Exploring Self-Determination Outcomes of Racially and Ethnically Marginalized Students with Disabilities in Inclusive, General Education Classrooms

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Abstract

Opportunities and experiences for all students, including students with intellectual and developmental disabilities, to build self-determination abilities and skills is critical to enable positive postsecondary outcomes (e.g., competitive and integrated employment, community access participation). However, racially and ethnically marginalized students with disabilities might experience fewer opportunities to build self-determination due to systemic issues (e.g., absence of policies emphasizing equity and racial justice, lack of understanding of students' social and cultural capital). The present study is an initial, exploratory analysis to determine if students with disabilities from racially and ethnically marginalized backgrounds reported different self-determination outcomes as they engaged in the Self-Determined Learning Model of Instruction (SDLMI) in inclusive, general education classrooms. Findings suggested African American/Black students with and without disabilities as well as Hispanic/Latinx students without disabilities scored highest in self-determination at the beginning of the academic year (baseline) and that including disability status crossed with race/ethnicity as a predictor of self-determination baseline improved understanding of the data patterns. Implications for systemic changes to enable equitable education across research and practice are discussed.

Keywords: self-determination, equitable education, special education, racially and ethnically marginalized youth

Exploring Self-Determination Outcomes of Racially and Ethnically Marginalized Students with Disabilities in Inclusive, General Education Classrooms

Self-determination has received significant attention in the intellectual and developmental disability (IDD) field. However, in educational contexts, self-determination instruction has frequently been conceptualized as a specialized, targeted intervention most relevant to developing goals for Individualized Education Programs (IEPs) and during planning for the transition from school to the adult world. While setting goals for the IEP and planning for transition are critical times for young people to learn, grow, and be supported in using their self-determination abilities and skills, instruction to build self-determination has relevance across multiple educational and community contexts for all students, inclusive of students with and without disabilities (Raley et al., 2018; Shogren & Ward, 2018). Creating opportunities for all students to build self-determination abilities in inclusive settings has the potential to enable greater goal attainment for all students, including students with IDD. Further, it may create new opportunities for generalization of these skills across the academic, transition, social/emotional, and community outcome domains (Shogren et al., 2016).

For these reasons, we have initiated a line of work to support general and special education teachers in inclusive classrooms to utilize the Self-Determined Learning Model of Instruction (SDLMI; Shogren et al., 2018). This work addresses the need for (a) greater access to the general education curriculum for racially and ethnically marginalized students with disabilities, particularly students with IDD, given the association between self-determination and access to the general education curriculum (Raley et al., 2018; Shogren et al., 2012) and (b) students without disabilities to develop self-determination, given the linkage of self-determination skills, including goal setting, problem solving, decision making, and self-

regulation with academic outcomes, with achievement and engagement (Raley, Shogren, Rifenbark, Thomas, et al., 2020; Shogren, Hicks, et al., 2020). Additionally, our work has focused on acknowledging that students with disabilities from racially and ethnically marginalized communities often experience a misalignment of their strengths and self-determination instruction as it is implemented in school settings (Shogren, 2012; Trainor, 2005). For example, a lack of culturally responsive self-determination instruction might be a contributing factor to recent data demonstrating African American/Black students with disabilities were more likely to drop out of school (20% versus 16%) and less likely to graduate with a high school diploma (66% versus 73%) compared to all students with disabilities from other racial and ethnic backgrounds (U.S. Department of Education, 2020). Furthermore, African American/Black students and families' social and cultural capital is often depressed during the transition process, problematizing self-determination experiences for these students (Banks, 2014; Scott et al., in press).

Researchers have found that these inequitable opportunities likely influence self-determination outcomes. For example, Shogren and colleagues (2018) found in a sample of over 4,000 youth with and without disabilities that White/European American students without disabilities consistently scored higher on self-determination assessments. African American/Black and Hispanic/Latinx students as well as students from other racially and ethnically marginalized groups (Native American or Alaskan Native, Asian American, and Native Hawaiian or Pacific Islander) scored lower than White/European American students with and without disabilities. These disparities were further compounded when students reporting having an intellectual disability (Shogren, Shaw, et al., 2018b). However, other analyses using large, national datasets, have also identified that students from racially and ethnically

marginalized backgrounds report strengths in specific domains associated with self-determination. For example, researchers found that African American/Black students with cognitive disabilities, including autism spectrum disorder (ASD), multiple disabilities, and deaf-blindness, scored significantly higher than White/European American and Hispanic/Latinx youth in their self-reported levels of autonomy, one component of self-determination (Shogren et al., 2014). These findings highlight that more work is needed to examine the impact of self-determination interventions on outcomes, considering student characteristics and experiences, particularly in inclusive general education settings.

This paper undertook an initial, exploratory analysis of self-determination outcomes during the first year of a cluster-randomized controlled trial (C-RCT) to determine if students with disabilities from racially and ethnically marginalized backgrounds reported different self-determination outcomes as they engaged in the SDLMI in inclusive, general education classrooms. We must acknowledge, however, that our analyses were limited by small sample sizes in specific racial and ethnic and disability groups. For example, the sample of students with IDD learning in inclusive general education contexts was severely limited. As such, more work is needed that specifically targets minoritized populations that are often underrepresented or collapsed with other groups in research. Despite this limitation, we hope this work can prompt greater attention to the importance of targeting these issues, while providing preliminary information on potential impacts of self-determination instruction for racially and ethnically marginalized students. To this end, we explored the following research questions:

1. To what degree does student race/ethnicity when crossed with disability status predict baseline levels of self-determination?
2. To what degree does student race/ethnicity when crossed with disability status predict

levels of self-determination outcomes after one semester of SDLMI intervention (2a) and after a full academic year of SDLMI intervention (2b)?

