-test contact with people with disabilities, $\chi^2(1) = 4.14$, $p = .04$, and post-test contact with people with disabilities, $\chi^2(1) = 15.61$, $p < .001$. Age, Pacific Islander, disability status, and pre-test and post-test contact with people with disabilities were controlled for in ANCOVA analyses.

Based on independent samples t-tests, significant differences existed between intervention and control groups on all pre-test scores. ATDP: $t(712) = 6.2$, $p < .001$, 95% CI [.15, .28]. Medical model: $t(712) = 8.2$, $p < .001$, 95% CI [.22, .36]. Social model: $t(712) = 6.2$, $p = .007$, 95% CI [-.17, -.03]. Mobility beliefs: $t(712) = 6.2$, $p < .001$, 95% CI [-.22, -

.10]. Equal variance was assumed according to Levene's test of equality of error variance for all pre-test scores ($p > .05$). Pre-test scores were controlled for in ANCOVA analyses.

Hypothesis 1: ATDP

Hypothesis 1 was supported. There was a significant effect of group on ATDP scores at post-test after controlling for baseline scores ($F(1, 686) = 31.50, p < .001, \eta_p^2 = .044$). Baseline ATDP scores were also significantly related to post-test ATDP scores ($F(1, 686) = 377.1, p < .001, \eta_p^2 = .355$). These results were interpreted that the intervention group had more favorable attitudes toward people with disability than the control group at post-test. Pacific Islander ($p = .847$), disability status ($p = .813$), pre-test contact ($p = .690$) and post-test contact with people with disabilities (.142) were not significantly related to post-test ATDP scores ($p > .05$). Equal variance was assumed according to Levene's test of equality of error variance ($F(1, 692) = 3.26, p = .07$).

Hypothesis 2: Medical model

Hypothesis 2 was supported. There was a significant effect of group on medical model scores at post-test after controlling for baseline scores ($F(1, 686) = 6.99, p = .01, \eta_p^2 = .010$). Baseline medical model scores were also significantly related to post-test medical model scores ($F(1, 686) = 261.07, p < .001, \eta_p^2 = .28$). These results were interpreted that the intervention group had lower medical model scores than the control group at post-test. Pacific Islander ($p = .239$), disability status ($p = .412$), and pre-test contact with people with disabilities ($p = .840$) were not significantly related to post-test medical model scores ($p > .05$). According to results of Levene's test ($F(1, 692) = 7.20, p = .01$), the assumption of equal variance between the two groups was violated.

Hypothesis 3: Social Model

Hypothesis 3 was supported. There was a significant effect of group on social model scores at post-test after controlling for baseline scores ($F(1, 686) = 70.31, p < .001, \eta_p^2 = .093$). Baseline social model scores were also significantly related to post-test social model scores ($F(1, 686) = 161.75, p < .001, \eta_p^2 = .191$). These results were interpreted that the intervention group had higher social model scores than the control group at post-test. Pacific Islander ($p = .380$), disability status ($p = .090$), pre-test contact ($p = .684$) and post-test contact with people with disabilities ($p = .793$) were not significantly related to post-test social model scores ($p > .05$). According to results of Levene's test ($F(1, 692) = 12.78, p < .001$), the assumption of equal variance between the two groups was violated.

Hypothesis 4: Mobility Beliefs

Hypothesis 4 was supported. There was a significant effect of group on mobility beliefs at post-test after controlling for baseline scores ($F(1, 686) = 266.28, p < .001, \eta_p^2 = .28$). Baseline mobility beliefs were also significantly related to post-test mobility beliefs ($F(1, 686) = 101.77, p < .001, \eta_p^2 = .129$). These results were interpreted that the intervention group had higher mobility beliefs than the control group at post-test. Contact with people with disabilities was significantly related to post-test mobility scores ($F(1, 686) = 5.29, p = .02, \eta_p^2 = .008$). Pacific Islander ($p = .147$), disability status ($p = .479$), and pre-test contact with people with disabilities ($p = .510$) were not significantly related to post-test mobility scores ($p > .05$). Equal variance was assumed according to Levene's test of equality of error variance ($F(1, 692) = 1.29, p = .26$). See Table 2 for pre- and post-intervention mean scores and standard deviations for attitudes toward people with disabilities, medical and social model beliefs, and self-directed mobility across groups.

Table 2. Means and standard deviation (SD) for attitudes toward people with disabilities (ATDP), medical model and social model beliefs, and self-directed mobility beliefs.