Method

Overall Study Design

Data for this secondary analysis comes from over 1,000 students across six high schools participating in the first year (2018-2019) of a three-year C-RCT, focused on testing the added value of intensifying supports for teachers delivering SDLMI instruction in inclusive general education classrooms on a range of outcomes, including student self-reported self-determination. The first year targeted ninth grade, inclusive general education English Language Arts (ELA) and science classrooms, and included six schools in the Mid-Atlantic region of the United States. Schools were randomized to one of two teacher implementation support conditions (i.e., online supports only vs. online supports + in-person coaching).

Participants and Setting

To be included in the present analysis, demographic (i.e., race/ethnicity and disability status) and self-determination data had to be available for a given student. This selection criteria resulted in a subset of 936 students (total sample = 1,002) from six U.S. high schools from the same Mid Atlantic state. Table 1 presents demographic data on this subset gathered from administrative records with a small amount of missing data (<2%) backfilled from a self-report form. Of the cases excluded (n = 68, 6.5% of the total sample), most were discarded due to the absence of self-determination data (<5.5% of the total sample). The total sample was split between students who identified as male (n = 494, 52.9%) and female (n = 440, 47.1%). Most participants were in their first year of high school, consistent with the focus on ninth grade classrooms (n = 903, 96.7% of the total sample), but a small fraction of students in upper grades

were enrolled in the ninth grade classes. With respect to race/ethnicity, the majority of the sample identified as White/European American (*n* = 413, 44.2%), African American/Black (*n* = 371, 39.7%), or Hispanic/Latinx (*n* = 85, 9.1%), although other races and ethnicities were represented in the sample, including students who were Native American or Alaskan Native, Asian American, and Native Hawaiian or Pacific Islander and reported being of two or more races. Approximately 20% of the students had an IEP and identified disability. See Table 1 for a breakdown of racial and ethnic groups by disability status. Out of the six schools included in the first year of the C-RCT, three schools were in rural regions, two schools were in urban areas, and one school was in a suburban area. The highest percentage of students from diverse racial and ethnic backgrounds across the six schools was 74.4%, whereas the lowest representation of students from diverse racial and ethnic backgrounds was 12.5%.

Implementing teachers included 12 general and five special educators who collectively taught 20 ninth grade English Language Arts (ELA) and 16 ninth grade science classes. Most teachers identified as female (*n* = 15, 88.2%) and two (11.8%) identified as male. Teachers identified as White/European American (*n* = 15, 88.2%), African American/Black (*n* = 1, 5.9%), and Hispanic/Latinx (*n* = 1, 5.9%). All general education implementers were certified in the subject areas they taught (i.e., ELA or science), and special education implementers were certified to provide special education supports. Regarding collaboration, two general education teachers (11.8%) reported that they did not collaborate at all with other teachers. Other teacher participants reported collaborating in multiple ways across general and special education, including co-assessing student performance and progress (*n* = 11, 58.8%), co-planning lessons (*n* = 9, 52.9%), co-teaching some class sessions (*n* = 9, 52.9%), and co-teaching all classes (*n* = 6, 35.3%). Across the six high schools, class sizes ranged from 13 to 29 students.

Procedures

All teacher participants attended a standardized, two-day SDLMI in-person training in the summer of 2018. Implementers followed specific protocols for SDLMI whole-class implementation (Raley et al., 2018; Shogren et al., 2019). Specifically, implementers were trained to provide two weekly SDLMI mini-lessons (i.e., 15-minute instructional sessions) as part of class instruction. General and special educators were co-trained to implement the SDLMI as a team. During the summer training, teachers were encouraged by the SDLMI expert trainers to integrate students' preferences, values, strengths, and beliefs into their implementation, consistent with SDLMI protocols. Because the SDLMI is intended to be an individualized process, SDLMI trainers provided implementers with frequent opportunities to reflect on their current practices and embed modifications to their implementation based on their students' support needs and cultural backgrounds.

Teachers reported positive changes in their knowledge, skills, and usefulness of self-determination as a result of the summer professional development training (Bojanek et al., in press). During the school year, teacher implementers followed structured SDLMI mini-lessons (e.g., Student Question guides) to support students in cycling through the three phases of the SDLMI at least twice, once per semester. So long as they passed fidelity checks by trained external raters, implementers were empowered by trainers to modify the SDLMI mini-lesson materials to align with student support needs. All implementers demonstrated consistent overall fidelity throughout the first year (Shogren et al., in press).

C-RCT Conditions

Schools (n = 6) were randomized to one of two conditions (online supports only vs. online supports + coaching). In the first condition (online supports only), implementation

support was fully provided to implementers via online modules disseminated every two weeks via email. These modules provided implementers with instructional strategies, video examples, and other digital resources. In the second trial condition (online supports + coaching), in addition to accessing the modules, implementers also received monthly in-person coaching focused on professional development and improvement goals related to implementing SDLMI. All coaches completed a standardized two-day training during Summer 2018 to implement the SDLMI Coaching Model (Hagiwara et al., 2020). An area of emphasis during the SDLMI coach training was how to support teachers in proactively designing and modifying their SDLMI implementation to address the needs of their students with disabilities as well as from diverse racial and ethnic backgrounds.

Outcome Measure Self-Determination Inventory: Student Report

The Self-Determination Inventory: Student Report (SDI:SR; Shogren & Wehmeyer, 2017) is a standardized, self-report measure of self-determination validated with adolescents aged 13-22 with and without disabilities. In the validation study, data was collected with over 4,000 adolescents with and without disabilities, including youth from racially and ethnically marginalized backgrounds with a variety of disability labels, including intellectual disability (Shogren, Little, et al., 2020). Subsequent research (Shogren, Shaw, et al., 2018b) found that the SDI:SR scores varied in expected ways based on student personal characteristics, including disability label and race/ethnicity. The SDI:SR is aligned with Causal Agency Theory, which defines the essential characteristics of self-determination to include volitional action, agentic action, and action-control beliefs. The instrument has 21 slider-scaled items (computer scored to range from 0-99): six items for volitional action, six items for agentic action, and nine items for action-control beliefs. The SDI:SR is administered online, enabling precision in scoring and

accessibility features (e.g., audio playback, in-text definitions). Shogren and colleagues (2018) found satisfactory internal consistency and unidimensional internal structure (with respect to factor analysis). Subsequent work showed that a single general self-determination factor fits the data better than a three-factor structure (Raley, Shogren, Rifenbark, Anderson, et al., 2020). Consistent with previous research, we calculated an overall SDI:SR score for students who completed at least 85% of the items on the measurement instrument for secondary analysis purposes by averaging across items to derive a total score. In this C-RCT, students completed the SDI:SR at the beginning (September), middle (December or January), and end (May or June) of the academic year. To assess the internal consistency of items scores, we calculated the omega total (ω_{Total}) with the current sample. At $\omega_{Total} = .916$, this suggests high internal consistency in the present sample.

Analysis Plan

Because crossing racial and ethnic groups and specific disability labels (e.g., intellectual disability; see Table 1) led to substantial reductions in cell sample size, we instead chose to create groups by crossing students' race/ethnicity (i.e., African American/Black, Hispanic/Latinx, Asian American, Hawaiian Native or Pacific Islander, White/European American, Two or more races) with disability status (i.e., whether students had an IEP or not). Even this choice led to some small cell sample sizes (e.g., only one Native American/Alaska Native student had an IEP) but by using a Bayesian approach we were able to retain all race/ethnicity groups crossed with disability status in analyses, although as discussed in the Limitations, our ability to robustly discuss the smaller groups was limited and necessitates further research.

To address Research Question 1 (*To what degree does student race/ethnicity when*

crossed with disability status predict baseline levels of self-determination?) and Research Question 2 *(To what degree does student race/ethnicity when crossed with disability status predict levels of self-determination outcomes after one semester of SDLMI intervention and after a full academic year of SDLMI intervention?*), we implemented Bayesian multilevel modeling (Gelman & Hill, 2006) to evaluate whether including race/ethnicity when crossed with disability status in a model enhances predictive power. To implement Bayesian multilevel modeling, we re-scaled the original SDI:SR metric (0,99) to be in the range (0,1) by dividing scores by 99 to perform Beta regression analysis, a framework which is suitable for analyzing bounded slider-scale data (Ferrari & Cribari-Neto, 2004). Bayesian methods are well suited for overcoming the challenge of studying very subtle effects as the numbers of students represented in each group shrinks when crossing race/ethnicity with disability status. Particularly, Bayesian multilevel modeling addresses this hurdle through the route of adaptive priors (defined as plausible size ranges for a class of effects learned from data). Adaptive priors allow models to moderate effect sizes when random fluctuations drive small-sample data to suggest absurd sizes for an effect. Consequently, Bayesian multilevel modeling enabled us to uncover expected levels of self-determination across all the race/ethnicity groups crossed by disability status, regardless of cell size. McElreath (2020) documents that Bayesian multilevel modeling with adaptive priors can be an effective solution to deriving meaningful effect sizes from small samples.

To implement Bayesian multilevel modeling, we used the Markov Chain Monte Carlo (MCMC) procedure in SAS 9.4 (SAS Institute Inc., 2017). Because of their high stability, MCMC algorithms recover complex models otherwise inaccessible with reduced sample sizes (Bolstad, 2010). Our strategic use of diffuse priors and adaptive priors also meant that our fully Bayes estimates coincided with traditional maximum likelihood and empirical estimates.

Although there was some missing SDI:SR data (see Table 2 for details), Bayesian analysis also offers a modeling-based solution to address this problem. In this approach, missing data are treated as unknown parameters and estimated accordingly. The benefit of this approach is that no student was discarded from this analysis because of partially incomplete longitudinal data. Instead, Bayesian analysis maximized information by retaining every student that satisfied inclusion criteria while adjusting inferences to reflect uncertainty due to missing SDI:SR data. General details about computation (e.g., priors) are available in supplemental materials.

In total, we compared the fit of four models: (M_0) an empty model with no predictors; (M_1) a model with only school (i.e., the school each student attended) as a predictor; (M_2) a model with only student personal characteristics (i.e., disability status, race/ethnicity) as a predictor—and; (M_3) a model with both school and student personal characteristics as predictors. To evaluate the fit of each model, we used the *Deviance Information Criterion* (Ando, 2007). In DIC analysis, a DIC value is generated for each model to quantify fit. The model with smallest DIC has best fit (defined as optimally balanced with respect to predictive power and parsimony). In addition to DIC analysis, we took the extra step of evaluating whether simulated data generated by the best-fitting model were consistent with observed data (i.e., a posterior predictive check). In a posterior predictive check, a model is consistent with sample data if such data are shown to likely be generated by the model during simulation. After completing a posterior predictive check, we computed a global effect size—in this case, the pseudo-R^2 (reduction in unexplained variance)—to summarize practical significance (Hoffman, 2015). We accepted the convention that a pseudo-R^2 between .2 and .15 is small; between .15 and .35, moderate; and greater than .35, large (Ferguson, 2009). Despite these steps, we acknowledge that a causal interpretation of the best-fitting model would be very premature based on only this

exploratory study as ongoing research is needed with larger sample sizes, allowing deeper examination including the disaggregation of results by disability labels (e.g., intellectual disability, learning disability) and diverse racial and ethnic backgrounds.