Measure	Control (n = 357)		Intervention (n = 357)		p-value	Effect size
	Pre	Post	Pre	Post ^c		
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
ATDP ^a	2.84 (0.46)	2.78 (0.49)	2.63 (0.45)	2.40 (0.48)	<.001	.044
Medical model ^b	3.55 (0.45)	3.42 (0.51)	3.26 (0.50)	3.14 (0.51)	.01	.010
Social model ^b	3.64 (0.48)	3.53 (0.53)	3.74 (0.48)	3.88 (0.48)	< .001	.093
Self-directed mobility ^b	3.33 (0.40)	3.33 (0.44)	3.49 (0.41)	4.02 (0.46)	< .001	.280

Note. ^aScoring ranges from 1–6, lower scores indicate more favorable attitudes. ^bScoring ranges from 1–5, higher scores indicate stronger beliefs. ^cIntervention group post-test scores were significantly different from pre-test scores in the hypothesized direction for all dependent variables compared to the control group.

Discussion

The purpose of this research was to examine the effect of a Kinesiology course on undergraduate students' attitudes toward people with disabilities, alignment with disability models, and mobility beliefs. The results support our hypotheses that participants in the intervention group would report greater change in attitudes toward people with disabilities, decreased medical model orientation, increased social model orientation, and more favorable views toward self-directed mobility compared to participants in the control group. These findings suggest that the incorporation of social justice concepts into the classroom may be an important addition for Kinesiology student curricula. Additionally, these data are important when considering that more favorable attitudes and beliefs about disability among Kinesiology professionals may allow for increased knowledge about disability, increased preparation to provide service to diverse individuals, and in turn higher quality physical activity experiences among people with disabilities.

Attitudes toward People with Disabilities

The results of this study are consistent with other literature that suggests educational interventions may improve attitudes toward people with disabilities among college students (Hunt & Hunt, 2004; Logan & Bogart, 2022). It is important to acknowledge there were several aspects of the intervention that may have contributed to favorable attitude change toward people with disabilities. The intervention course material included lectures that centered mobility as a fundamental human right, motor behavior examples of people with disabilities, podcasts on disability that required reflection and discussion posts, and video-based contact with people with disabilities. Education and in-person contact with people with disabilities are effective ways to promote favorable attitude change towards people with disabilities (Bogart et al., 2022). The unique contribution of the current study is the use of video-based contact, which is less used in previous literature. A large research base has similarly shown that educational interventions, including those with in-person, contact-based opportunities, have elicited favorable changes in disability attitudes among college students, including those in Kinesiology fields (Bogart et al., 2022; Case et al., 2020; Shields & Taylor, 2014). It is important to recognize the unique circumstances of this study that advance this literature. Contact between college students and people with disabilities in this study was made through video recording as opposed to real-time, in-person contact. In addition, this intervention included a large group of Kinesiology students. In-person contact with people with disabilities is widely encouraged as a best practice for positive attitude change (Pettigrew & Tropp, 2006) and has demonstrated greater effects compared to video-based contact (Corrigan et al., 2012). Indeed, based on previous literature, educational opportunities for in-person contact with people with disabilities are common among Kinesiology students who have interests in or need specific preservice experiences working with disability populations (Hodge et al., 2002; Shields & Taylor, 2014). However, many

courses may not have the infrastructure to support practical, in-person learning opportunities with people with disabilities and may benefit from other effective options for attitude change. Our findings suggest that video-based contact may be an appropriate alternative for attitude change efforts when in-person contact with people with disabilities is not available or possible for all Kinesiology students. In addition, video-based contact with people with disabilities also allows for increased exposure and dissemination of material to multiple courses or larger groups. Further research may additionally support video-based contact as a beneficial alternative to other attitude change strategies that do not involve in-person contact among Kinesiology students.