Results

To contextualize the analyses, we first provide an overview of the descriptive findings related to self-determination outcomes. Table 3 describes self-determination data for the racial/ethnic groups crossed with disability status across the three time points. This summary information indicates visually detectable, yet small, differences in the median and variability of self-determination outcomes across the three time points (baseline, after one semester of SDLMI intervention, and after an academic year of SDLMI intervention). At the beginning of the year (baseline), students in the African American/Black, Hispanic/Latinx, and Asian American no disability groups appeared to have slightly higher self-determination levels than White/European American students in the no disability group. Slightly lower levels were found for students in the Native American or Alaskan Native, Native Hawaiian or Pacific Islander, and Two or more Races Group, although the extremely small sample sizes must be considered in interpreting findings for these groups. African American/Black, Native American or Alaskan Native, Asian American, and Hispanic/Latinx students with disabilities also appeared to have slightly higher levels than students with disabilities in the White/European American group. After one semester of SDLMI intervention, the students in the no disability African American/Black and Hispanic/Latinx groups appeared to decrease slightly towards self-determination levels comparable to baseline levels for students in the White/European American group except the Asian American group. However, after a full academic year, all groups without disabilities appeared to experience a comparable upward shift in self-determination. Across students with

disabilities, this decrease at the mid-time point was detectable in White/European American as well as African American/Black youth. Additionally, there is also greater variability in the White/European American youth sample.

Research Question 1: Predicting Baseline Self-Determination

Table 4 presents the results of DIC analysis for each measurement occasion, including baseline data. Despite penalties for too much complexity, DIC analysis still identified the full model (M_3) as best fitting, suggesting that including both school and student race/ethnicity when crossed with disability status best predicted outcomes. It is important to note, however, that although M_3 (full model) had the best fit in this set of models, the modest improvement of fit between M_3 and M_1 (only school predictor), demonstrated that the extra predictive power gained by student race/ethnicity when crossed with disability status was subtle. In addition to best fit, the posterior predictive check results verified that M_3 (full model) was consistent with the observed data and, hence, a viable predictive model. To get at practical significance, we next calculated the pseudo-R^2 to be 2.1%, which indicates that M_3 reduces 2.1% of the unpredicted variance in baseline levels. As such, inspection of the estimated adaptive prior for the student race/ethnicity when crossed with disability status groups shows a 95% probability that the mean for any given group will not be far away from the overall grand mean for everyone (i.e., it will be less than .329 standard deviation units). Estimate of these small fluctuations across all student race/ethnicity when crossed with disability status groups implied by the model are shown in Figure 1. The wide bands in the caterpillar plot show the modeling uncertainty induced by reduced sample sizes; however, there are statistically detectable differences between certain groups (i.e., White/European Americans vs. Black/African Americans; White/European Americans vs. Hispanic/Latinx youth). The practical implications of these results will be further

contextualized in the Discussion.

Research Question 2a: Predicting Self-Determination After One Semester

Table 4 presents the results of DIC analysis after students engaged in the SDLMI intervention for one semester. After only one semester of intervention, DIC analysis indicated that M_1 (school effects only) superseded M_3 (full model) as the best fitting model. This means that adding student race/ethnicity when crossed with disability status to the model did not improve fit at this measurement occasion. The posterior predictive check verifies that M_1 is consistent with the data and its pseudo-R^2 of 2% matches the performance of M_4 at baseline. Thus, while at baseline, including student race/ethnicity when crossed with disability status groups improves fit, after intervention for one semester, student race/ethnicity when crossed with disability status does not improve fit, and the best fitting model is now the model with school effects only. With respect to group differences, these results suggest that although the school predictor continued to increase the predictive power of the model one semester after baseline, student race/ethnicity with crossed by disability status no longer did so.

Research Question 2b: Predicting Baseline Self-Determination After One School Year

Table 4 also shows the findings that, after a full academic year of intervention, the data favors M_0 (empty model) over the other models. This result indicates that neither school, disability status, nor race/ethnicity increased predictive power after one year of the SDLMI. In addition, M_3 now has a pseudo-R^2 < 1%, which means these predict less than 1% of variance in outcome levels in the total sample. With respect to group differences, these results suggest that the pattern of self-determination outcomes across schools and student race/ethnicity when crossed with disability status was so similar after baseline that neither of these predictors increased the predictive power of the model after one year of SDLMI implementation.

Overall Findings

To summarize overall results, the change in fit of the model when including student race/ethnicity and disability status had a minor impact over time. Although there was more than an 80% probability the groups created by crossing student race/ethnicity with disability status differed at baseline, the probability of any group difference reduced to almost a 50/50 toss-up after students engaged in the SDLMI for only one academic semester. In other words, whereas there were statistically detectable differences between groups at the beginning of the academic year, these differences disappeared by the end of the academic year when the SDLMI was implemented.