Medical and Social Model Orientation

The hypotheses that participants in the intervention group would report decreased medical model orientation and increased social model orientation were supported through this study, which aligns with other evidence that college students' disability model orientation can be changed through course delivery (Bogart et al., 2022). Additionally, there were no significant changes in model beliefs among the control group. These results suggest that some aspect of the intervention course may have contributed to students' changes in disability model orientation since model beliefs did not change for the control group. Importantly, this study contributes new knowledge that participation in a course can promote favorable changes in disability model orientation among Kinesiology students. Moreover, integrating social justice topics into the classroom may therefore be a viable way to effectively expose Kinesiology students to social model perspectives of disability. In addition, these findings are of value considering previous research where the social model content alone is not sufficient for promoting positive changes in disability attitudes, but that medical model beliefs must also be challenged (Bogart et al., 2022). Kinesiology and related disciplines, such as athletic training and physical education, may typically be more-closely aligned with medical model perspectives (Grenier, 2007; McNamara et al., 2021). Therefore, given the previously mentioned favorable changes in disability attitudes of this study, the present findings may suggest that incorporating social justice content within a course that traditionally follows medical model views of disability may be an effective strategy for challenging existing beliefs. Further research is needed to better understand this mechanism of change. Lastly, while this study examined college students' orientation with two prominent disability models, it is important to note that both the social and medical models have received criticism for presenting an incomplete picture of disability (Dunn & Andrews, 2015; Haegele & Hodge, 2016). Instead, the International Classification of Disability, Functioning, and Health (ICF) model conceptualizes disability in a way that considers medical and physical characteristics in addition to personal, environmental, and social factors of disability (World Health Organization, 2001). Researchers have encouraged health professionals to use this model when promoting or prescribing physical activity for people with disabilities, as this model considers a broader definition of what may contribute to disability (Rimmer, 2006). As this model accounts for the strengths of both medical and social model perspectives, future study of the relationship between college students' alignment with the ICF model's multidimensional view of disability and attitudes is therefore of interest.

Self-Directed Mobility Beliefs

Our findings also support previous literature that documents favorable change in views toward self-directed mobility as a fundamental human right following an educational intervention (Logan & Bogart, 2022). In addition, the observed effect size among the intervention group was relatively large. The findings of this research contribute important

knowledge to the literature that integrating social justice perspectives within a university course is a viable intervention for improving views toward self-directed mobility. Additionally, it is essential to recognize that health professionals' views toward self-directed mobility may influence the way in which they provide treatment, advocate for their clients to gain access to necessary mobility technology and minimize societal barriers that individuals may face due to mobility issues (Logan et al., 2018). In turn, favorable changes in these factors for professionals may have pivotal impacts on the potential for physical activity participation among people with disabilities. The present findings highlight the potential advantages of exposing Kinesiology students and other future health professionals to social justice concepts, including self-directed mobility as a human right, in a way that positively supplements their professional training to support disability populations. Future research is needed to understand the connection between mobility beliefs and intended and actual behaviors (i.e., advocacy). One strategy to explore this relationship includes examining views toward self-directed mobility among other samples, such as physical therapists, whose primary role includes facilitating access to mobility technology for individuals with disabilities.

Strengths of this study include a relatively large sample size compared to existing disability attitude research involving Kinesiology students and the close examination of other factors that are associated with attitudes toward people with disabilities through attitude intervention. Attitudes are commonly documented as multidimensional and difficult to change (Dunn, 2015). This new knowledge highlights the importance of considering additional factors associated with disability attitudes, including social model orientation and mobility beliefs, in combination with attitudes through intervention. It is also important to acknowledge that significant attitude change existed within a required Kinesiology course. Past literature reports that the potential for attitude change is limited when people, including college students, are not voluntarily involved in activities (Case et al., 2020). Our results offer that integrating social justice issues related to disability may be a unique and creative strategy to initially target attitude change within required educational activities.

The findings from this study have important implications for the way in which Kinesiology students and pre-professionals are trained to promote and provide physical activity service to people with disabilities. Traditionally, coursework and training in Kinesiology, Physical Education, and related fields situates disability content using a medicalized approach (Grenier, 2007; McNamara et al., 2021). This may include an emphasis on understanding legal and medical definitions of disability, contraindications to exercise for people with disabilities, and using physical activity as a treatment for impairment. Based on our results, we argue that such an approach is not optimal. Training that overemphasizes a medical approach may mislead students to believe people with disabilities are defined by impairments. This may further lead to negative attitudes or biases that limit adequate professional preparation, creating barriers for people with disabilities that hinder physical activity participation and health-related benefits. Instead, this study aligns with previous recommendations for teaching about disability and highlights the value of teaching from a social justice framework (McNamara et al., 2021). Exposing students to additional perspectives to disability, particularly those that recognize disability as diversity over impairment, may elicit favorable improvements in attitudes and disability-related beliefs that ultimately improve their capacity to advocate for, prescribe, and teach physical activity to people with disabilities. Moreover, researchers have reported that many Kinesiology professionals around the world were not adequately prepared to properly support people with disabilities in their work (Hutzler et al., 2019; McGrath et al., 2019;

Rimmer et al., 2004). These claims only further support the need to include additional and diverse disability training across the discipline.