Discussion

The data for this study originated from the first year of a larger C-RCT of the SDLMI in inclusive general education classrooms, and it is one of the first studies to examine self-determination outcomes of students with disabilities in the context of ninth grade general education classes. The purpose of the current analysis was to explore the degree to which student race/ethnicity when crossed with disability status predicted baseline levels of self-determination as well as self-determination outcomes after one semester and full academic year of intervention. The hope was to enhance understanding of self-determination across racially and ethnically marginalized students with and without disabilities as well as the patterns of change in self-determination during SDLMI implementation by general and special educators in inclusive settings across multiple schools. Although the limitations described in the following section must be considered in interpreting the findings, we generally observed that African American/Black students with and without disabilities, as well as Hispanic/Latinx students without disabilities, tended to score highest in self-determination at baseline. Further, including

student race/ethnicity crossed with disability status as a predictor of self-determination at baseline slightly improved the predictive power of the model. This corresponds with other research in the disability field, suggesting strengths in self-determination in racially and ethnically marginalized youth at the start of high school (Shogren et al., 2014). However, after only one semester (and continuing through the end of the academic year) of SDLMI implementation, including race/ethnicity crossed with disability status no longer improved the predictive power of the model of self-determination levels. As shown in Figure 1, after an academic year of SDLMI implementation, all groups showed similar self-determination outcomes, there was a drop after one semester across all students, which was more pronounced in youth from racially and ethnically marginalized backgrounds and disability groups. In previous research related to this C-RCT, which did not account for race/ethnicity, it has been suggested that this finding may be the result of students recalibrating their understanding of their self-determination over the academic year (Raley, Shogren, Rifenbark, Lane, et al., 2020). However, the more pronounced observed effects in students from racially and ethnically marginalized backgrounds, as well as in youth with disabilities and the lack of ongoing prediction of differences by race/ethnicity crossed with disability status suggests the need to (a) further consider how to build on strengths in racially and ethnically marginalized youth and (b) more systematically consider the integration of and supports for teachers to engage in culturally responsive teaching practices inclusive of racial/ethnic and disability identities within SDLMI implementation to advance research and practice. Specific directions for research and practice will be described after limitations of the present analysis.

Limitations

Several limitations should be considered when interpreting the results of the current

study. First, we only examined data from the first year of a three-year C-RCT, and ongoing research is needed over time and with larger groups, particularly groups representative of specific disability labels and varying race/ethnicities. Further, as noted in the introduction, given the limited number of students from racially and ethnically marginalized backgrounds with intellectual and other developmental disabilities included in general education classrooms, it is highly challenging to examine outcomes specific to this population. At this point, those who were included in our sample show similar response patterns as the overall sample, a finding which invites further inquiry. This study can thus inform ongoing, needed efforts to make systematic reforms to promote inclusive opportunities for students with IDD so that they can access opportunities for inclusive self-determination instruction, enabling evaluation in ongoing research. In the present study, even when only looking at disability status crossed with race/ethnicity, some racial/ethnic groups had less than five participants (see Table 1). This reflects the low numbers of students with more extensive support needs served in inclusive, general education classrooms. With Bayesian multilevel modeling, we pooled information across race/ethnicity and disability status, creating groups of varied sizes to maximize the available information and increase power to make more useful predictions. However, these small sample sizes indicate these results must be considered exploratory and replicated in future research as we could not disaggregate by disability label even with Bayesian approaches. Further, all conclusions about students who are Native American or Alaskan Native, Asian American, Native Hawaiian or Pacific Islander, or Two or More Races must be considered tentative and preliminary. We also could not explore other personal factors such as gender or language, or school or community factors.

Additionally, we only examined predictive models rather than causal mechanisms (e.g.,

did the SDLMI cause change or differences in outcomes?). Future causal research is needed, although this predictive analysis can inform this work, particularly informing critical socio-demographic variables to consider in the analysis. Finally, there were some missing data across measurement occasions (see Table 2). With Bayesian multilevel modeling, we treated missing data as parameters and estimated them; however, future replication studies with larger sample sizes could move this analysis into latent space to gain more resources to deal with the missing data issues as well as potential measurement error.

Implications for Future Research

The findings from our current study have several implications for future research. First, based on the small number of students from racially and ethnically marginalized backgrounds with IDD in our study, future intervention research on this topic should specifically target this group to better represent the diversity present in society as well as to better understand how self-determination interventions, like the SDLMI, impact outcomes in this population. A necessary part of such efforts will be addressing the limited access to instruction in inclusive, general education classrooms available to this population (Kurth et al., 2014). We are encouraged that for students with disabilities, including a small number of students with IDD, some gains in self-determination were noted, confirming research that has suggested self-determination interventions have the potential to improve academic, social/emotional, and postschool outcomes for youth with IDD (Burke et al., 2020). Thus, future researchers, in the context of the current C-RCT, should continue exploring the effects of the SDLMI on outcomes with a specific focus on the impact on students from diverse disability and racial and ethnic backgrounds.

Second, although the SDLMI and associated training used to prepare participating teachers encouraged and created space and time for teachers to integrate students' preferences,

values, strengths, and beliefs into implementation, we did not assess teachers' knowledge of culturally responsive practices and ability to identify and incorporate students' cultural identities into SDLMI implementation before and after the training (Bojanek et al., in press). Therefore, we are not certain if implementers were able to integrate an understanding of cultural factors into self-determination instruction. This highlights the need for research on teachers' abilities and the supports needed to incorporate evidence-based culturally responsive practices in SDLMI instruction. Researchers continue to call for investigations of teachers' culturally responsive teaching, cultural beliefs, and patterns of how their teachings and beliefs are reflected in student achievement (Brown et al., 2019). While some intervention researchers who promote self-determination have noted a need for further research in inclusive education settings with culturally diverse students with IDD (Raley, Burke, et al., 2020), we extend a call to examine the implementation of culturally responsive practices within self-determination interventions to address issues related to race, ethnicity, and disability identities. In doing so, a focus must be on strengths racially and ethnically marginalized youth brings to self-determination instruction. The lack of focus on student strengths, particularly the strengths of students from diverse racial and ethnic backgrounds has led to justifiable criticism (Trainor, 2008; Trainor et al., 2020), and further perpetuates racism and ableism in educational systems (Scott et al., in press). Additionally, the majority of implementers in the first year of the C-RCT identified as White/European American (n = 15, 88.2%), and future analyses should explore student self-determination outcomes when the SDLMI is implemented by educators who share similar racial/ethnic and cultural identities given growing evidence demonstrating this inequity contributes to disparities in student outcomes (Grissom et al., 2015; Kozleski et al., 2014).

Fourth, we are somewhat concerned that for students from racially and ethnically

marginalized backgrounds with and without disabilities, self-determination levels generally dropped following baseline. While, as noted in the limitations, a different sample may produce different baseline scores or scores after the intervention, particularly given the small sample size in some groups, we want to acknowledge the importance of exploring the influence of culturally-related instructional practices, including teachers' cultural beliefs and culturally responsive teaching practices to support students' cultural needs in the context of self-determination instruction. It is possible that these decreases, particularly after one semester of SDLMI instruction, reflected a struggle to use culturally responsive teaching practices during self-determination instruction, although future research is needed. School-level factors, including policies and practices that perpetuate systemic racism and ableism, must be considered. Future research should also consider the role of coaching in enabling teachers to support students with and without disabilities from racially and ethnically marginalized backgrounds in their classrooms. From an implementation science perspective, teacher coaching could potentially provide an opportunity for implementers to receive more intensive support to use culturally responsive teaching practices through the early stages of SDLMI implementation until the intervention is successfully embedded in typical practice with fidelity (Fixsen et al., 2010).

Lastly, future researchers must leverage the social and cultural capital of racially and ethnically marginalized youth at the start of their high school education with respect to self-determination. Supporting teachers to interpret and leverage this capital may be a key mechanism for improving self-determination outcomes. Previous literature has identified teacher racial and cultural bias during the transition process that can undermine recognizing social and cultural capital in students from racially and ethnically marginalized backgrounds (Banks, 2014), including Black students with IDD (Scott et al., in press). Shedding light on the social

and cultural competencies of racially and ethnically diverse students who have disabilities, including IDD, and teachers' efficacies in leveraging these competencies should be an important focus of future self-determination research, including ongoing work in the three-year C-RCT of the SDLMI.

Implication for Practice and Inclusion

As the focus of promoting self-determination within inclusive education settings grows, our preliminary, exploratory findings provide implications for the inclusion of students with disabilities generally and particularly for students with IDD in such instruction. First, as noted throughout this paper and highlighted by the limited sample of students with IDD in inclusive settings targeted in this C-RCT, a critical and necessary first step is continuing to dismantle the systems that perpetuate the disparate access to inclusive opportunities for students with IDD. Second, when training general and special education teacher implementers, teachers collectively reported that their knowledge, skills, and perceived usefulness of SDLMI improved as a result of professional development (Bojanek et al., in press). The result is promising, as student-directed instruction to increase self-determination is a central feature of the SDLMI; however, this is not also a focus of teacher preparation in general or special education. Relatedly, continuing to integrate culturally responsive resources in future iterations of SDLMI training has the potential to further enable equitable and inclusive opportunities for all students so long as such opportunities leverage the social and cultural capital of racially and ethnically marginalized students and their families. Self-determination interventions often fail to focus on directly leveraging strengths present in minorized communities, integrating culturally responsive practices, and challenging the racist and ableist systems that limit culturally sustaining opportunities and experiences for students (Scott et al., in press). More attention needs to be

directed to this area. School-related contextual factors and policies that perpetuate segregation and lack emphasis on culturally sustaining practices must be addressed to address systemic inequalities. Third, thoughtful consideration of valuing existing student strengths is critical, especially as we saw that students from diverse racial and ethnic backgrounds tended to score higher in self-determination at baseline than White/European American students. The finding that initial self-determination scores were higher for these groups highlights the importance of implementing interventions that sustain rather than diminish these strengths as students navigate through high school.

Finally, our preliminary results support the implementation of practices to advance the infusion of self-determination throughout inclusive school contexts. Our early results indicate that the majority of students showed improvements in self-determination outcomes by the end of the first year of SDLMI intervention (Raley, Shogren, Rifenbark, Lane, et al., 2020). Thus, despite limitations that must be considered, we are encouraged by implications of the early results for inclusive and equitable self-determination intervention for diverse students. However, there is a critical need to create more inclusive opportunities for students with IDD and to leverage the strengths of students from diverse racial and ethnic backgrounds in self-determination instruction. These finding provide preliminary direction for such efforts as little is currently known about the outcomes of students with disabilities from diverse racial and ethnic backgrounds when participating in whole-class self-determination instruction in inclusive, general education classrooms.