Some limitations to the present study should be addressed. Participants for this study were drawn from two separate existing courses and were pre-enrolled in the courses at the start of participant recruitment. Considering this study examined the effects of an educational intervention through a course, this study did not employ randomization to the separate groups. As such, it is possible that variation between the two experimental conditions and the two samples may limit understanding of the true intervention effect. Another limitation is the sampling procedure to remove Kinesiology majors from the control group and non-Kinesiology majors from the intervention group. Our results may not be due only to the differences in the course materials. It is possible there are systematic reasons why Kinesiology vs. non-Kinesiology majors may have different views about disability and mobility, however, pre-test scores on dependent variables were controlled for when examining post-test scores. Furthermore, the potential effect of the *Motor Behavior* course is limited to Kinesiology majors. It is unclear if and how the intervention may be generalized or replicated with students of other majors. In addition, one of the courses is typically taken by first- and second-year students, while the other course is taken by third- and fourth-year students. It is possible that students with additional life experience may have a greater openness to change their views about disability and mobility. Most participants in this sample also self-identified as White and without a disability. This issue may limit our understanding of how this intervention could influence outcomes within a more heterogeneous sample. However, significant group differences in participant demographics including age, Pacific Islander, disability status, and pre-test and post-test contact with people with disabilities were examined and controlled for in statistical analyses. In addition, both classes were required undergraduate courses with course content related to Kinesiology and movement themes. For these reasons, we believe the participants in the *Lifetime Fitness for Health* course serve as an appropriate control group for initial investigation and highlight the intervention's effect among the current sample. Future research that includes randomization, increased participant matching, and increased matching of course content between groups, except for social justice topics, could enhance understanding of how the present intervention influences attitudes toward disability, disability model orientation, and mobility beliefs as well as the ability to generalize these results beyond the current sample. Future studies that investigate the infusion of social justice topics within Kinesiology courses should prioritize the recruitment of diverse participants to continue to advance this literature.

Assumptions of equal variance between groups were also violated in the ANCOVA analyses comparing changes in medical model and social model scores between groups, which limits the interpretation that the intervention group demonstrated favorable changes compared to the control group. It has been noted, however, that analysis of variance is robust to violations of equal variance when sample sizes are similar (Howell, 2013). In addition, this study did not examine retention of changes in attitudes toward disability, alignment with disability models or mobility beliefs. However, our findings show preliminary evidence that there can be favorable changes in all the previously mentioned outcomes through an educational intervention for a large group of Kinesiology students. Importantly, this research also demonstrates the feasibility of an attitude intervention that can be used within potential situations where in-person contact is not available, whether due to online coursework, lack of resources, or unforeseen circumstances in which physical or social contact is not permitted or possible. It is also unclear whether video-based contact with people with disabilities or other aspects of the intervention course contributed to favorable changes in attitudes and beliefs. The observed changes may have been due to improved

knowledge and understanding of disability through a combination of all aspects of the intervention course and may have challenged students cognitive understanding about the nature of disability (Bogart et al., 2022). While these contributions are timely, future work should include follow-up measurement to explore how attitude change is maintained overtime, and the specific contribution of the different course components and underlying reasons for changes in attitudes and beliefs.

Our results suggest that participation in a university course broadly related to health and wellness does not change students' views on disability or mobility. An interpretation of this finding is that completing this course, in combination with the other factors of these students such as their year and major of study, experience with navigating the university experience, and access to on-campus resources and activities alone does not change views on disability or mobility. Students' views on disability and mobility favorably changed following a course that used a social justice lens to discuss these topics. An interpretation of this finding is that one or more aspects of the intervention course, in combination with other factors, led to the observed changes in attitudes. However, the precise reasons for the changes remain unknown due to the study limitations.

Perspectives

Educational interventions that include social justice topics and video-based contact with people with disabilities may be an effective strategy to promote more favorable attitudes toward disability, disability model orientation, and views toward self-directed mobility among Kinesiology students. This has valuable implications for pre-professional training and may indirectly be important for access to quality physical activity service among the disability community. Specifically, students who receive this exposure, knowledge, and intervention in their training may be more likely to provide a higher quality of service to people with disabilities they work with in their future career in physical activity and allied health fields. In addition, data for this study was collected prior to the COVID-19 pandemic but may have timely implications for remote teaching or other educational situations through which in-person contact is not included within course components (Ng, 2020). Video-based contact with people with disabilities, including educational videos, may be a valuable and convenient strategy for increasing exposure to people with disabilities and disseminating social justice topics to a variety of courses. This study provides initial insight to reaching a larger base of Kinesiology students through disability attitude interventions than is typically prioritized, which is of value for more favorable intentions, behavior, and advocacy of future physical educators and health professionals as well as potential physical activity experiences of people with disabilities. Future studies should consider how these results may expand to diverse samples of students and professionals.

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