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Table 1

Student Demographics

	Overall		Disability Status			
			No		Yes	
	N	(%)	N	(%)	N	(%)
Race/Ethnicity						
African American/Black	371	(39.7)	284	(37.4)	87	(50.0)
Native American or Alaska Native	5	(.5)	4	(.5)	1	(.6)
Asian American	29	(3.1)	25	(3.3)	4	(2.3)
Hispanic/Latinx	85	(9.1)	73	(9.6)	12	(6.9)
Native Hawaiian or Pacific Islander	3	(.3)	3	(.4)	0	(0)
Two or more races	28	(3.0)	20	(2.6)	8	(4.6)
White/European American	413	(44.2)	351	(46.2)	62	(35.6)
Primary Disability Classification						
Autism Spectrum Disorder	12	(1.3)	0	(0)	12	(6.9)
Emotional or Behavioral Disturbance	6	(.6)	0	(0)	6	(3.4)
Hearing Loss or Deafness	1	(.1)	0	(0)	1	(.6)
Intellectual Disability	5	(.5)	0	(0)	5	(2.9)
Learning Disability	102	(10.9)	0	(0)	102	(58.6)
Other Health Impairments	40	(4.3)	0	(0)	40	(23.0)
Physical Disability	2	(.2)	0	(0)	2	(1.1)
Speech/Language Disability	5	(.5)	0	(0)	5	(2.9)
Traumatic Brain Injury (TBI)	1	(.1)	0	(0)	1	(.6)
No Disability	760	(81.4)	760	(100.0)	0	(0)
English Language Leaner (ELL)						
No	903	(96.7)	734	(96.6)	169	(97.1)
Yes	25	(2.7)	20	(2.6)	5	(2.9)
Missing	6	(.6)	6	(.8)	0	(0)
Free Reduced Lunch						
No	464	(49.7)	393	(51.7)	71	(40.8)
Yes	435	(46.6)	335	(44.1)	100	(57.5)
Missing	35	(3.7)	32	(4.2)	3	(1.7)
Grade						
9th Grade	903	(96.7)	733	(96.4)	170	(97.7)
10th Grade	18	(1.9)	15	(2.0)	3	(1.7)
11th Grade	3	(.3)	3	(.4)	0	(0)
12th Grade	1	(.1)	0	(0)	1	(.6)
Missing	9	(1.0)	9	(1.2)	0	(0)
Sex						
Female	440	(47.1)	373	(49.1)	67	(38.5)
Male	494	(52.9)	387	(50.9)	107	(61.5)
Total						
N	934		760		174	

Note. Total of percentages for each category may not be 100% due to rounding.

Table 2

Patterns of Missing Data

	Patterns				
#	Fall	Winter	Spring	*n*	%
1	X	X	X	470	(50.3)
2	X	X	.	155	(16.6)
3	X	.	X	54	(5.7)
4	X	.	.	123	(13.2)
5	.	X	X	73	(7.8)
6	.	X	.	36	(3.9)
7	.	.	X	23	(2.5)
Totals:	132 (14.1)	200 (21.3)	314 (33.5)		

Note. X = Not Missing; . = Missing; Total of percentages for each category may not be 100% due to rounding. Line 1 states that that 470 students had no missing data across measurement occasions. Bayesian missing data analysis was implemented throughout analyses to account for the inferential uncertainty caused by missing self-determination data.

Table 3

Self-Determination Levels by Race/Ethnicity

Students without Disabilities

	Self-Determination (SDI:SR)		
	Fall M (SD)	Winter M (SD)	Spring M (SD)
African American/Black	0.822 (0.123)	0.788 (0.152)	0.814 (0.142)
N=305	240	213	168
Native American or Alaska Native	0.735 (0.118)	0.732 (0.066)	0.772 (0.066)
N=4	3	3	2
Asian American	0.823 (0.117)	0.798 (0.16)	0.783 (0.151)
N=26	21	16	15
Hispanic/Latinx	0.808 (0.146)	0.768 (0.17)	0.78 (0.201)
N=80	58	56	50
Native Hawaiian or Pacific Islander	0.643 (0.382)	0.799 (0.168)	0.867 (0.119)
N=3	3	2	2
Two or More Races	0.764 (0.138)	0.734 (0.111)	0.788 (0.145)
N=23	19	16	12
White/European American	0.792 (0.142)	0.778 (0.156)	0.795 (0.159)
N=361	317	298	261

Students with Disabilities

	Self-Determination (SDI:SR)		
	Fall M (SD)	Winter M (SD)	Spring M (SD)
African American/Black	0.831 (0.125)	0.785 (0.151)	0.809 (0.171)
N=96	69	62	56
Native American or Alaska Native	0.851 (.)	0.796 (.)	0.956 (.)
N=1	1	1	1
Asian American	0.809 (0.181)	0.809 (0.203)	0.765 (0.304)
N=4	4	4	2
Hispanic/Latinx	0.811 (0.106)	0.81 (0.104)	0.736 (0.198)
N=13	12	9	5
Two or More Races	0.722 (0.117)	0.814 (0.087)	0.807 (0.101)
N=8	6	6	5
White/European American	0.761 (0.189)	0.758 (0.167)	0.772 (0.184)
N=65	49	48	41

Note. Descriptive statistics of self-determination levels by race/ethnicity when crossed with disability status. Measurements of self-determination were repeatedly taken throughout the academic year (fall- baseline [1], winter – one semester SDLMI intervention, mid-year [2], spring – two semesters SDLMI intervention, end of year [3]).

Table 4

Results of DIC Analysis for Self-Determination Levels

	Fall (Baseline)				Winter (One Semester; Mid-Year)				Spring (Two Semesters; End of Year)			
Models	M_0	M_1	M_2	M_3	M_0	M_1	M_2	M_3	M_0	M_1	M_2	M_3
Fixed Effects												
Intercept (β_0)	1.420	1.430	1.373	1.386	1.2864	1.2967	1.2684	1.2924	1.3445	1.3466	1.3323	1.3371
Scale (ϕ)	5.831	5.932	5.899	5.959	4.9237	4.9716	4.9255	4.9856	4.5224	4.5438	4.5296	4.5637
Variances												
Identities (τ_c^2)			0.044	0.037			0.0142	0.0129			0.0203	0.0234
Schools (τ_s^2)		0.076		0.096		0.0837		0.0572		0.0529		0.0579
Fit Statistics												-1123.6
DIC (smaller is better)	-1230.5	-1239.6	-1237.2	-1242.1	-1019.1	-1034.3	-1016.4	-1031.7	-1092.8	-1083.1	-1091.7	-1083.1

Note. $M_0 = Empty\ Model$; $M_1 = School\ Effects\ Only$; $M_2 = Student\ Characteristics\ Effects\ Only$; $M_3 = Full\ Model$; We applied DIC analysis separately on each measurement occasion. DIC analysis compares the relative fit of models in a set to the same data by balancing competing needs for model simplicity and predictive power. In Fall, M_3 (Full model) had the best fit, which means adding student race/ethnicity and disability status—improves overall fit at baseline. In winter, M_1 (only school predictor) had the best fit, which means that adding student race/ethnicity and disability status to the model did not substantively improve overall fit. In Spring, M_0 (empty model) had the best fit, which means even adding a school predictor to the model did not substantively improve overall fit.

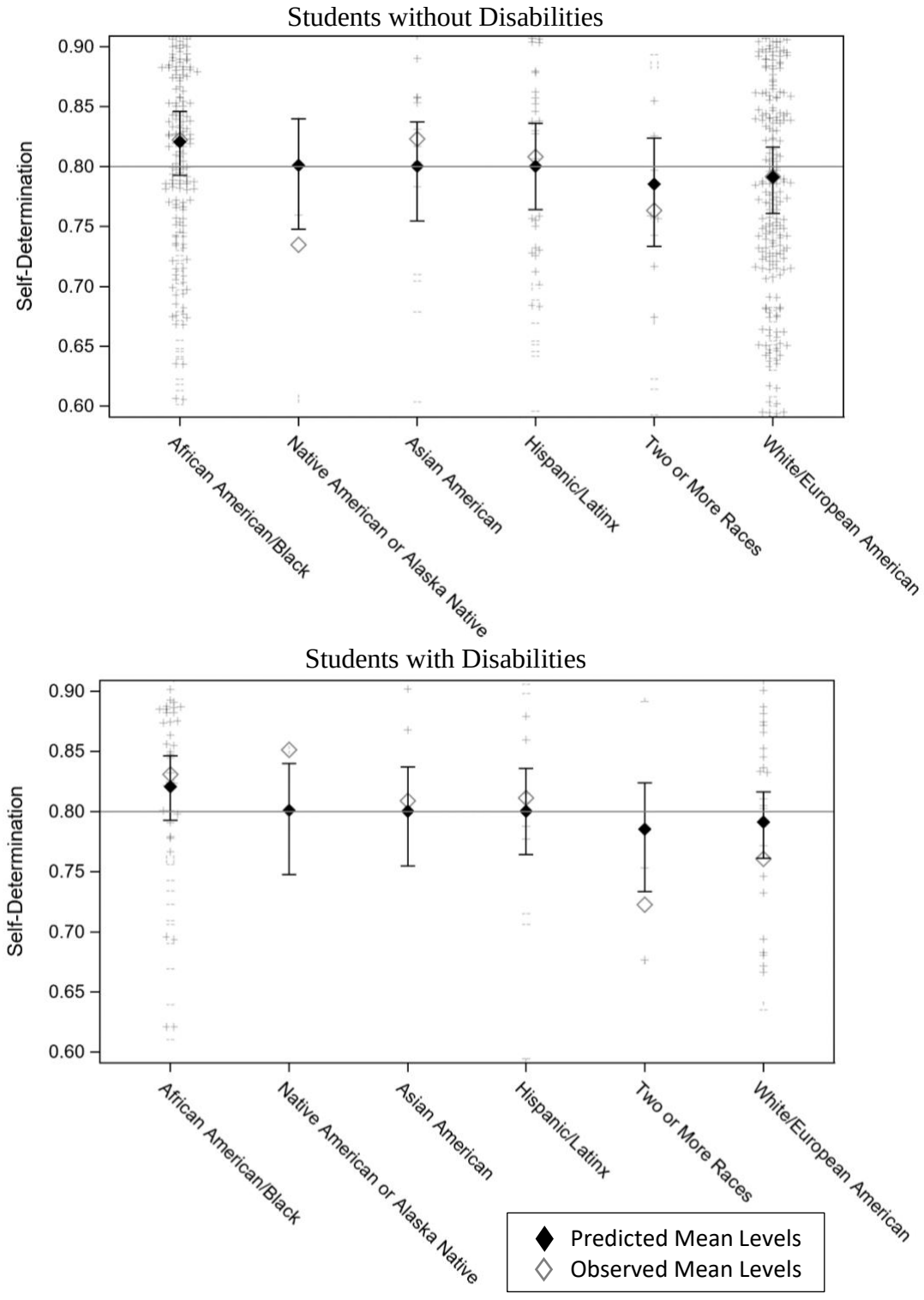

Figure 1. A caterpillar plot of model-implied group effects at baseline. Only baseline results are shown based on DIC analysis. These model-implied group effects correct for imbalanced sample sizes. The plot also shows how group effects compare to one another with respect to direction.